International Journal for the Scholarship of Teaching and Learning

Volume 5 | Number 2 Article 15

7-2011

Students Who Aren't Prepared For College Find Less Value In Books And Lecture Than Students Who Are Prepared

Jeffrey B. Henriques
University of Wisconsin - Madison, jhenriqu@wisc.edu

Lyrissa I. Kusse
University of Wisconsin - Madison, kusse@wisc.edu

Recommended Citation

Henriques, Jeffrey B. and Kusse, Lyrissa I. (2011) "Students Who Aren't Prepared For College Find Less Value In Books And Lecture Than Students Who Are Prepared," *International Journal for the Scholarship of Teaching and Learning*: Vol. 5: No. 2, Article 15.
Available at: https://doi.org/10.20429/ijsotl.2011.050215

Students Who Aren't Prepared For College Find Less Value In Books And Lecture Than Students Who Are Prepared

Abstract
Students in three sections of introductory psychology, N = 1051, were asked about the utility of traditional, e.g. instructor, lectures and textbook, and nontraditional, e.g., clickers, podcasts and online lecture slides, teaching tools. Students who felt unprepared for college (25.9%) differed from their peers in their perceived utility of these tools. Both groups of students reported that novel teaching tools were less helpful than traditional teaching tools and while there was no group difference in the perceived usefulness of the novel tools, underprepared students found traditional teaching tools to be less helpful than did prepared students. When the individual tools were used to predict the amount of self-reported learning gains in these students, it was the traditional teaching tools that accounted for the greater proportion of variability in overall learning. These results suggest that, rather than adding new approaches to their teaching, instructors could best assist their underprepared students by helping them learn to make better use of traditional teaching tools.

Keywords
Learning, Innovation, Academic readiness, Technology

Creative Commons License
This work is licensed under a Creative Commons Attribution-Noncommercial-No Derivative Works 4.0 License.

Students Who Aren't Prepared For College Find Less Value In Books And Lecture Than Students Who Are Prepared

Jeffrey B. Henriques University of Wisconsin – Madison Madison, Wisconsin, USA
jhenriqu@wisc.edu

Lyrissa I. Kusse University of Wisconsin – Madison Madison, Wisconsin, USA kusse@wisc.edu

Abstract

Students in three sections of introductory psychology, N = 1051, were asked about the utility of traditional, e.g. instructor, lectures and textbook, and nontraditional, e.g., clickers, podcasts and online lecture slides, teaching tools. Students who felt unprepared for college (25.9%) differed from their peers in their perceived utility of these tools. Both groups of students reported that novel teaching tools were less helpful than traditional teaching tools and while there was no group difference in the perceived usefulness of the novel tools, underprepared students found traditional teaching tools to be less helpful than did prepared students. When the individual tools were used to predict the amount of self-reported learning gains in these students, it was the traditional teaching tools that accounted for the greater proportion of variability in overall learning. These results suggest that, rather than adding new approaches to their teaching, instructors could best assist their underprepared students by helping them learn to make better use of traditional teaching tools.

Keywords: learning, innovation, academic readiness, technology

Introduction

The U.S. Department of Education projects that approximately one-half of the students who began a four-year bachelor's degree program in the fall of 2006 will actually receive their degree within six years. Projections appear even more dismal for students who were ranked among the bottom quarter of their high school classes, with only 20% expected to get their bachelor's degree or a two-year associates degree (Steinberg, 2010). As colleges and universities admit a greater diversity of students, this is the challenge educators face. Not all incoming college students will have received the same academic preparation in their high school educations. Estimates are that up to 55% of students entering 2- and 4-year institutions are underprepared for the challenges of higher education (Kay & Greenhill, 2011). College instructors have attempted to assist these less than well-prepared students, going so far as to incorporate a variety of technologies in their instruction with the hope of improving learning (Aronowitz, 2011).

These strategies are, in part, based on the principles of variation theory. According to variation theory, learners must experience new information from a variety of perspectives in order for learning to occur, as this facilitates new ways of learning (Oliver & Trigwell, 2005). The theory claims that without variation, there is no discernment; without discernment,

https://doi.org/10.20429/ijsotl.2011.050215

there is no learning (Marton, 2007). Thus, this theory suggests that using various forms of teaching media may help students discern important differences (variations) in patterns and, in turn, enhance learning. In response to this theory, colleges and universities are doing just that: including various technologies and innovations in classrooms (Twig, 2000).

Introducing new technologies into the classroom as a means of enhancing learning is not a new notion. Since the 1920s, we have seen a push for media use in an educational setting (e.g., radio, television, and computer programs) because of the strong claims for pedagogic value, yet few have proven to be effective (Cuban, 1986). However, as more colleges and universities incorporate technology into teaching, such as the use of personal response systems ("clickers") and podcasts, it behooves us to examine just how effective these strategies are and whether they are providing enhanced learning opportunities for underprepared students.

Clickers are one such instructional technology that have recently become popular and are being used to promote student-instructor interaction in large lectures. Survey-based studies have found that both students and teachers rate clickers to be helpful as well as enjoyable to use (Beekes, 2006; Draper & Brown, 2004; Hatch, Jensen, & Moore, 2005; Latessa & Mouw, 2005; Zahorik, 1996). Consistent with these findings, a recent quasi-experiment concluded that, "if the goal is to help students learn in large college lecture classes, there is reason to consider using a personal response system to foster student–instructor interaction during class" (Mayer et al., 2009). While user feedback has been positive, evidence is mixed as to whether these devices increase student performance (Lantz, 2010).

Podcasting, another relatively new teaching tool, allows students to listen to recorded lectures; however, results are mixed as to whether or not it is more beneficial than traditional tools, such as the textbook or coming to lecture. Some studies have found that students prefer supplementary material in the podcasting format and rated podcasts as at least as useful as printed handouts or the textbook (Copley, 2007; Evans, 2008). Copley (2007) also found that podcasts provided better learning outcomes for students as they facilitate better note revision and exam preparation, more student engagement in lecture topics, and the flexibility for students to learn complex material at their own pace. However, while students enjoy the flexibility of podcasting, traditional lectures are still preferred by students as a means of learning new information (Stephenson, Brown, & Griffin, 2008).

The present study examines the self-reports of 3 sections of students on an end of semester course evaluation. The Student Assessment of Learning Gains (SALG; Seymour, Weise, Hunter, & Daffinrud, 2000) allows instructors to get feedback from students about their learning gains in a course and the perceived utility of different teaching and learning tools. We investigated whether students who differed in their perceived level of preparation for college differed in their ratings of the utility of traditional teaching tools, e.g. lectures, textbook, pace of class, and instructor, versus novel or nontraditional teaching tools, e.g., podcasts, clickers, and online resources.

We predicted that the students who felt prepared for college by their high school education would rate the traditional tools to be more useful than nontraditional tools, and that prepared students would find these tools were more useful than underprepared students. We expected the opposite pattern of results for underprepared students, i.e., to report higher ratings of utility for the nontraditional tools than prepared students and to rate the nontraditional tools as more helpful than the traditional tools.

Method

Participants

Participants were 1,051 students enrolled across three sections of introductory psychology at a large Midwestern university. The majority of participants were female (54.7%), Caucasian (85.8%), and in their first year of college (77.2%). Of the 1,051 enrolled students, 924 (87.9%) completed the SALG (Seymour et al. 2000). Response rates were comparable across sections, and reflecting the class demographics, respondents were primarily Caucasian (85.2%) and in their first year of college (75.7%).[i]

Procedure

During the last week of the semester, students were asked to complete the SALG, for which they received course credit. This assignment was 1 of 10 assigned over the course of the semester. While course credit was an incentive to complete the assignments, students were allowed to miss 2 of these assignments and still receive full credit. All responses to the survey were anonymous. Students logged on to the SALG site using their campus email addresses, but this information was kept separate from and could not be linked to their survey responses.

Teaching Tools

Traditional Tools – The seven traditional teaching tools evaluated by the students were lectures, textbook, instructor, in-class demonstrations, discussions in class, pace of the course, and how all assignments, readings, and activities fit together. Classes met twice a week for 75 minutes over the course of a 15 week semester. The textbook for the course was a standard "brief" psychology textbook, *Essentials of Psychology* (Bernstein, Nash, Clarke-Stewart, Penner, & Roy, 2008), and the class covered a chapter's worth of material every week. In-class demonstrations consisted of occasional demonstrations of concepts such as neuronal communication, conditioning, and memory.

Nontraditional Tools – The nontraditional tools consisted of podcasts, clickers, and online resources. There were more than 60 podcasts ranging from 2 to 38 minutes in length. The median duration was 7 minutes and 12 seconds. Average duration was 8 minutes and 13 seconds, *SD* = 4:53. Podcasts were recommended but not required and were intended to expand upon topics covered in lecture. Clickers were used in every class, during which, the professor would ask between two and ten questions per class (*M* = 4). The questions were variably distributed throughout the lecture and primarily consisted of concept review of material covered earlier in that class or of material covered in previous lectures. Other questions were designed to demonstrate psychological concepts, e.g., availability heuristic, anchoring and adjustment, and critical thinking exercises that required students to predict outcomes of psychological studies.

Online resources consisted of lecture slides, chapter review and exam review quizzes, the textbook website, a bank of frequently asked questions (FAQs), and course related web links. The lecture slides were pdf handouts of the PowerPoint slides with space for notes. The content of the slides was also provided in outline form in Word formatted documents. The chapter-review quizzes consisted of 10 multiple choice questions randomly drawn from a larger bank of questions on each topic covered in that section. These were required for one section and recommended for the other two sections. The exam review quizzes selected 20 questions from across topics for each exam and were designed to allow students to test their preparedness for each exam. Students were allowed to take both the chapter review quizzes and the exam review quizzes an unlimited number of times. There were

more than 75 FAQs covering topics that include test taking, studying strategies, and questions about course material. The course related web links provided students with videos, outside resources to support individual interests, scholarly articles, and an RSS feed of related articles in the popular press.

Measures

The SALG (Seymour et al., 2000) is a modifiable online instrument that allows students to provide feedback to their instructors about various aspects of their course. In this study, students were asked to rate the utility of various traditional and novel teaching tools and to rate their learning gains in specific course content areas as well as their gains in more broadly defined areas such as critical thinking, confidence in their abilities, and enthusiasm for the material. The rating scales for utility of tools ranged from 1 to 5 (No Help – Great Help). Learning gains were also rated from 1 to 5 (No Gains – Great Gains). Additional questions at the end of the instrument asked students about their race/ethnicity, whether it was their first year in school (Yes/No), and whether they felt that their high school education had sufficiently prepared them for college (Yes/No). Average Learning (AL) was computed by averaging the amount of self-reported learning gains across topic areas, which included research methods, the brain, sleep and hypnosis, learning, memory, cognition, emotion, personality, psychological disorders, and social psychology. Overall internal consistency for this composite measure was .87 (Cronbach's alpha for each individual section ranged from .80 - .90). The measure of Learning Gains (LG) was a composite score of students' self-reported learning gains on 13 items pertaining to their interest and enthusiasm for the material, increase in skills in the subject area, integration of learning, and understanding the relationships between different psychological concepts. Cronbach's alpha for this measure of LG was .95 (range .95 - .96). Students rated the usefulness of six traditional teaching tools (lectures, textbook, instructor, in-class demonstrations, pace of the course, and how all assignments, readings, and activities fit together) and seven novel teaching tools (podcasts, clickers, and online resources, such as lecture slides, review questions, the textbook website, frequently asked questions, and course related web links). Across the three sections, the internal consistency for traditional teaching tools was .81 (range .77 - .84). For novel teaching tools, overall internal consistency was .83 (range .82 - .85).

Results

Of the students surveyed, 238 (25.9%) reported that they felt that their high school education had left them unprepared for college.

Average Learning and Learning Gains

Students' AL and LG were examined by way of separate two-way multivariate analysis of variances (MANOVA) with Section and Preparation (Prepared/Unprepared) as the between subjects variables.

These analyses revealed a main effect for Preparation, $F(2, 912) = 3.09$, $p = .046$, but no significant differences between Sections, $F(4, 1826) = 0.55$, $p = .693$, or any significant Section X Preparation interaction, $F(4, 1826) = 0.34$, $p = .854$. Students who reported that they were inadequately prepared for college reported lower amounts of AL, $F(1, 913) = 6.00$, $p = .014$, partial eta squared = .006, and lower levels of LG, $F(1, 913) = 3.87$, $p = .049$, partial eta squared = .005 (see Table 1).

Table 1. Average Learning Gains and Utility of Teaching Tools for Prepared and Unprepared Students (SD in parentheses)

	Section 1 Prepared		**Section 2 Prepared**		**Section 3 Prepared**		**Total Sample Prepared**	
	Yes n=235	No n=66	Yes n=235	No n=79	Yes n=211	No n=93	Yes n=681	No n=238
Average Learning (AL)	4.22 (.54)	4.11 (.54)	4.14 (.71)	4.04 (.77)	4.22 (.58)	4.07 (.76)	4.19 (.62)	4.07 (.71)
Learning Gains (LG)	3.81 (.79)	3.71 (.80)	3.75 (.88)	3.57 (.90)	3.77 (.88)	3.66 (.92)	3.78 (.85)	3.65 (.88)
Traditional Tools	3.99 (.60)	3.87 (.61)	3.96 (.68)	3.78 (.76)	3.99 (.66)	3.88 (.71)	3.97 (.64)	3.84 (.70)
Novel Tools	3.24 (.73)	3.26 (.74)	3.29 (.77)	3.35 (.78)	3.37 (.78)	3.25 (.79)	3.30 (.76)	3.28 (.74)

Teaching Tools

The utility of the traditional and novel teaching tools was examined by way of a three-way repeated measures MANOVA. Section and Preparation were the between subjects variables and Tool (Traditional/Novel) was the within subjects variable. This revealed a main effect for Tool, $F(1, 913) = 568.30$, $p < .001$, partial eta squared = .384, which was the result of traditional teaching tools being rated as more useful than the novel teaching tools by all students. Furthermore, there was a significant Preparation X Tool interaction, $F(1, 913) = 5.23$, $p < .03$, partial eta squared = .006 but no other main effects or interactions were significant, all F's < 2.50, all ps ≥ .10. Separate ANOVAs for traditional and novel teaching tools were computed comparing prepared and unprepared students collapsed across the three sections in order to decompose the significant interaction. There was no difference between prepared and unprepared students in their ratings of the utility of novel teaching tools, $F(1, 918) = 0.06$, $p > .80$, partial eta squared = .000, M = 3.30 and M = 3.28 for each group respectively. There was a significant difference in how these students rated the traditional teaching tools, $F(1, 918) = 7.16$, $p < .01$, partial eta squared = .008, and this was a result of underprepared students rating the traditional teaching tools lower than the prepared students, M = 3.84 and M = 3.97 respectively. (see Figure 1).

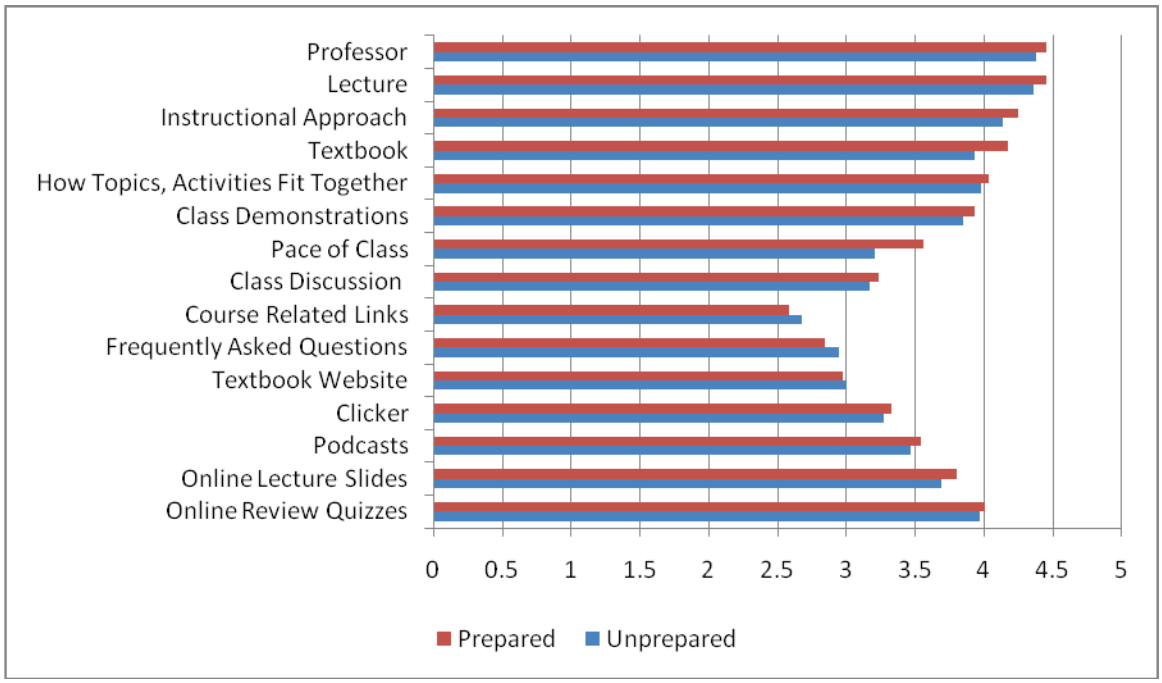

Figure 1. Reported utility of individual traditional and nontraditional teaching tools by students who felt prepared and unprepared for college by their high school education.

Predicting Students' Learning Gains

In order to examine which individual teaching tools accounted for the most variability in students' LG, exploratory hierarchical regression analyses were computed separately for each group. In each analysis, section was entered into the model first to control for any systematic differences between classes. The individual teaching tools were entered in stepwise hierarchical fashion according to the amount of variance accounted for by each tool. For prepared students, eight teaching tools accounted for 54.9% of the total variance in LG. In order of proportion of variance accounted for, these were the Professor, the Way Topics, Activities, Readings and Assignments Fit Together, the Pace of the Class, Demonstrations in Class, Frequently Asked Questions, Lectures, Textbook, and Course Related Links. For unprepared students, seven teaching tools accounted for 58.9% of the total variance in AL. In order of proportion of variance accounted for, these were the Professor, the Way Topics, Activities, Readings and Assignments Fit Together, the Clicker, the Pace of the Class, Online Quizzes, Class Discussion, and the Frequently Asked Questions. (See Table 2).

Table 2. Multiple Regression Predicting Learning Gains (LG) in Prepared and Unprepared Students

	Variables Entered	***R***	***R Square***	**Significance *F* Change**
Prepared Students	Section	.022	0	.565
	Professor	.577	.333	.000
	Way fit together	.662	.438	.000
	Pace of class	.700	.490	.000
	Demonstrations	.718	.516	.000
	Frequently Asked Questions	.727	.539	.000
	Lectures	.733	.537	.001
	Textbook	.738	.545	.000
	Course Related Links	.741	.549	.016
Unprepared Students	Section	.019	0	.771
	Professor	.608	.370	.000
	Way fit together	.685	.469	.000
	Clicker questions	.718	.515	.000
	Pace of class	.735	.540	.001
	Review Quizzes	.753	.567	.000
	Class Discussion	.761	.580	.010
	Frequently Asked Questions	.767	.589	.027

Discussion

Students who felt prepared for college reported greater AL and LG than students who reported less college preparation by their high school, providing a measure of validity to our construct of readiness for college. The differences in the reported utility of novel and traditional teaching tools between the two groups of students were unexpected. While we had expected that traditional teaching tools would be rated more highly by college prepared students, we had predicted that underprepared students would rate the nontraditional tools more highly. What we found was that both groups perceived traditional teaching tools as being more effective than nontraditional or novel tools. While there was no difference in the reported utility of the novel tools between groups, the two groups of students did differ in their evaluation of the traditional teaching tools. Students who felt prepared for college reported that these tools were of greater utility than underprepared students.

While traditional teaching tools were perceived as less helpful by underprepared students as compared to students who felt prepared for college, these traditional tools were significant

predictors of overall learning gains for both prepared and underprepared students. For both groups of students, the pace of class, the way topics, activities, and readings fit together and the professor all played significant roles in their overall learning gains. These three variables alone accounted for almost 50% of the variance in overall student learning gains. While the number of nontraditional teaching tools that were significant predictors was greater than the number of nontraditional tools that predicted the learning gains of prepared students, traditional teaching tools accounted for a greater proportion of learning gains in both groups of students. These findings suggest that while innovation can be useful in the classroom, it is traditional teaching tools that are most critical to students' learning. The fact that these traditional tools are perceived as less helpful by underprepared students suggests that colleges and universities need to provide incoming students with instruction on how to make best use of these critical resources.

There are some limitations to the current study which should be addressed in future research. Underprepared students were identified on the basis of their own self-report, and the validity of that judgment cannot be determined in the current research. For instance, it could be the case that students were judging their level of preparedness based simply on whether they had performed as well as they had expected in this particular class. It would be informative to explore how exactly students felt unprepared for college, are there particular skills such as note-taking or test preparation that they feel they are lacking or is their lack of preparedness related to a particular area of study, such as mathematical skills. It would also be useful to find out if these students felt unprepared in all of their courses or only in particular classes. Another limitation of the current study is that students evaluation of the utility of the traditional and nontraditional teaching tools was purely subjective. It could be the case that certain teaching tools had a greater impact on the students' learning than they in fact realized. An examination of changes in classroom performance in response to the introduction or removal of different teaching tools would provide greater support for the initial findings reported in this paper. Similarly, it would be helpful if we knew students' actual performance in the class rather than having to rely on their expectation of their grade in the class.

While we might argue that our results suggest that faculty could better help underprepared students be successful by providing instruction on how to make use of these traditional learning tools rather than introducing novel tools and approaches into their classes, it could be argued that greater instruction on the use of novel teaching tools, as well, would result in a more substantial impact of these new tools on student learning for all students. We should note that there were no questions asked of students addressing the extent to which they felt adequately informed on how to make use of the different teaching tools, and their reported utility may simply reflect their level of comfort with the different instructional tools. As further exploration of this topic continues, we would do well to consider the comments of Mayer et al. (2009) who note that, "The search for an appropriate educational technology can become a misleading and potentially unproductive adventure…."

References

Aronowitz, S. (2011, February 16). Survey shows college students overwhelmed, underprepared. *Campus Technology*. Retrieved March 1, 2011, from http://campustechnology.com/Articles/2011/02/16/Survey-Shows-College-Students-Overwhelmed-Underprepared.aspx

Beekes, W. (2006). The "millionaire" method for encouraging participation. *Active Learningin Higher Education, 7*, 25–36.

Bernstein, D. A., Nash, P. W., Penner, L. A., Clarke-Stewart, A., & Roy, E. J. (2008). *Essentials of Psychology, 4th Edition*, New York: Houghton Mifflin.

Copley, J. (2007). Audio and video podcasts of lectures for campus-based students: Production and evaluation of student use. *Innovations in Education and Teaching International, 44,* 387-399.

Cuban, L. (1986). *Teachers and machines: The classroom use of technology since 1920*. New York: Teachers College Press.

Draper, S. W., & Brown, M. I. (2004). Increasing interactivity in lectures using an electronic voting system. *Journal of Computer Assisted Learning, 20*, 81–94.

Evans, C. (2008). The effectiveness of m-learning in the form of podcast revision lectures in higher education. *Computers & Education, 50,* 491–498.

Hatch, J., Jensen, M., & Moore, R. (2005). Manna from heaven or clickers from hell: Experience with an electronic response system. *Journal of College Science Teaching, 34*, 36–39.

Kay, K., & Greenhill, V. (2011). Twenty-first century students need 21st century skills. In G. Wan & D. M. M. Gut (Eds.), *Bringing schools into the 21st century*, Explorations of Educational purpose, 13, 41-65.

Lantz, M. E. (2010). The use of "Clickers" in the classroom: Teaching innovation or merely an amusing novelty? *Computers in Human Behavior*, *26*, 556-561.

Latessa, R., & Mouw, D. (2005). Use of an audience response system to augment interactive learning. *Family Medicine, 37,* 12–14.

Marton, F. (2007). In: *Student learning and university teaching*. Entwistle, Noel (Ed.); Tomlinson, Peter (Ed.); Leicester, England: British Psychological Society. pp. 19-30

Mayer, R. E., Stull, A., DeLeeuw, K., Almeroth, K., Bimber, B., Chun, D…Zhang, H. (2009). Clickers in college classrooms: Fostering learning with questioning methods in large lecture classes. *Contemporary Educational Psychology, 34,* 51-57.

Oliver, M., & Trigwell, K. (2005). Can 'blended learning' be redeemed? *E-Learning, 2,* 17-26.

Seymour, E., Wiese, D., Hunter, A. & Daffinrud, S.M. (2000, March). Creating a Better Mousetrap: On-line Student Assessment of their Learning Gains. Paper presentation at the National Meeting of the American Chemical Society, San Francisco, CA.

Steinberg, J. (2010, May 14). Plan B: Skip College. *New York Times*. Retrieved June 2, 2010, from http://www.nytimes.com

Stephenson, J. E., Brown, C., & Griffin, D. K. (2008). Electronic delivery of lectures in the university environment: An empirical comparison of three delivery styles. *Computers & Education, 50*, 640–651.

Twigg, C. A. (1999). Improving learning and reducing costs: Redesigning large-enrollment courses. Retrieved May 29, 2010, from the National Center for Academic Transformation Web site: http://www.thencat.org/Monographs/ImpLearn.html

Zahorik, J. (1996). Elementary and secondary teachers' reports of how they make learning interesting. *Elementary School Journal, 98*, 3–13.

Footnotes

[1] Students were not asked to identify their gender on the SALG