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Online Assessment - The Value of a Friend's Assistance

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Abstract

The availability of online computerized assessments is increasing, especially for economics principles courses. A severe limitation of online assessments is the possibility of cheating. Scant information is available on student preferences, behavior, and learning that is accomplished when online assessments are completed either independently or in team settings.

This study investigates the performance of students in a macro-economics principles course that recently adopted online assessment with an "open book, open friend" policy. Several strategies were developed that encouraged students to learn the material independently. Data were collected throughout the semester to quantify the number of students who actually did have a friend assist them during assessment and whether or not the presence of a friend improved assessment results.

Results of the analysis show that most students complete online assessments independently, even when assistance from a friend is permitted. Over half of the class did not rely on a friend and the remaining students utilized a friend's help only periodically. Use of a friend's help steadily declined over the semester. Moreover, students routinely consulted the same friend as opposed to seeking assistance from a wide variety of people. Only limited assistance was obtained from friends who were not enrolled in the class. The overall impact of a friend's assistance on student performance was marginally positive but statistically insignificant.

Key Words: assessment, plagiarism, cheating, online, teams

Online Assessment - The Value of a Friend's Assistance

Cole R. Gustafson*

The goal of this paper is to broaden the University community's knowledge and understanding of online assessment methods as a means of accommodating increasingly diverse learning and life styles of undergraduate students enrolled in large enrollment economics principles courses. This study investigates the performance of students in a macro-economics principles course that recently adopted online assessment with an "open book, open friend" policy. Several strategies were developed that encouraged students to learn the material independently. Data were collected throughout the semester to quantify the number of students who actually did have a friend assist them during assessment and whether or not the presence of a friend improved assessment results.

Merits of Online Assessment

Faculty have long recognized that students have different biological clocks (e.g. morning people v. nightowls), interpersonal skills (loners v. team members), learning styles, and study habits that impact learning (Graham, et. al.). These differences are most evident in large enrollment principles courses where majors and non-majors from across campus collectively engage a subject. Most faculty enjoy teaching, but are reluctant to teach large enrollment principles courses because of the perceived frustration in meeting these diverse needs of students, let alone being overwhelmed by the shear volume of testing and paper grading. Becker and Watts found that most economics principles courses still rely on lecture presentations, visual illustrations, and multiple-choice in-class assessments.

Availability of online computerized assessments is increasing and economics principles instructors are starting to consider adoption (Vachris). Most economics principles textbooks now offer computerized assessment packages as part of their instructor materials. Online assessment methods accommodate the diverse needs of students by permitting them to balance workloads, take tests when they have the most energy, test in physical/emotional environments most conducive to learning, and receive instantaneous feedback if they possess that learning style preference. Online computerized assessments offer instructors numerous advantages as well, once initial network and development problems are overcome. Moreover, precious classroom time is increased if assessment occurs outside normal classroom hours.

A severe limitation of online computerized assessments is the possibility of cheating. Most colleges have an honor policy or code. Strategies to minimize plagiarism in online assessment include the use of passwords, "mastery" and "integration" questions, random questions to different students, and proctors at designated sites (Illinois Online Network), although the latter defeats many of the conveniences associated with online assessment. Proctoring online

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assessments is particularly difficult in large enrollment courses because room seating in computer clusters is typically insufficient.

An alternative, but more controversial, approach is to assume students will receive outside assistance despite instructor efforts to limit plagiarism and incorporate it into the assessment method by use of team responses, etc. The amount of independent learning on the part of each team member in this situation is unknown, however. Anecdotal evidence suggests that one team member often provides most of the responses and others participate as free-riders.

A review of literature suggests little is known about whether students prefer to complete online assessments individually or in team settings. Moreover, even less is know about actual student behavior and degree of learning accomplished when presented with that choice. To further understanding in this important area, a novel experiment was devised and data collected over a complete semester from an economics principles class that recently adopted computerized online assessment. The frequency of receiving a friend's assistance when completing an assessment and resultant impact on final course performance are delineated.

Methodology

In Spring 2002, one section (170 students) of AgEcon/Econ 202, Principles of Macroeconomics, adopted online computerized assessment for all regular examinations. Students were permitted to take examinations any time, any place, and utilize any external resources including publications, classmates or other friends. Ten individual examinations, each with a fixed time limit and random questions for each individual student, were administered over the semester. All examinations were taken outside normal classroom hours. A traditional (e.g. in-class, closed book, no external help) mid-term and online final were also administered in addition to the examinations. The mid-term and final assessments contained the same number of questions and time limit as online assessments.

Having students take assessments outside class increased class time for other activities. When progress was compared with other sections of the course, students in this online course devoted more time to covering additional material, to discussing existing material more thoroughly with examples, etc., to resolving online testing problems (there were several institutional impediments!), and to vacation, as two class periods were canceled due to student and instructor time conflicts.

Several strategies were devised to motivate independent learning on the part of each student when taking examinations online. First, a fixed time limit was imposed on each examination. Students were required to balance the amount of time necessary to converse with friends and evaluate friend's responses with the progress they could make completing a test independently. Second, a large number of examinations (more frequent assessment) over the course of the semester was expected to stymie collaboration due to the logistics of scheduling meeting times

with friends, etc. With busy life schedules, increased frequency of assessment makes it difficult for students to consistently arrange for a friend's presence to assist with assessment taking. Finally, each student received questions randomly selected from a test bank of 150-300 questions. Thus, it is unlikely a second friend received the same questions after assisting the first friend with their examination. This feature limited incentives for cooperation because knowledge gained on one exam is less useful when helping a friend take their examination.

At the end of each online assessment, students received extra credit if they voluntarily answered another question asking them to submit the name of the person(s) who assisted them with taking the examination. If they did not receive any assistance from a friend, they were given the opportunity of writing "nobody" and still receive the additional credit. Further, they were told that the instructor would not review or tabulate the responses until after final grades for the course were determined.

The novel feature of this study is that data on time/date of assessment taken and the presence of a friend permit statistical testing of the following questions:

How often is a friend's help used?
Does reliance on a friend increase or decrease over the semester?
Is the same friend used throughout the course?
Is the friend a class mate or other expert?
Does the presence of friend increase assessment scores?

Results

Data were obtained from 170 students who enrolled in the course. Figure 1 summarizes the number of times a student received assistance from a friend when taking an online assessment during the semester. The frequency chart shows that 95 students did not receive any assistance from a friend over the course of the semester. Only 17 students used a friend for each of the eleven assessments. The remaining students received help from a friend only periodically. The raw data show that several students experimented with receiving a friend's help and then took the remaining tests themselves. Likewise, other students appeared to seek help from a friend for all tests, but could not obtain it due to scheduling problems, etc. The skewed U-shaped pattern indicates two distinct preferences for receiving assistance for friends. Failure to accommodate either learning style could lead to lower overall student performance.

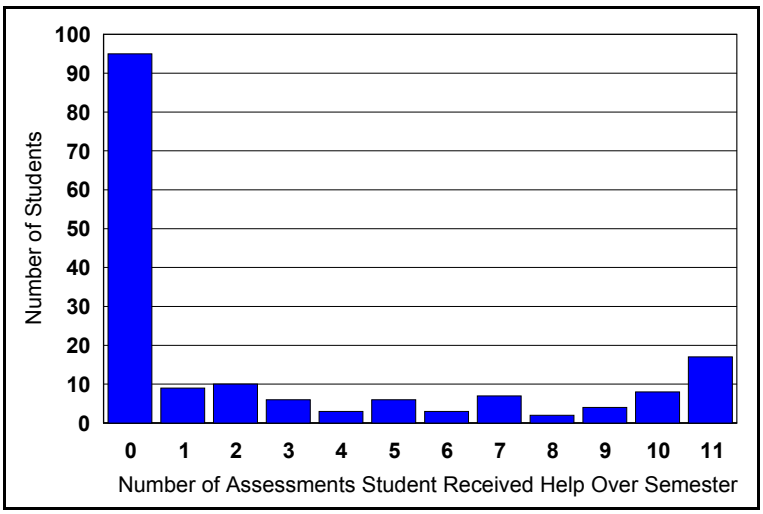

Figure 1. Frequency of Receiving Friend's Help

Prior to the start of the semester, it was expected that greater numbers of students would have routinely relied on the assistance from friends when completing examinations. However, during the first class period it became apparent that most students intended to take assessments individually as several expressed paranoia that students taking tests with friends would have a distinct advantage. Those concerns were partially alleviated by describing the disincentives the instructor put in place to discourage use of a friend's help as discussed above.

Figure 2 summarizes the frequency that students received help from a friend, by individual test. With the exception of the final, student use of a friend's help declined over the course of the semester. In the first examination 49 students indicated that they received help from a friend. By the last assessment (test 10), only 35 students received assistance. Regressing numbers of students receiving assistance (y) on test number (x) yields:

$y = 50.73 - 1.39\ x$ $\qquad\qquad$ $R^2 = .61$
$\qquad\quad (.393)$

with standard errors shown in parenthesis. The results show student use of a friend's assistance declined about 2 pupils per examination over the semester.

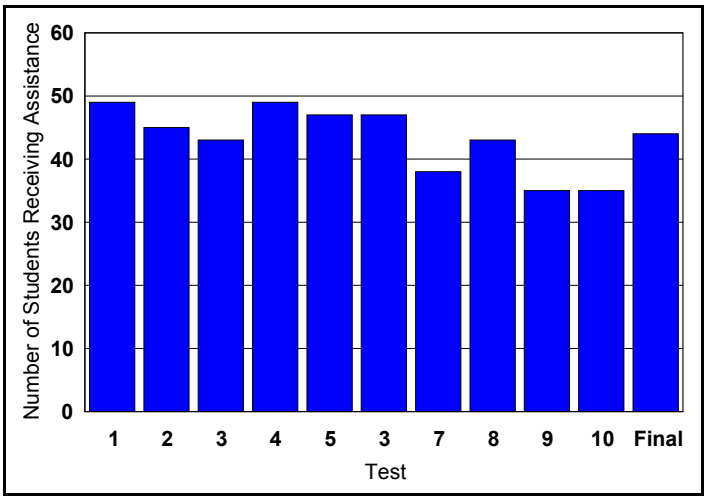

Figure 2. Frequency of Help Received, by Test

The raw data showed that students usually relied on the same friend for assistance. The number of different friends relied upon by each student who used a friend was tabulated. The average number of different friends was 1.65 with a standard deviation of .99. The distribution of different friends used is shown in Table 1. All but two students utilized three or less different friends over the semester. Student paranoia that dormitory and Greek house students have an advantage appears unwarranted.

Of the students who sought assistance from a friend, the friends were predominately classmates. Only six students sought the expertise of a friend who was not enrolled in the class. A priori, it was expected that greater use would have been made of external experts, since many freshman students taking this course live in dormitories and Greek houses where students in other sections of the course and students who have taken the course previously reside. Evidently, sufficient variation in material emphasized by instructors of each section and/or differences in class pace among sections limit the value of external assistance.

To determine the impact any assistance received from a friend may have on overall student performance, the following seemingly unrelated regression (SUR) was estimated:

$$Grade_i = a_i + b_i\ Friend_i + e_i$$

where $Grade_i$ is the student's score on examination i, a_i is the student's expected score on examination i, $Friend_i$ is a dummy variable where 0 indicates the student did not receive any assistance from a friend and 1 indicates that assistance from a friend was received on examination i, b_i is impact the a friend's assistance has on the student's grade for examination i, and e_i is the error term that is assumed to be independently and identically distributed (iid).

Table 2 summarizes the results of SUR model estimation. Overall, the results show that the presence of a friend has a slightly positive, but statistically insignificant impact on a student's examination grade. Coefficient b_i for the dummy variable $Friend_i$ indicating whether or not the student received assistance from a friend when taking examination i was only statistically significant ($p < .01$) for one examination which was the final (examination 11). The coefficient for all other equations was positive but not statistically significant at $p < .01$.

Anecdotal observations and a review of the raw data both suggest that the impact of a friend's assistance would be expected to be negligible. Students did not seek out friends who understood the material more or were better than they were at completing the examination. Instead, the raw data show students who received assistance from a friend took the test in pairs. One friend took the examination first with the other helping and then the second friend took the examination with the first friend's assistance. If both friends had equal understanding of the material, the impact of the second friend would be negligible. If one friend had better information or understanding, their assistance would lead to an increased grade for the other friend whereas the other friends assistance could lead to a lower grade for the first. Thus, on average, there is no mutual benefit. Assessment procedures with fewer disincentives for receiving a friends assistance (e.g. no time limits, non-randomized questions, etc.) could lead to greater mutual benefits.

Table 1. Distribution of Distinct Friends
Utilized by Students

Distinct Friends Utilized	Frequency
1	41
2	22
3	11
4	2

Table 2. Results of SUR Estimating Impact of Friend's Assistance on Examination Grade (t-statistics shown in parentheses).

Examination	a_i	b_i	Adj. R^2
1	17.48 (27.13)	3.14 (2.85)	.05
2	17.65 (23.45)	0.31 (0.23)	.01
3	16.45 (22.24)	2.48 (1.85)	.02
4	18.38 (31.99)	2.93 (3.01)	.06
5	14.38 (12.36)	2.38 (1.49)	.01
6	13.63 (16.21)	4.16 (2.83)	.05
7	15.99 (10.80)	1.27 (0.73)	.00
8	17.00 (7.41)	2.26 (1.32)	.01
9	14.94 (8.82)	2.46 (1.39)	.01
10	11.48 (12.71)	5.66 (3.19)	.06
11	14.13 (13.26)	6.14 (3.83)	.09

Conclusion

The availability of online computerized assessments is increasing, especially for economics principles courses. A severe limitation of online assessments is the possibility of cheating. Scant information is available on student preferences, behavior, and learning that is accomplished when online assessments are completed either independently or in team settings.

This study investigates the performance of students in a macro-economics principles course that recently adopted online assessment with an "open book, open friend" policy. Several strategies were developed that encouraged students to learn the material independently. Data were collected throughout the semester to quantify the number of students who actually did have a friend assist them during assessment and whether or not the presence of a friend improved assessment results.

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Thus, with careful curriculum design and appropriate disincentives for plagiarism, online computerized assessment methods can provide instructors with greater class time flexibility, accommodate differing student learning preferences, and minimize the advantage of team responses. Students who prefer to study independently do not need to be concerned that others completing assessments as teams have an advantage.

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