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STUDENT PERCEPTIONS AND PERFORMANCE: THE USE OF AN ONLINE TEXTBOOK WITH AN INTEGRATED WEB-BASED HOMEWORK MANAGEMENT PRODUCT

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ABSTRACT

This paper presents results of a survey of student perceptions of the use of an online text combined with a homework management product (Aplia). A majority of the students taking the undergraduate economics courses in our sample (58%) disliked using the online textbook combined with the Aplia product. On the other hand, an even greater percentage of students (64%) felt that the utilization of the online textbook combined with Aplia assignments did require that they spend more time studying economics. Using a basic regression model, we then tested to determine if the use of an online textbook combined with Aplia had any impact on student performance. The data for this analysis were obtained from four sections of introductory economics. Two classes used the online textbook combined with Aplia while the other two sections utilized a standard textbook with no online component. Controlling for factors such as the instructor, gender, race, age, and SAT scores of the students, we found that the use of the online textbook combined with Aplia resulted in a negative (but insignificant) impact on student performance. Significant factors impacting student performance include past GPA, age, and the verbal SAT score. It is our view, that as faculty more effectively integrate online materials into courses and students become more comfortable utilizing online materials, student perceptions and performance will both be positively impacted.

I. INTRODUCTION

The increasing cost of textbooks has become a concern for college students, professors, and legislators in recent years. Legislators in Georgia proposed three bills in the 2004 session that, if passed, would have restricted the profit margin on campus bookstores and would have limited the ability of faculty to change textbooks (Task Force on Textbook Pricing, 2004). A report by the Government Accountability Office (2005) found that the prices of college textbooks have been increasing at twice the rate of inflation over the past two decades. Between December 1996 and December 2004, the price of textbooks nearly tripled. The report cited the cost of developing

instructional supplements such as CD-ROMs as the main reason for this rapid price increase. The surge in textbook prices has led to increasing pressure on instructors and college textbook publishers to find ways to keep the cost of textbook for their courses down. Various alternatives include textbook rental systems, stripped-down versions of books, and online versions of textbooks (Carbaugh and Ghosh, 2005 and Kang, 2004).

The cost problem mentioned above coupled with an increase in average class size, led instructors at the University of West Georgia (UWG) to adopt Aplia, a web-based economics package developed by Stanford Economist Paul Romer that allows for students to complete interactive problem sets, news analyses, experiments, and tutorials. Information on Aplia can be found at the website: Aplia.com. In 2004, Aplia teamed up with educational publishers including Thomson Learning to provide a digital edition of the major economics textbooks in a package with Aplia¹. Thus far, little research has been conducted on the effectiveness of the use of Aplia. One study (Pozo and Stull, 2006) did find that assigning an Aplia's math skills unit did positively impact student performance in principles of macroeconomics courses. However, these researchers did not consider the impact of utilizing the entire Aplia package (economics problems sets, news analyses, etc.) on student performance.

During Fall 2005, the cost of the integrated package was \$60, significantly less than the cost of a new paperback version of the textbook without access to Aplia. UWG students were required to subscribe to the online textbook product since a significant portion of their grade was determined by how well they answered the online homework assignments. Students who desired a hard copy of the textbook had the option to print out the book or to purchase a physical textbook at a discounted price. Choosing Aplia's Integrated Textbook Solution allowed the Department to stay with our preferred textbook, McEachern's Macroeconomics. The \$60 price for the Integrated Textbook Solution was less than the price students had paid for a new textbook in the past and provided them with access to the on-line learning tools associated with Aplia.

This paper presents results of a survey of students' perceptions on the use of an online textbook combined with the Aplia product from five different economics classes during the Fall 2005 semester. Four of the classes were principles of macroeconomics courses while the fifth class was an upper division economics major class titled "Macroeconomic Policy." In addition, using a regression model, we examine the impact of use of the online textbook combined with Aplia on student performance. Appendix A includes a copy of the survey instrument distributed to the students in December 2005 along with a summary of responses. Tables in Appendix B

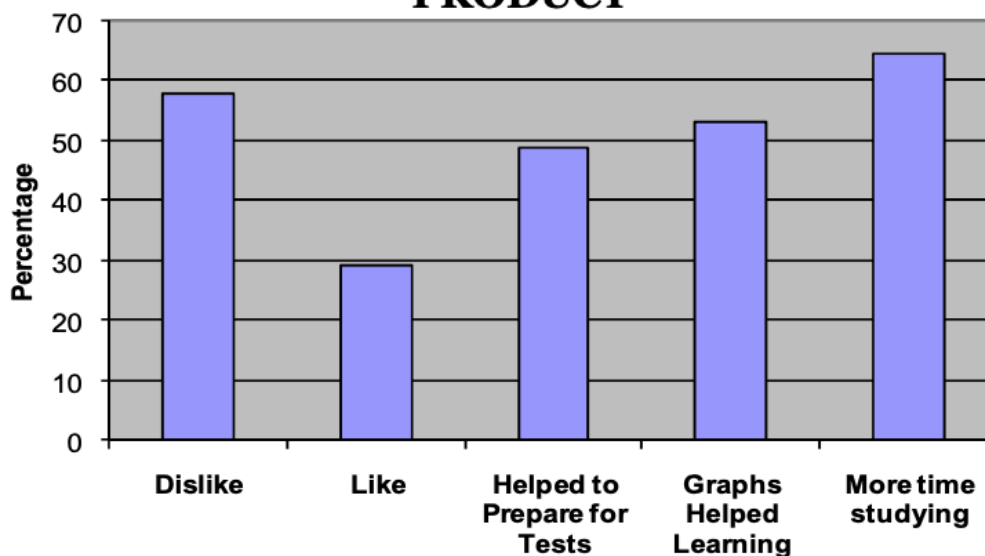
¹ In February 2007, Thomson Learning announced its intention to acquire Aplia Inc.

provide selected cross tabulation results for the survey as well as a summary of survey results for the three instructors participating in the study.

II. SURVEY RESULTS – TOTAL SAMPLE

Chart 1 below shows the broadest results of the survey. Most students disliked using the Aplia product combined with an online textbook (about 58%). Despite the fact that less than 30% of the students liked using this product, 53% felt that Aplia's graphing exercises were an effective tool to learn important concepts, and about half of them thought that it helped them get prepared for examinations. In addition, over 64% of students responded that requiring completion of Aplia assignments forced them to spend more time studying in their economics classes.

**CHART 1:
GENERAL STUDENT EVALUATION
OF ONLINE TEXTBOOK AND APLIA
PRODUCT**



As indicated in Appendix A, most students (about two-thirds) would have preferred that we assigned a physical textbook as opposed to the online textbook. If an alternative physical textbook costs \$95, slightly over one-half of the students indicated that they would prefer to buy the physical textbook as opposed to the Aplia/E-Book combination. On the other hand, if a used textbook were available at \$75, about two thirds of the students would have preferred the used textbook alternative over the

Aplia/E-Book package. The estimated elasticity of demand over this price range was 1.15, indicating a relatively elastic demand for physical textbooks.²

Responses to other questions in the survey also provided insights regarding student usage and attitudes toward the online book and supplementary materials. These are summarized in Appendix A. About 30% of the students never read the online text on a computer monitor while about the same percentage read the online textbook “frequently” or “only” online. Students could also print out the textbook chapters if desired. Just over half of the students never printed out textbook chapters while about a quarter of them printed out “most” or “all” the chapters in the book. Assignments in these courses needed to be submitted electronically on specific days by a specific time. Generally, students did not wait until the last minute to submit responses as over 90% of answers were submitted an hour or more before the deadline. After the assignment due date and time, the Aplia system allows students to review their responses and to get explanations as to why certain responses were right or wrong. Almost 16% of the students admitted that they never reviewed explanations after they submitted answers to the assignments.

Table B1 in Appendix B provides results of a cross tabulation between responses to question 1 (like/dislike of Aplia with an online textbook) and other survey responses.³ Some differences in attitudes toward the Aplia/E-Book product were observed among students based on class level. Juniors had the lowest acceptance level of the Aplia/EBook combination (23%) while sophomores had the highest at 36%. Focusing on negative attitudes, seniors expressed the strongest dislike (70%) while just over 50% of sophomores either “moderately disliked” or “strongly disliked” being assigned the Aplia/E-Book package.

Other cross tabulation results are summarized in Chart 2 below.⁴ A pattern of responses is obvious: most students who liked the Aplia/E-Book product also thought that it was helpful for test preparation and learning economics. However, among students who disliked the online package, an overwhelming majority (almost 90%) would have preferred a physical textbook instead. On the other hand, only 31% of the students who liked accessing the book and Aplia online would have preferred a physical textbook.

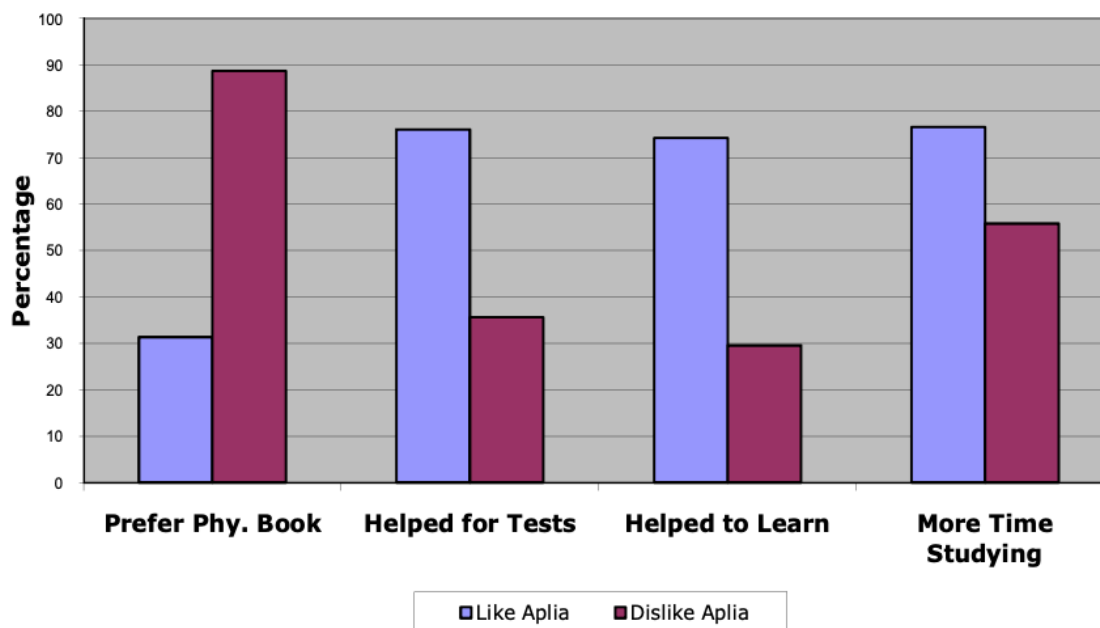
² $\epsilon = [(151-115)/(115+151)]/[(75-95)/(75+95)] = -1.15$

³ The totals differ for the cross tabulations because some students did not answer all the questions. Only students who answered both the relevant questions are included in the cross-tabulation results.

⁴ The mean values of “Like Aplia” and “Dislike Aplia” for each of the categories displayed in Chart 2 are significantly different at a 99% confidence level.

Only a small percentage of students who disliked the Aplia/E-Book product felt it

**CHART 2:
PREFERENCES ACROSS STUDENTS**

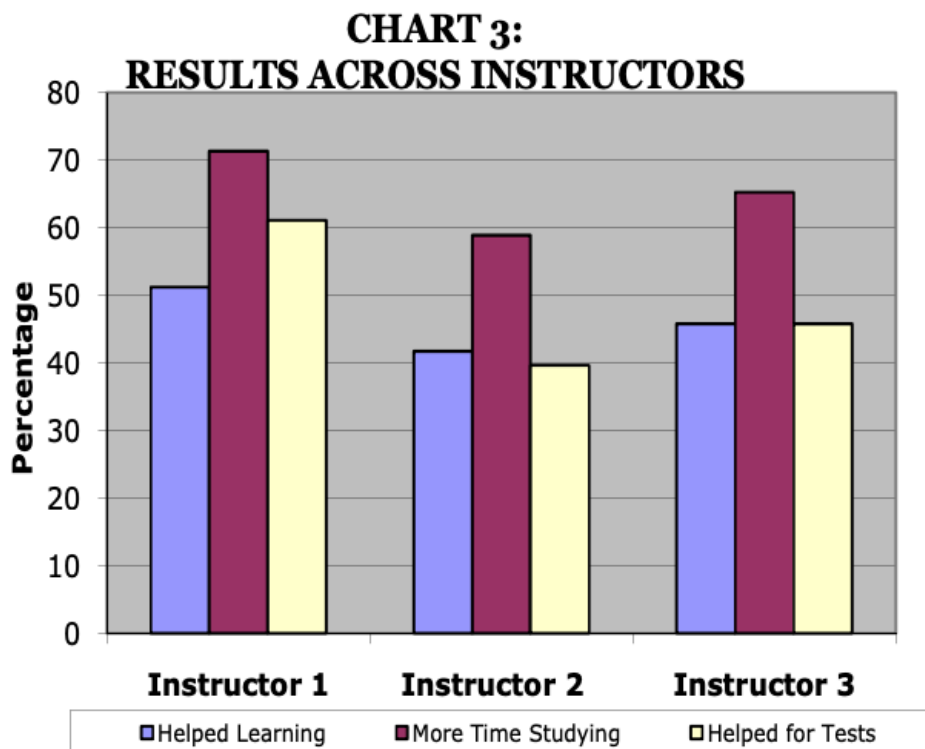


helped them prepare for tests (35.6%) or learn economics (29.5%). On the other hand, a higher percentage of students who liked using the Aplia/E-Book product felt that this resource helped them prepare for tests (76.1%) or learn economics (74.3%). A majority of both groups of students indicated that the use of Aplia/E-Book package did require that they spend more time studying economics.

III. SURVEY RESULTS – INSTRUCTOR DETAILS

Three instructors utilized the Aplia/E-Book product during the Fall 2005 term. Table 2 in Appendix B summarizes student responses for four of the survey questions for these instructors. Chart 3 below highlights some of these findings also. One of the sections, taught by Instructor 3, was an upper division course titled “Macroeconomic Policy.” The other participating instructors (Instructor 1 and Instructor 2) taught two sections of principles of macroeconomics each. The pattern of responses across instructors seems to be the same: the highest percentage of students think that the Aplia/E-Book combination made them study more. Another observation is that Instructor 1 obtained the highest percentages in every response while Instructor 2 received the lowest. Such results are not surprising since the instructors weighed differently the importance of Aplia assignments in their lectures and tests. Instructor 1

did add some Aplia-based questions to the in-class examinations while Instructor 2 made little effort to integrate the online example problems into class discussions or examinations.



IV. IMPACT OF THE APLIA/E-BOOK PACKAGE ON STUDENT PERFORMANCE

In order to examine the impact that adopting the Aplia/E-book package had on student performance, we looked at the performance of students in four sections of principles of macroeconomics. Two of the classes were in the Fall of 2004 before the Aplia/E-book was adopted and two of the sections were in the Fall of 2005 after the Aplia/E-book was adopted. Both courses used the textbook *Macroeconomics: A Contemporary Introduction* by William A. McEachern.⁵ The Fall 2004 course required a hard copy of the textbook while the Fall 2005 course required the Aplia/E-book package. All of the sections were Tuesday/Thursday classes and were taught by the same instructor. Although the tests were not identical for the two semesters, the format of the tests was the same and questions were drawn from the same test bank.

⁵ The text did come out with a new edition between the courses. However, the revisions were minor and did not alter the material covered in the class.

Our data set consisted of 176 students.⁶ For each student, we had data on his or her test grades in the course, the section he or she was enrolled in, and selected demographic data such as ethnicity, gender, and age. We also had data on each student's GPA and cumulative hours earned at the start of the semester. For a selected number of students, we also had information on SAT verbal and math scores.⁷ The test score average for the classes in the Fall of 2004 before the Aplia/E-book package was adopted was 75.2. In the Fall of 2005, after the Aplia/E-book package was adopted, the average test score was 72.3. A simple t-test suggests that the average test score was higher before the Aplia/E-book package was adopted. The test statistic was 1.83, which is significant at the 5% level in a one tailed test. However, this simple comparison of mean test scores does not control for possible differences in the students between the two semesters. In order to better examine the impact of the Aplia/E-book package on student test scores, we ran a regression model that allowed us to control for differences in the characteristics of the students in the two classes.

Our basic regression model (Regression Model A) looked at the relationship between the student's test grade average and their textbook package controlling for demographic characteristics, time of day the class met, cumulative hours earned and GPA at the start of the semester as shown below:

$$\text{Testavg} = \text{fn}(\text{Aplia/E-book}, \text{AM}, \text{White}, \text{Male}, \text{Age}, \text{Cumhr}, \text{GPA})$$

GPA was included as a proxy for academic ability as suggested by Grove, et.al (2006). Age and cumulative hours were included following Austin and Gustafson (2006) to account for student maturity and time spent in college, respectively.⁸ This model was run for the full data set of 176 students. The variable definitions and descriptive statistics for the data used in this model are contained in Table 1.

A second regression model (Regression Model B) was run for the sub-sample of 153 students for whom we had SAT data. This model was identical to Regression Model A except that it also includes SAT verbal and math scores as regressors:

$$\text{Testavg} = \text{fn}(\text{Aplia/E-book}, \text{AM}, \text{White}, \text{Male}, \text{Age}, \text{Cumhr}, \text{GPA}, \text{SATV}, \text{SATM})$$

⁶ We had to drop nine students from the data set because they were first semester freshman and they did not have a college GPA at the start of the semester. We also dropped students from the sample who did not take all four tests.

⁷ The University of West Georgia does not require all students to take the SAT. For instance, we would not have SAT scores for student who took only the ACT and for transient, transfer, or non-traditional students who did not take the SAT.

⁸ Age is calculated as age at the end of the semester (the end of December).

SAT scores were included to provide another proxy for academic ability (Grove, et. al., 2006). The variable definitions and descriptive statistics for the data used in this model are also contained in Table 1.

TABLE 1
VARIABLE DEFINITIONS AND DESCRIPTIVE STATISTICS

Variable Name	Definition	Full Data Set (n=176)		Students with SAT Scores (n=153)	
		Mean	Standard Deviation	Mean	Standard Deviation
Testavg	Average of the four test grades	73.76	10.60	74.04	10.62
Aplia/E-Book	Dummy variable = 1 if student used the Aplia/E-Book package	0.49	0.50	0.50	0.50
AM	Dummy Variable = 1 if Class Started before noon	0.48	0.50	0.49	0.50
White	Dummy Variable = 1 if student is white	0.72	0.45	0.72	0.45
Male	Dummy Variable = 1 if student is Male	0.53	0.50	0.55	0.50
Age	Age at the end of the semester	20.80	3.37	20.33	1.72
Cumhr	Cumulative hours earned at the start of the semester	42.32	19.65	42.12	20.15
GPA	GPA at the start of the semester	2.74	0.52	2.76	0.53
SATV	SAT-verbal score			512.22	63.09
SATM	SAT-math score			513.20	71.05

The results for the two regression models are presented in Table 2. The results for both models suggest that controlling for demographics and various aspects of past student achievement, the use of the Aplia/E-book package appears to have had a negative but insignificant impact on student performance. This suggests that the use of the Aplia/E-book package did not improve student performance on tests. In both model's past GPA had a positive and significant impact on the student's test average, indicating that students who had performed better in other classes also tended to get better test grades in principles of macroeconomics. The coefficient on age was also positive and significant, suggesting that older students tended to perform better on tests. The rest of the variables did not have a significant impact on student performance. In model B where SAT scores were included as independent variables, the score on the verbal section had a positive and significant impact on a student's test average while the score on the math section did not have a significant impact on performance. We tested for collinearity between SAT scores and GPA by running a

regression of GPA on a constant term, verbal SAT scores and math SAT scores. The r-squared in this regression was 0.19, which was not high enough to be problematic.

TABLE 2
REGRESSION RESULTS – DEPENDENT VARIABLE TESTAVG

Heteroskedasticity-Consistent Standard Errors Are In Parentheses

Variable	Model A	Model B
Constant	28.54 (6.83) ***	0.47 (12.12)
Aplia/E-Book	-1.88 (1.36)	-1.92 (1.39)
AM	-1.05 (1.38)	-0.08 (1.41)
White	0.45 (1.48)	0.36 (1.52)
Male	1.51 (1.26)	0.54 (1.45)
Age	0.45 (0.25) *	0.95** (0.47)
Cumhr	0.02 (0.03)	-0.008 (0.04)
GPA	12.89 (1.18) ***	11.37 (1.43) ***
SATV		0.03 (0.01) ***
SATM		0.01 (0.01)
R ²	0.41	0.48
N	176	153

*** Significant at the 1% level

** Significant at the 5% level

* Significant at the 10% level

V. CONCLUSION AND TEACHING IMPLICATIONS

The results of this survey provide insights on how students use and feel about the Aplia/E-book combination and suggest how faculty could more effectively integrate online materials in their courses. One interesting finding is that although many of the students felt that the Aplia/E-Book product helped them learn economic concepts, they still had a negative perception of this online resource. If the online textbook/Aplia product helps students learn economics, then instructors have an incentive to use the package despite its low student approval.

On the other hand, the empirical results suggest that the switch to the Aplia/Ebook package did not result in improved student performance. Although our survey indicates that students believe they are spending more time studying and that the Aplia assignments help them learn economics, this “effort” does not appear to be resulting in higher test scores. The coefficient on the Aplia/E-Book dummy variable was negative (but insignificant). This lack of improvement in student performance could be a result of many factors. Our survey does indicate that many students are not

reading the text online nor are they printing out the chapters to read offline. If students are less likely to read the chapters in E-book format than they were to read them out of a physical textbook, this could be a possible explanation of why the switch to the Aplia/E-Book package does not appear to have improved student performance.

Another challenge is to change student attitudes about the Aplia/E-Book package. It was clear from our survey that our students did not like using an E-book. Since our students did not like to read the book on-line, many of them were not reading it at all. Our results suggest that students in particular did not like being forced to subscribe to the Aplia/E-Book package. This is similar to the results found in other surveys on the topic such as Carlson (2005). Despite the lower cost, Carlson found that a number of obstacles stood in the way of student acceptance of online textbooks. These include the need to read the textbook on a computer screen, limitations on the ability to share an online textbook with fellow students, and the inability to resell an online textbook back to the bookstore at the end of the term.

One change instructor using E-books might consider is to put more emphasis on the importance of reading the textbook and on the ability to print out chapters if students want a hardcopy. More emphasis can also be placed on the option of buying a hardcopy. Students need to understand that if they do not like reading the book on-line, they have access to a physical textbook. Although E-books may be the wave of the future, many of today's students still seem to desire a hardcopy. Carlson suggested that a more viable model in the future may involve using an online textbook as a supplement and enhancement to paper textbooks. Another possible way to improve student attitudes toward the E-book/Aplia package is to strengthen the relationship between the Aplia assignments and the lectures and exams. Instructors can make more of an effort to use examples in class that are similar to the Aplia questions. Students may find Aplia less intimidating if they have examples in their notes that are closely aligned to the Aplia questions. There could also be a stronger link between Aplia questions and test questions. If students can see a clear relationship between the Aplia assignments and success in the class, they might develop a more positive attitude toward the product.

It was interesting that very few of our students complained about not having access to the internet or lacking the technical skills needed to use the package. Earlier studies have raised concerns that limited student access and inadequate IT skills may hinder the acceptance or effectiveness of E-books and electronic learning (Pascopella, 2002 and Gupta, White and Walmsley, 2004). This may still be a concern below the college level, but it may not be an obstacle to E-books and electronic learning tools for college students. Most of our students indicated that they have a computer and internet access where they live, and our university, like most others, has on-campus

computer labs for students who need them. Students are also coming to college with more computer experience, which should give them a stronger set of IT skills. As a result, students can more easily learn to use computers packages such as Aplia.

The results presented in this paper are only preliminary. We plan on collecting additional student feedback on the use of the online textbook with the integrated homework management system in the future. It is our expectation that as faculty become more comfortable with this technology and in integrating the online materials in lectures, discussions and testing, both student attitudes toward online materials as well as class performance will be positively impacted.

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APPENDIX A

SURVEY OF STUDENT EXPERIENCE USING AN ONLINE TEXTBOOK AND AN INTEGRATED WEB-BASED HOMEWORK MANAGEMENT PRODUCT (APLIA) – DECEMBER 2005

Results from December 2005 Survey in Parenthesis

1. Do you like using the Online Textbook with the Integrated Web-Based Homework Management Product (Aplia) in this class?

- a) strongly dislike (34.8%)
- b) moderately dislike (23%)
- c) indifferent (13.0%)
- d) moderately like (21.7%)
- e) strongly like (7.4%)

2. Would you have preferred a physical textbook in this class instead of the Online Textbook with Aplia?

- a) yes (68.4%)
- b) no (15.2%)
- c) indifferent (16.0%)

3. One-semester access to this Aplia site with the online textbook cost \$60. If the alternative was assigning a new physical textbook which cost \$95, which would you prefer?

- a) the Aplia site used in class which cost \$60 (49.8%)
- b) a new physical textbook which cost \$95 (50.2%)

4. One-semester access to this Aplia site with the online textbook cost \$60. If the alternative was assigning a used physical textbook which cost \$75, which would you prefer?

- a) the Aplia site used in class which cost \$60 (33.8%)

b) a used physical textbook which cost \$75 (66.2%) 5. Do you normally buy the textbook assigned for a class? a) never (0.9%) b) occasionally but less than ½ of the time (4.3%)

c) ½ of the time or more but not all of the time (22.5%)

5. Do you normally buy the textbook assigned for a class?

a) never (0.9%)

b) occasionally but less than ½ of the time (4.3%)

c) ½ of the time or more but not all of the time (22.5%)

d) always (71.4%)

6. Did you read the online text on a computer monitor?

a) never (30.3%)

b) occasionally but less than ½ of the time (38.1%)

c) ½ of the time or more but not all the time (20.3%)

d) only read the text online (11.3%)

7. Did you print out chapters of the book?

a) never (53.2%)

b) occasionally but less than ½ of the chapters (19.0%)

c) ½ or more but not all of the chapters (11.3%)

d) all of the chapters (16.5%)

8. The assigned problem sets you completed online helped you prepare for the examinations in class.

a) strongly disagree (13.0%)

b) moderately disagree (22.2%)

c) indifferent (16.1%) d) moderately agree (38.3%)

e) strongly agree (10.4%)

9. The graphing exercises in Aplia (ability to shift curves) helped you learn economic concepts such as supply/demand, equilibrium, etc.

a) strongly disagree (13.6%)

b) moderately disagree (15.4%)

c) indifferent (18.0%)

d) moderately agree (36.0%)

e) strongly agree (17.1%)

10. The Online Textbook with the Integrated Web-Based Homework assignments required in this class helped you learn economics.

a) strongly disagree (16.2%)

- b) moderately disagree (17%)
- c) indifferent (21.0%)
- d) moderately agree (38.4%)
- e) strongly agree (7.4%)

11. How long before the deadline did you normally complete an online assignment?

- a) within an hour of the deadline (7.9%)
- b) 1 to 4 hours before the deadline (37.3%)
- c) on the same day but more than 4 hours before the deadline (29.4%)
- d) the day before the deadline or earlier (25.4%)

12. Did you go back and read the explanations for the answers on the assignments after the due date?

- a) never (15.7%)
- b) occasionally but less than ½ of the time (36.7%)
- c) ½ of the time or more but not always (27.1%)
- d) always (20.5%)

13. Besides the graded assignments, did you also complete the practice assignments (which were not graded)?

- a) never (13.5%)
- b) occasionally but less than ½ of the time (26.6%)
- c) ½ of the time or more but not always (23.1%)
- d) always (34.9%)
- e) not applicable (1.7%)

14. How many hours per week outside of class do you normally study for each course?

- a) less than 1 hr. (13.5%)
- b) 1-3 hrs. (65.1%)
- c) more than 3 hrs. but less than 6 hrs. (19.7%)
- d) 6 hrs. or more per week (1.7%)

15. Do you think that requiring the completion of the Aplia assignments forced you to spend more time on this economics class than you normally would have?

- a) no (35.6%)
- b) yes (64.4%)

Background Questions

How would you describe your ethnic background?
(70.2% (white))

18.7% (black)
5.8% (Asian)
5.3% (Hispanic)).

What is your gender (male or female)?

Male= 55.6%
Female=44.4%

What is your age?

Average = 20.8

Do you have access to a computer at home, in your apartment, or in your dorm?

Yes (94.7%) No (5.3%)

If you answered yes to the above question, how do you access the internet?

Via a Dial-up (phone) connection (11.3%)

Via a DSL, cable connection or other high-speed connection (85.1%)

No internet access (3.6%)

Is this the first course you have taken which required the use of an online textbook (Ebook)?

Yes (81.1%)

No (18.9%)

What is your student status?

freshman (or Advanced Academy) (9.7%)

sophomore (42.3%)

junior (37.9%)

senior (8.8%)

graduate student or other (1.3%)

Other comments (below or on the back)

**APPENDIX B:
SUMMARY TABLES**

Table B1: Cross Tabulation Results

Question	Gender					
Do you like using the online textbook with the integrated web-based homework management product (Aplia) in this class?	Male	Female			Total	
Dislike	33.03%	25.45%			58.48%	
Indifferent	9.38%	3.12%			12.50%	
Like	12.95%	16.07%			29.02%	
Total	55.36%	44.64%			100%	
Question	Student Status					
Do you like using the online textbook with the integrated web-based homework management product (Aplia) in this class?	Freshman	Sophomore	Junior	Senior	Other	Total
Dislike	5.75%	21.24%	23.89%	6.19%	0.88%	57.95%
Indifferent	1.33%	5.75%	5.31%	0%	0.44%	12.83%
Like	2.65%	15.04%	8.85%	2.65%	0%	29.2%
Total	9.73%	42.03%	38.05%	8.85%	1.33%	100%
Question	Would you have preferred a physical textbook?					
Do you like using the online textbook with the integrated web-based homework management product (Aplia) in this class?	Yes	No	Indifferent	Total		
Dislike	51.3%	2.61%	3.91%	57.83%		
Indifferent	8.26%	0.87%	3.91%	13.04%		
Like	9.13%	11.74%	8.26%	29.13%		
Total	68.7%	15.22%	16.09%	100%		
Question	Do you normally buy an assigned textbook?					
Do you like using the online textbook with the integrated web-based homework management product (Aplia) in this class?	Never	Occasionally	Frequently	Always	Total	
Dislike	0.43%	1.3%	9.57%	46.52%	57.83%	
Indifferent	0.43%	1.3%	5.65%	5.65%	13.04%	
Like	0%	1.31%	7.39%	20.43%	29.13%	
Total	0.87%	3.91%	22.61%	72.61%	100%	
Question	Did you read the online text on a computer monitor?					
Do you like using the online textbook with the integrated web-based homework management product (Aplia) in this class?	Never	Occasionally	Frequently	Only Online	Total	
Dislike	18.7%	21.3%	10%	7.83%	57.83%	
Indifferent	3.04%	5.65%	3.04%	1.3%	13.04%	
Like	8.26%	11.3%	7.39%	2.17%	29.13%	
Total	29.96%	38.26%	20.43%	11.3%	100%	
Question	Did you print out the chapters of the book?					
Do you like using the online textbook with the integrated web-based homework management product (Aplia) in this class?	Never	Occasionally	Frequently	All Chapters	Total	
Dislike	32.17%	10%	5.65%	10%	57.83%	
Indifferent	7.39%	3.48%	0.87%	1.3%	13.04%	
Like	13.48%	5.65%	4.78%	5.22%	29.13%	
Total	53.04%	19.13%	11.3%	38	100%	
Question	The assigned online problems helped you prepare for the examinations in class.					
Do you like using the online textbook with the integrated web-based homework management product (Aplia) in this class?	Disagree	Moderately disagree	Indifferent	Moderately Agree	Strongly Agree	Total
Dislike	12.23%	15.72%	9.17%	18.34%	2.18%	57.64%
Indifferent	0.44%	3.49%	3.06%	4.37%	1.75%	13.1%
Like	0.44%	3.06%	3.49%	15.72%	6.55%	29.26%
Total	13.1%	22.27%	15.72%	38.43%	10.48%	100%
Question	The assigned online problems helped you learn economics.					
Do you like using the online textbook with the integrated web-based homework management product (Aplia) in this class?	Disagree	Moderately disagree	Indifferent	Moderately Agree	Strongly Agree	Total
Dislike	14.47%	14.47%	11.84%	14.91%	2.19%	57.89%
Indifferent	0%	1.32%	4.39%	6.58%	0.88%	13.16%
Like	1.75%	1.32%	4.39%	17.11%	4.39%	28.95%
Total	16.23%	17.11%	20.61%	38.6%	7.46%	100%
Question	Did the online component of the course result in more time spent studying Economics?					
Do you like using the online textbook with the integrated web-based homework management product (Aplia) in this class?	No	Yes		Total		
Dislike	25.79%	32.58%		58.37%		
Indifferent	3.17%	9.5%		12.67%		
Like	6.79%	22.17%		28.96%		
Total	35.75%	64.25%		100%		

Table B2: Survey Responses by Instructor

Instructor 1

Questions	Answer	Percentage
1. The Online Textbook with the Integrated Web-Based Homework assignments required in this class helped you learn economics?	Disagree	30.0%
	Indifferent	18.9%
	Agree	51.2%
2. Do you think that requiring the completion of the Aplia assignments forced you to spend more time on this economics class than you normally would have?	Yes	71.3%
	No	28.7%
3. The assigned problem sets you completed online helped you prepare for the examinations in class.	Disagree	22.3%
	Indifferent	16.7%
	Agree	61.1%

Instructor 2

Questions	Answer	Percentage
1. The Online Textbook with the Integrated Web-Based Homework assignments required in this class helped you learn economics?	Disagree.	35.7%
	Indifferent.	22.6%
	Agree	41.7%
2. Do you think that requiring the completion of the Aplia assignments forced you to spend more time on this economics class than you normally would have?	Yes.	58.9%
	No.	41.1%
3. The assigned problem sets you completed online helped you prepare for the examinations in class.	Disagree	44.0%
	Indifferent	16.4%
	Agree	39.6%

Instructor 3

Questions	Answer	Percentage
1. The Online Textbook with the Integrated Web-Based Homework assignments required in this class helped you learn economics?	Disagree	33.4%
	Indifferent	20.8%
	Agree	45.8%
2. Do you think that requiring the completion of the Aplia assignments forced you to spend more time on this economics class than you normally would have?	Yes	65.2%
	No	34.8%
3. The assigned problem sets you completed online helped you prepare for the examinations in class.	Disagree	41.7%
	Indifferent	12.5%
	Agree	45.8%