Success in Gateway Business Courses: What Matters and What Can We Do?

Tom Berry
Professor
Department of Finance
DePaul University
Chicago, Illinois

Lori Cook
Associate Professor
Department of Management
DePaul University
Chicago, Illinois

Nancy Thorley Hill
Professor
School of Accounting
DePaul University
Chicago, Illinois

Kevin T. Stevens
Professor
School of Accounting
DePaul University
Chicago, Illinois

ABSTRACT

Introductory business classes, particularly those with a quantitative emphasis, can often serve as a barrier to students rather than as a gateway. This study looks at how study skills, aptitude, and external factors affect classroom performance. We examine whether, when, how, and how much students read their textbook. We also look at selected deep versus surface study skills, and aptitude (as measured by ACT scores). We find positive support for some deep study skills and negative support for surface learning techniques. Our strongest result is the negative impact of hours spent working. With educational costs increasing it is difficult for many students not to work, but they should be advised of the potential consequences.

INTRODUCTION

Educators have recognized that introductory courses can act as either gateways or as barriers to students pursuing degrees in a given area of study. For example, Twigg (2005) states that comprehensive universities have failure and withdrawal rates in introductory courses ranging from 22 percent to 45 percent. In particular, introductory courses with topics related to mathematics seem to cause students a great deal of difficulty and may prevent students from majoring in fields for which those courses are a prerequisite. In our experience as teachers of introductory business courses, students in colleges of business struggle with both the introduction to finance and the introduction to operations management classes given the relatively high level of quantitative topics in those courses.

The question of interest is whether we as professors can help otherwise capable students succeed in the introductory courses. This is a topic that has received a great deal of attention outside of colleges of business but to a lesser extent in disciplines such as finance or operations manage-

ment. Results on whether instructors can influence students' study habits and whether and which "deep" versus "surface" study skills matter are sometimes conflicting. The purpose of this paper is to examine the effect of several factors on student success in introductory undergraduate business courses. The study examines whether, when, how, and how much students read the textbook affect performance (final exam scores). We also consider whether the use of selected deep versus surface learning skills impacts final exam scores. We also examine the effect of working outside the classroom on student performance. Finally, we consider the relationship between standardized test scores (the ACT) and course performance. We find a negative relationship between the time spent working and final exam scores. Indeed, students who work fewer than 30 hours per week have final exam scores which are higher by 6 – 7 points, or a full letter grade. We also find a negative relationship between the use of the surface study skills of cramming for exams and the amount of time spent memorizing facts and exam performance. As found in other research discussed below, we find a positive relationship between ACT scores and final exam scores. Finally, we find that students who spend time studying for exams with classmates perform better on final exams than students who do not.

PRIOR RESEARCH

Numerous studies of undergraduate students in business, but more so in the sciences, examine the impact of "surface" versus "deep" study skills in general, and how students use (or do not use) textbooks to study in particular. Examples of surface study skills or strategies include using flashcards, not reading the textbook at all, or only to cram for exams. Examples of deep study skills include reading/annotating material before lectures, testing oneself before exams, and forming study groups. Finally, several studies consider the effect of effort as measured by the number of hours spent studying/working and ability as measured by ACT/SAT scores on performance.

Effectiveness of Deep vs. Surface study skills

One of the leading works of the benefits of teaching towards encouraging students to use deep study skills is the oft-cited study by Biggs (1999). In essence, he suggests that the highest level of learning occurs when teaching results in student-learning focused activities. Another useful study is the meta-analysis of the relationship between psychological study skill factors (PSFs) and college success by Robbin et al (2004). They demonstrate that PSFs explain more of success (as measured by effect on GPA and on retention rates) than socioeconomic status, standardized test scores, or high school GPA.

Perhaps the shallowest of surface study skills is to choose not to read the assigned textbook at all. It will not come as a surprise to experienced instructors that students in general do not spend much time reading their textbooks. Clump et al (2004) find that on average about 27% of psychology students read the assigned textbooks before class. Indeed, about 80% of introductory psychology students reported not reading the book at all in introductory classes (Sikorski et al 2002). Phillips and Philips (2007) report that accounting students read only 17 percent of the textbook chapters before the day of class. They also note that students who scored in the top quartile of performance in their introductory accounting classes were more likely to read the material *before* class; in contrast, students who performed in the bottom quartile were more likely to read the material *after* the lecture.

Elias (2005) reports the use of deep studying skills has a significant positive correlation with expected course grade and prior GPA in a study of accounting courses. Holsuch (2000) reports similar results in the natural sciences: high performing students used deeper learning strategies while low and average students relied on memorization. Phillips (2001) finds that GPA is positively related to complex study beliefs (e.g., students who believe that knowledge is complex will adopt study strategies that seek to consolidate knowledge from a variety of sources rather than simply relying on memorization of facts in textbook or from lecture). The evidence of the effect of pedagogical supplements such as study guides on student performance is mixed. Dickson et al (2005) report that students who were required to complete the study guide performed significantly better on exams than students who did not. Yet, Gurung (2004 and 2003) finds no such positive correlation between pedagogical aids and performance.

Effort and Performance

Nonis et al (2006) report that neither time spent studying nor time spent at work by undergraduate business students is significantly related to academic performance, but they report that ACT scores are. Okpala et al (2000) find that the amount of time spent studying in an undergraduate economics class was not related to performance while GPA was. Further, SAT scores were positively related to performance but only for the above-average students. In contrast, Stinebrickner and Stinebrickner's (2007) report that a one-hour increase in daily study time had the same positive effect on student grades as a five percent increase in ACT scores. Dundes and Marx (2006) also found that students who worked 10 to 19 hours per week were more likely to have higher GPAs than students who work fewer than 10 hours or more than 20 hours per week.

THE STUDY

As noted above, the evidence is mixed on the effect of pedagogical supplements, time spent studying or at work, and standardized test scores on test performance. Several studies find that students who use deep learning strategies outperform students who do not. We designed our study to add to the research on those points. We used a survey, test results, and demographic data from 267 undergraduate students taking introductory operations management and finance classes. To control for teaching ability, we collected data from classes taught by three different professors of varying ranks and experience. We designed our survey following the work done by Clump et al (2004), Biggs et al (2001), Phillips and Phillips, Murden and Gillespie (1997), Sikorski et al (2002). The survey asked the students a series of questions on when and how often students read the textbook. We also examine the effect of four surface study skills on final exam performance: (1) looking at PowerPoint presentations, (2) using the study guide, (3) reading to memorize information/facts, and (4) "cramming" for exams. We also consider the impact of six deep study skills on final exam scores: (1) changing study habits if performed poorly on the midterm, (2) studying/explaining exhibits, charts, diagrams in the textbook, (3) taking notes while reading the textbook, (4) underlining/highlighting the textbook, (5) devising likely exam questions to test oneself, and (6) studying with classmates.

Survey Results

Table 1 below presents data on when students reported reading the required textbook. Table 1a reports the time spent reading per week versus how much time students thought we professors expected them to read. Perhaps not surprising, only 12% of students report that they frequently read the textbook before class and only 20% report that they frequently read after the lecture. The results indicate that it is only when confronted with exams that a majority of students report that they read the textbook frequently. Further, it may be sobering to notice from Table 1a that approximately half the students reported spending fewer than one hour per week reading the required textbook even though only 5% of students thought that the professor expected that low a level of reading. Also, only slightly more than a third read the book between one and three hours per week even though more than half the student respondents believed that the teacher expected that level of time commitment.

Table 1
When do you read?

When	Frequently or Always
Before attending class	12%
After material is covered in class	20%
When doing homework	46%
When studying for exams	54%

Table 1a
Time spent reading

Reading Time per Week	Spent by Students	Students Perceptions of Professor Expectations
< 1 hour	49%	5%
1 – 3 hours	36%	58%
> 3 hours	5%	26%
Do not read	10%	-----
Unsure about professor expectations		11%

We then asked a series of questions gauging the students' use of deep versus surface study skills. We used a five-point Likert scale ranging from 5,

"always", to 1, "never/rarely." Table 2 reports the results grouped by our understanding of 'deep' versus 'surface' study skills. In general, students were more likely to use surface study skills than to use deep learning skills. It may be especially surprising to see the low means for studying with classmates or self-testing indicating that fewer students engage in these study habits.

Table 2
Surface vs. Deep Study Skills
(Mean responses*)

	When studying	When Preparing for exams
Surface		
Look at PowerPoint Presentations	4.01	4.14
Use study guide	2.48	3.70
Memorize information/ facts	2.01	3.31
Cram for exams		3.24
Deep		
Change study habits		3.67
Study/explain exhibits, charts, diagrams	2.61	2.99
Take notes	2.53	
Underline/highlight	2.47	
Test myself/make up exam questions	2.43	2.33
Study with classmates		2.35

*Means based on a 5-point scale.
5=Always to 1=Never

Table 3 reports the demographic data. It may be disconcerting to see that these students are largely in school full-time (86% are taking three or more classes per quarter), but more than half the students work at least 20 hours a week, and one in ten works full-time.

With the results from the survey, and with final exam scores from a standard exam across all sections (after identifying which scores came from sections in which we intervened to promote the use of deep study skills), we performed a stepwise regression analysis to identify the model variables that best explain the dependent variable, i.e., the final exam score. We further used the Akaike Information Criteria (AIC) to confirm the goodness of fit (Bozdogan, 2000; Beal, 2005). The table below indicates that three variables are significantly ($p \leq 0.05$) related to final exam score and two additional variables are significant at $p < 0.10$.

Table 3
Demographic Information
(n = 267)

Gender	
Male	53%
Female	46%
Level in School	
Sophomore	5%
Junior	30%
Senior	65%
# Classes Enrolled in this Quarter	
1	7%
2	7%
3	8%
4	53%
5	24%
6	1%
Hours Worked Outside of School	
0 hrs	12%
< 10 hrs	13%
10 – 19 hrs	21%
20 - 29 hrs	31%
30 - 39 hrs	13%
40 or more hrs	10%

RESULTS AND DISCUSSION

The regression results found no statistically significant relationship on final exam performance between either the number of hours spent reading, whether students read before or after the lecture, while doing homework, or before the exams. Of the four surface study skills considered, we find two significant negative relationships. Students who reported that they always or frequently crammed before exams had lower final exam scores ($p = 0.055$) than other students. Similarly, students who reported that they always or frequently read over and over to memorize facts performed worse on the final exam than students who did not ($p = 0.091$). Of

Table 4
Regression Results
(F-value 15.85, Pr < 0.001)
Dependent Variable = Final Exam Score

	Parameter Estimate	P value
Intercept	57.57	<0.001
ACT score	1.44	<0.001
# hrs worked per week	-1.55	0.002
Student always...never memorizes facts for an exam	-1.09	0.055
Student always...never studies for exams with classmates	0.97	0.089
Student always...never "crams" for exams	-0.97	0.091
R-Sq = 0.31		
The order above notes the order in which the independent variables entered the model.		

the six deep study skills examined, only one had a significant relationship with final exam score: studying with classmates was positively related to exam performance ($p = 0.089$).

As in most prior studies, self-reported ACT scores were significantly related to final exam performance ($p<.001$). In contrast to the results reported in some prior studies, the amount of time spent working was significantly ($p = 0.002$) and negatively related to final exam performance and more than offset the positive impact of ACT scores (see Table 5). In fact, the difference in test scores would represent in our grading scale a full letter grade change, e.g., a score of 93 or better corresponds to an "A" while a grade of 86 corresponds to a "B". Perhaps it is commonsense, but those of us who teach in urban schools with large percentages of commuting students will appreciate that students perhaps tired from work or studying while commuting to or on their jobs are less engaged in class and, while striving to keep up with their peers, do worse. We surmise that is not because they care less, but because they have less time to concentrate on school. It also seems likely that students working essentially full-time will be less able to spend time studying with classmates and be more likely to cram for exams.

Table 5

Hours worked	Final Exam Mean Score
0-29	81.7*
30 plus	74.9
*Significantly different at p≤0.05	

We argue that it is important for educators to communicate the negative effect of an inordinate amount of time working may have on their learning goals. For many of our students, deciding whether or not to work more hours than may seem advisable may not be an easy choice; however, students must be made aware that the short-term benefits of working extra hours may be more than offset by the loss of other long-term opportunities.

REFERENCES

Beal, D. J. 2005. SAS Code to Select the Best Multiple Linear Regression Model for Multivariate Data Using Information Criteria. http://analytics.ncsu.edu/sesug/2005/SA01_05.PDF

Biggs, J. 1999. What the student does: Teaching for enhanced learning. *Higher Education Research & Development* 18, #1, 57 – 75.

Biggs, J., Kember, D. and Leung, D.Y.P. 2001. The revised two-factor Study Process Questionnaire: R-SPQ-2F. *British Journal of Educational Psychology* 71:133-149.

Bozdogun H. 2000. Akaike's Information Criterion and Recent Developments in Informational Complexity. *Journal of Mathematical Psychology,* 44, 62-91.

Clump, M., H. Bauer, and Bradley, C. 2004. The extent to which psychology students read textbooks: A multiple class analysis of reading across the psychology curriculum. *Journal of Instructional Psychology* 31, #3, 227 – 232.

Dana, S.W., Brown, F.W., and Dodd, N.G. 2001. Student perception of teaching effectiveness: a preliminary study of the effects of professors' transformational and contingent reward leadership behaviors. *Journal of the Academy of Business Education*, 55 – 71.

Dickson, K.L., Miller, M.D. and Devoley, M.S. 2005. Effect of textbook study guides on student performance in introductory psychology. *Teaching of Psychology* 32, #1, 34 – 39.

Dundes, L, and Marx, J. 2006. Balancing work and academics in college: Why do students working 10 to 19 hours per week excel? *Journal of College Student Retention,* 8 (1), 107-120.

Elias, R.Z. 2005. Students' approaches to study in introductory accounting courses. J*ournal of Education for Business* 80, #4, 194 – 199.

Gurung, R.A.R. 2004. Pedagogical aids: Learning enhancers or dangerous detours? *Teaching of Psychology* 31, #3, 164 – 166.

Gurung, R.A.R. 2003. Pedagogical aids and student performance. *Teaching of Psychology* 30, # 2, 92 – 95.

Holschuh, J. 2000. Do as I say, not as I do: High, average and low performing students strategy use in biology. *Journal of College Reading and Learning* 31(1):94-108.

Murden, T. and C.S. Gillespie. 1997. The role of textbooks and reading in content area classrooms: What are teachers and students saying? In W. M. Linek & E. G. Sturtevant (Eds.), *Exploring Literacy* (pp. 87-96). Pittsburg, KS: College Reading Association.

Nonis, S.A. and Hudson, G.I. 2006. Academic performance of college students: influence of time spent studying and working. *Journal of Education for Business*, 151 – 159.

Okpala, A.O., Okpala, C.O. and Ellis, R. 2000. Academic efforts and study habits amongst students in a principles of macroeconomics course. *Journal of Education for Business*, 219 – 224.

Phillips, B.J. and Phillips, F. 2007. Sink or skim: textbook reading behaviors of introductory accounting students. *Issues in Accounting Education* 22, #1, 21 – 44.

Phillips, F. 2001. A research note on accounting students' epistemological beliefs, study strategies, and unstructured problem-solving performance. *Issues in Accounting Education* 16, #1, 21 – 39.

Robins, S. B., Lauver, K. Le, H. Davis, D. Lang, and R. Carlstrom, A. 2004. Do psychological and study skill factors predict college outcomes? A meta-analysis. *Psychological Bulletin* 130, #2, 261 – 288.

Sappington, J., Kinsey, K. Munsayac, K. 2002. Two studies of reading compliance among college students. *Teaching of Psychology* 29, #4, 272 – 274.

Sikorski, J.E., Rich, K. Saville, B.K. Buskist, W. Drogan, O. and Davis, S. 2002. Student use of introductory texts: Comparative survey findings from two universities. *Teaching of Psychology* 29, #4, 312 – 313.

Stinebrickner T. and R. Stinebrickner. 2007. The causal effect of studying on academic performance. *NBER Working Paper Series* 13341, 1 – 42.

Twigg, C. 2005. Increasing success of underserved students: Redesigning introductory courses, National Center for Academic Transformation, Saratoga Springs, NY, 2005.