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Using a Quasi-Experimental Design in Combination with Multivariate Analysis to Assess Student Learning

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Abstract: College professors have adopted numerous strategies for teaching undergraduates, yet few researchers provide empirical evidence students' learning actually increased because of the instructional innovation. Assessment of pedagogy is frequently subjective and based on comments from students or faculty. Consequently, evaluating the effectiveness of teaching activities on college student learning, in general, and in statistical analysis courses, in particular, is warranted. This study employed a pretest-posttest design to measure student learning and then examined the relationship between student demographics, prior knowledge, and course characteristics on knowledge gained in undergraduate statistics. Data derived from 185 students enrolled in six different sections of a statistical analysis course taught over a seven-year period by the same instructor. Multiple regression analyses revealed age, age X gender (interaction effect), major, prior knowledge, examinations, and group projects all had statistically significant effects on how much students learned in the course. The results suggest faculty assess students' prior knowledge at the beginning of the semester and use such data to inform both the content and delivery of statistical analysis. Moreover, before embracing a new pedagogy, faculty should establish empirically that learning is linked to the teaching innovation.

Keywords: learning versus performance, knowledge gain, direct assessment, pretest/posttest design, multivariate analysis, groupwork, teaching statistic.

Coursework in statistical analysis is required in most undergraduate social science and professional studies programs. Despite the importance of quantitative skills in these disciplines, students with insufficient preparation in algebra and/or math anxiety confront faculty teaching statistics (Bandalos, Finney, & Geske, 2003; Blalock, 1987; Cerrito, 1999; Forte, 1995; Garfield and Chance, 2000; Macheski et al., 2008; Wilder, 2010). In response, professors assigned to statistical analysis courses search for pedagogy to reduce student anxiety and increase quantitative knowledge. Many instructional techniques (e.g., small-group work, collaborative testing, humor, computer-assisted data analysis, active learning, etc.) have been recommended for teaching undergraduates (Delucchi, 2006; Helmericks, 1993; Schacht and Stewart, 1990; Schumm et al., 2002; Strangfeld, 2013). Faculty employing these practices report greater student satisfaction with the course (Fischer, 1996; Perkins and Saris, 2001; Potter, 1995; Stork, 2003), reduced math anxiety (DeCesare, 2007; Lomax and Moosavi, 2002), and a belief student learning was greater than could have been achieved without the teaching innovation (Auster, 2000; Wybraniec and Wilmoth, 1999; Yamarik, 2007).

While not without some value, most studies offer little direct empirical evidence that student's knowledge, i.e., learning, increased as a result of pedagogy. Assessment of learning tends to rely on student comments or faculty impressions (Fisher-Giorlando, 1992; Lomax and Moosavi, 2002; Marson, 2007; Schacht and Stewart, 1992). Perceptions of learning and even quantitative student evaluations of teaching (SETs) do not represent direct measurement of learning. As indicators of *perceived* knowledge (rather than actual knowledge), these indirect assessments of learning are limited by assumptions that must be made about what such self-reports constitute (Price and Randall, 2008).

Often used as proxies for learning, students' quiz, examination, and course grades (Borresen, 1990; Delucchi, 2007; Perkins and Saris, 2001; Smith, 2003; Yamarik 2007) do not represent direct

indicators of learning (Baker, 1985; Chin, 2002; Garfield and Chance, 2000; Lucal et al., 2003; Luce & Kirnan, 2016; Wagenaar, 2002; Weiss, 2002). Grades measure academic performance. Learning is increased knowledge, i.e., the difference between what students know at the beginning of the course, compared to the end of the semester. Performance is demonstrating mastery, e.g., accurate statistical computation or correct responses to multiple-choice items on examinations. Cognitive psychologists have found that taking a quiz or examination improves students' subsequent learning of course material. How this occurs is not clear, but testing appears to make ensuing study more effective (Little and Bjork, 2010; Little and Bjork, 2011). Therefore, examinations may function as teaching devices that motivate students to study course content (Bjork and Bjork, 2011). This is noteworthy, as researchers consistently report a positive association between learning and studying (Arum and Roksa, 2011; Astin, 1993), i.e., the more time students spend studying, the more they learn.

The distinction between learning and performance is important, because students enter courses with unequal knowledge, skills, and academic experiences. For example, an individual may begin the semester knowing little, learn a great deal, perform adequately, and receive an average grade, or a student may enter a course knowing a great deal, learn a small amount, perform very well, and earn a high grade (Neuman, 1989). While such students' examination scores and course grades represent performance, neither is a direct assessment of learning. Rather, a pretest is required at the beginning of a course (to establish students' prior knowledge) and a posttest is necessary to measure learning (i.e., knowledge gain) after the course is completed (Luce & Kirnan, 2016).

Quasi-experimental research on student learning in university-level statistics courses is rare (Bridges et al., 1998; Luce & Kirnan, 2016; Price & Randall, 2008). For that reason, the purpose of this study is twofold. First, to assess learning, a pretest-posttest design is used to compare students' statistical knowledge at the beginning of the course with measurement at the end of the semester. Second, multivariate analysis is employed to examine the effects of individual attributes (e.g., age, gender, major, prior knowledge) and course characteristics (e.g., time of day, class size, group projects, quizzes, and examinations) on student learning.

Data and Methods

The study was conducted at a small (approximately 2,500 students), state-supported baccalaureate degree granting university in the United States. The "Carnegie Classification for Institutions of Higher Education" describes the university as a Baccalaureate College: Diverse Fields (Center for Postsecondary Research, 2015). The institution is co-educational (66% women; 34% men), ethnically diverse (59% ethnic minorities), and comprised of many nontraditional age (30% 25 years of age or older) students. Eighty-two percent of the student population is employed (40% working more than 31 hours per week), and all students commute to the campus.

Course Description

Statistical Analysis is an undergraduate course taught in the Division of Social Sciences that serves as an introduction to descriptive and inferential statistics. Completion of algebra II (or a higher-level mathematics course) with a grade of "C" or better is the prerequisite. *Statistical Analysis* is required for all social science majors (e.g., anthropology, economics, political science, psychology, and sociology) at the university. In addition, the course can be taken to fulfill a core requirement for some professional studies majors (e.g., early childhood education, health care administration, justice administration, and public administration). As a result, approximately 70 percent of the students enrolled in *Statistical Analysis* are social science majors and 30 percent come from other programs. Course requirements included three examinations, i.e., Examination 1 (15%), Examination 2 (20%),

Final Examination (35%), two small group projects worth 10% each, and twelve quizzes weighted a combined 10%. Computational problems and computer exercises using the Statistical Package for the Social Sciences (SPSS) were assigned from the textbook, but not graded.

Sample

Student data derived from class records for six sections of *Statistical Analysis* taught over a seven-year period. Complete information was obtained for 185 of the 214 students enrolled in the course at the beginning of each semester, representing an 86% response rate. The class met for 80 minutes, twice a week, during a fifteen-week semester. Course content, delivered via lectures and class discussions, paralleled chapters in the text. While the text, most recently Healey (2015), changed as new editions became available, the instructor, lectures, homework, quizzes, group projects, examinations, and grading criterion were essentially constant across the six sections of the course.

Measures

Pretest-Posttest Instrument. To assess students' statistical knowledge, a comprehensive multiple-choice test was developed and administered at the second-class meeting during the first week of the semester.[1] This pretest contained 30 questions on descriptive and inferential statistics derived from "typical" computational and quantitative reasoning skills covered in the *Statistical Analysis* course. (See Appendix for pretest-posttest content areas.) The same instrument was administered as a posttest at the last scheduled class session. Students were given 50 minutes to complete each test and could use a calculator and consult their textbook. Pretest and posttest scores did not count toward students' course grade.

Only students who completed both tests were included in the data set. The Office of Institutional Research and Assessment (serving as the campus institutional review board for faculty research using student and course-level data) approved the *Statistical Analysis* course pretest-posttest project upon which this study is based. Information collected and analyzed did not include student names or any individual identifiable information.

Dependent Variable: In this study, the term "learning" refers to improvement over the 15-week semester in measurable statistical analysis skills and knowledge. The dependent variable (Improvement) measured learning or knowledge gained from the course. Improvement was calculated by subtracting the percentage of correct answers (out of 30) students received on the pretest from the percentage correct on the posttest. Positive values represented an increase in students' statistical knowledge from the beginning to the end of the course (Posttest percentage – Pretest percentage = Improvement, i.e., learning), while "0" or negative percentages represented no improvement. The higher the percentage, the more student knowledge gained or material learned.

Independent Variables: In addition to the pretest and posttest, students completed three examinations during the semester. These tests required students to perform statistical computations and to interpret their results. During the 80-minute class period, students worked independently, but were permitted use of a calculator, textbook, lecture notes, quizzes, homework, and group projects.

[1]This test was created by sampling content from materials used in *Statistical Analysis*, including homework exercises, quizzes, examinations, projects, and textbooks. The instrument was "pilot" tested in a *Statistical Analysis* course one semester prior to its implementation in the study. Based on feedback from students and their performance, the test was revised, primarily to clarify specific questions.

The arithmetic average of the three examinations, each coded on a 0 to 100-point scale, served as an independent variable (i.e., Exam Mean).

Approximately once a week during the final 10-15 minutes of class, students were administered a quiz. Each quiz involved computations and interpretations similar to (but less rigorous than) those on examinations. Students could use a calculator, textbook, lecture notes, and their homework, but were required to complete quizzes independently. The first four quizzes covered descriptive statistics and corresponded to quantitative skills assessed on Examination 1. Quizzes 5 thru 8 focused on inferential statistics and represented content evaluated on Examination 2. The last four quizzes addressed statistical relationships and required knowledge similar to that on the Final Examination. The arithmetic average of the twelve quizzes, scored on a 0 to 10-point scale, was computed and used an independent variable (i.e., Quiz Mean).

Course requirements also included the completion of two group projects. Approximately four weeks prior to a projects' due date, students were instructed to organize themselves into two to four-member groups.[2] Groups decided how to divide the workload, but each member was required to be involved in all stages of the project. Students were collectively responsible for their project and all members received a group grade. To discourage "free riders" (i.e., individuals who contribute little or nothing the project), students were asked to apprise the professor if some members did not attend group meetings or were not performing their share of responsibilities. After the initial formation of the groups, students met outside of class. Groups were encouraged to meet with the instructor when they had questions and to submit rough drafts of their papers.

Group Project 1 introduced students to material that would appear on Examination 1. Working together, students used SPSS to compute frequency distributions, cross-tabulations, and descriptive statistics (i.e., measures of central tendency and dispersion) for nominal, ordinal, and ratio scale variables. After obtaining an SPSS printout, the group was required to interpret the data and write up the results in a two to three-page paper. Group Project 2 included content (e.g., correlation and regression) found on the Final Examination. Groups were required to select one scholarly article on reserve in the university library. Each group was instructed to discuss their article and interpret its findings. Subsequently, the group was required to compose a two to three-page paper demonstrating their ability to interpret multiple regression, as it appeared in the article. The arithmetic average of grades (assigned on a 0 to 12-point scale) awarded on Group Project 1 and Group Project 2 served as an independent variable (i.e., Group Projects).

Additional Independent Variables: Individual characteristics included student age, gender, major, and prior knowledge (percentage of correct answers on pretest). Class size and course meeting time were also recorded. Table 1 presents coding information and descriptive statistics for the dependent and all independent variables used in the study.

Table 1. Variables, Indicators, Means, and Standard Deviations (N = 185)

Variable	Indicator	Mean	S.D.
Pretest	Arithmetic average of the percentage of correct answers on the pretest.	43.89	11.13
Posttest	Arithmetic average of the percentage of correct answers on the posttest.	64.76	12.99
Improvement	Difference between the percentage correct on the pretest and posttest.	20.88	11.55

[2] Project groups ranged in size from two to four members, unfortunately, I did not collect data on the exact size of each group. Consequently, I was unable to control for the effects of group size.

	Posttest Percentage - Pretest Percentage		
Age	Student age (in years)	29.66	9.53
Female	1 = Female; 0 = Male	.76	.43
Social Science	1 = Student major reported as anthropology, economics, political science, psychology, sociology, or unclassified social science; 0 = Professional Studies major	.68	.47
Prior Knowledge	Arithmetic average of the percentage of correct answers (out of 30 items) on the pretest.	43.89	11.13
Night Class	1 = Class began at 5 p.m. or thereafter; 0 = Class began prior to 5 p.m.	.12	.33
Class Size	Number of students in enrolled in course	30.83	4.10
Exam Mean	Arithmetic average of three examinations. Coded on a 0-100 point scale	80.63	12.72
Quiz Mean	Arithmetic average of twelve quizzes. Coded on a 0-10 point scale	8.25	1.15
Group Projects	Arithmetic average of the combined grades of Group Project 1 and Group Project 2. Coded into 12 descending numeric categories representing A to F, e.g., 12 = A; 11 = A-; 10 = B+, etc.	8.66	2.27

Note: Professional Studies majors, e.g., Early Childhood Education and Public Administration, serve as the omitted reference category for the academic major dummy variable.

Analytic Procedure

In order to identify student and course characteristics associated with learning, it first had to be established that knowledge was gained. The study's design generated appropriate data, while a statistical test determined if there were significant differences (i.e., learning) between pretest and posttest scores (Improvement, i.e., the dependent variable). A paired-sample *t* test was applied to each of the six sections of *Statistical Analysis*.

Hierarchical regression analysis is a technique in which independent variables are entered into an equation sequentially. Noting the increase in r-square due to particular independent variables, partitions the proportion of variance in the dependent variable accounted for by all the independent variables (Schutz et al., 1998). Hierarchical regression was used to: 1) evaluate the net effect of student characteristics (e.g., age, gender, prior knowledge) on their pretest-posttest difference and 2) assess the net effect of course characteristics (e.g., exams, group projects) on student's pretest-posttest improvement percentage. As such, in this study, the question is "How much of the total variance in students' learning (Improvement) is explained by specific independent variables, after controlling for the effects of all other independent variables?" Standardized regression coefficients represent the relative effect of each independent variable on the dependent variable.

Results

Pretest-Posttest Differences

A paired-sample *t* test was applied to each of the six sections of *Statistical Analysis*. Pretest-Posttest means, standard deviations, and differences appear in Table 2. The results reveal statistically significant (differences) gains in knowledge for each section and all courses combined. In sum, the pretest-posttest instrument consistently documents statistical knowledge gain, i.e., student learning.

Table 2. Pretest-Posttest Means, Standard Deviations and Differences

		Pretest		Posttest				
Section	*n*	*M*	*SD*	*M*	*SD*	*Difference*	*t*	*df*
1	31	45.3	11.2	67.9	11.8	22.6***	10.0	30
2	31	40.1	12.9	62.6	14.6	22.5***	8.5	30
3	36	46.0	10.7	66.6	13.9	20.6***	10.2	35
4	33	45.9	10.4	60.2	12.1	14.3***	8.2	32
5	32	43.3	11.5	64.0	12.5	20.7***	10.4	31
6	22	42.8	9.8	60.0	11.2	17.2***	7.9	21
1 – 6	185	44.0	11.2	63.8	13.0	19.8***	22.0	184

NOTE: The values for the difference column are the changes in the percentage correct from the pretest to the posttest. *** p<.001 (two-tail test)

Regression of Improvement Percentage on Student Demographics

By comparing the regression coefficients for age, female, and major in four different equations, change can be observed in the effects of these student characteristics (on learning), while controlling for prior knowledge and other independent variables. Table 3 displays results for Equation 1, Equation 2, Equation 3, and Equation 4. In the first equation, the dependent variable, Improvement, is regressed on age, female, and social science major. The estimated coefficient (b = -3.58) for Female is negative and statistically significant and can be interpreted as follows: Holding constant the effects of age and major, female students' improvement (knowledge gain) on the posttest is 3.58% less than male students. For Equation 1, r-square equals .020. This indicates that age, gender and major explain about 2 percent of the variation in the dependent variable, i.e., Improvement.

Table 3. Student Characteristics Regressed on Improvement (Equation 1), Controlling for Interaction between Age *X* Gender (Equation 2), Prior Knowledge (Equation 3) and Course Variables (Equation 4)

	Equation *1*		*Equation 2*		*Equation 3*		*Equation 4*	
Variable	*b*	β	*b*	β	*b*	β	*b*	β
Age	.041	.033	.300+	.248	.154	.127	.510***	.422
	(.089)		(.199)		(.183)		(.183)	
Female	-3.581*	-.133	5.788	.215	2.824	.105	8.838	.340
	(1.981)		(6.705)		(6.126)		(6.263)	

Social Science	1.192	.048	1.335	.054	2.454	.100	4.141***	.168
	(1.819)		(1.816)		(1.664)		(1.477)	
Female *X* Age			-.325^{+}	-.435	-.186	-.249	-.479**	-.653
			(.222)		(.204)		(.208)	
Prior Knowledge					-.435***	-.419	-.680***	-.651
					(.070)		(.068)	
Night Class							-6.160	-.180
							(5.123)	
Class Size							.003	.001
							(.414)	
Quiz Mean							.935	.095
							(.942)	
Exam Mean							.337***	.382
							(.086)	
Group Projects							.741**	.141
							(.345)	
Intercept	22.774***		15.420***		38.300***		0.879	
R-Square	.020		.031		.201		.423	

NOTES: N = 185; *b* = unstandardized regression coefficient with standard errors in parentheses; β = standardized regression coefficient.
*** p<.01 (two-tail test); ** p<.05 (two-tail); * p<.05 (one-tail test); + p<.10 (one-tail)

Before concluding women acquire less statistical knowledge than men, an interaction term (Female *X* Age) is added to Equation 2. The regression coefficient (*b* = -.325) for Female *X* Age falls just short of statistical significance (p<.10). However, including the interaction, renders the coefficient (*b* = 5.79) for Female to a level that is no longer significant, while at the same time, Age (*b* =.300) approaches statistical significance (albeit at p<.10). R-square increases, from .020 in Equation 1 to .031 in Equation 2, an indication the interaction term explains some of the variation in Improvement percentage.

Regression of Improvement Percentage on Student Demographics and Prior Knowledge

To control for prior course knowledge, Equation 3 includes, as an independent variable, the percentage of correct items students attained on the pretest. The estimated coefficient (*b* = -.435) for Prior Knowledge exerts a negative and statistically significant effect on Improvement. Once again Age, Female and the interaction term, Female *X* Age, are not statistically significant. Notably, Equation 3 produces an r-square of .201, a substantial increase (nearly 7 times larger) over Equation 2, and an indication that Prior Knowledge explains most of the variation in the dependent variable. Holding constant all other independent variables, a one-percent increase in students' pretest score produces a .435% decrease in Improvement percentage. In other words, students improve less on the posttest if they entered the course knowing more (performed better on the pretest) than their peers.

Regression of Improvement on Student, Prior Knowledge, and Course Characteristics

Equation 4 includes several course characteristics (time of day, class size, and quiz, examination, and group project performance) absent from the previous equations. The new independent variables substantially increase the model's explanatory power. R-square (.423) in Equation 4 is more than twice the size generated in Equation 3 (r^2 = .201), meaning, course characteristics are a major predictor of the dependent variable (Improvement), over and above the effects of student demographics and prior knowledge.

Once again, Female (*b* = 8.84) is not statistically significant, however, both Age (*b* = .510) and the interaction term, Female *X* Age (*b* = -.479), attain significance in Equation 4. This can be interpreted as follows: The coefficient for Age (*b* =.510) represents the effect of age when Female equals 0, that is, when the student is male. Therefore, among men, each additional one-year increase in age produces (on average) a .510% gain in Improvement. The coefficient for the interaction, Female *X* Age (*b* = -.479), is the additional effect of age when the student is female, so the effect for women is .510 - .479 = .031. Therefore, each additional year increase in age for females predicts a rise of only .031% in Improvement. In sum, age has a statistically significant positive effect on learning for men, but little or no effect for women.

In Equation 4, the estimated coefficient (*b* = 4.141) for Social Science majors produces a positive and statistically significant effect on Improvement. This finding indicates, all other things being equal; Social Science majors score 4.14% higher on the dependent variable, than do Professional Studies students. Meanwhile, the effect of Prior Knowledge (*b* = -.680) remains negative and statistically significant.

Both examination and group project performance are positive and statistically significant predictors of learning. Specifically, holding constant the effects of all other independent variables, Equation 4 predicts that with each one-point increase in examination scores (Exam Mean), Improvement rises, on average, by .337%. Likewise, each additional grade category increase in Group Projects (*b* = .741) produces a .741% gain in knowledge.

Lastly, I compare standardized coefficients (β) to determine which independent variables have the greatest impact on Improvement, i.e., learning. The interaction term (Female *X* Age) and Prior Knowledge have the largest effect sizes (β = -.653 and β = -.651, respectively). These two variables explain the most variance in the dependent variable. Age (β = .422) is the third strongest predictor of Improvement, followed by Exam Mean (β = .382). Social Science major (β = .168) and Group Projects (β = .141) have the smallest effect sizes amongst the statistically significant independent variables.

Discussion

Based on significant paired-sample *t* tests, students' statistical knowledge is greater at the end of the semester than at the beginning of the course. This finding is important for teaching and assessment. Namely, a pretest-posttest design can document student learning or knowledge gained upon completion of university-level coursework.

Age, gender, major, and pretest scores combine to explain a large proportion (over 20 percent) of the variance in the dependent variable (Improvement). The results for the age *x* gender interaction require further discussion. Why does age have a much less positive effect on learning for women than men? One potential explanation is that as nontraditional (age) students, women may experience longer

interruptions between their college enrollments than do their male counter parts.[3] If so, the advantages of life experience and maturity often attributed to nontraditional student success (Bye, Pushkar, & Conway, 2007; Carney-Crompton & Tan, 2002) may diminish with the knowledge loss associated with increasing time away from higher education. This may be especially salient for math-based courses, such as statistics.

Social science majors, compared to those in professional studies, gained more statistical knowledge. This finding cannot be attributed to social science students learning more because they entered the course knowing less. Pretest performance reveals social science majors (Mean = 45.3) scored higher than professional studies students (Mean = 42.5) on Prior Knowledge. One possibility is that social science majors have more prior exposure to statistical content in previous coursework (Bridges et al., 1998). This may reduce their anxiety and predispose them toward an interest in statistical analysis that leads to higher pretest and posttest scores (i.e., learning).

Among student characteristics, pretest scores (Prior Knowledge) account for the largest proportion (about 17 percent) of variation in Improvement, while demographic variables explain a little more than three percent. Overall, nearly half of the variance in learning is predicted by student background and prior knowledge. Students who scored low on the pretest, improved the most on the posttest, and acquired the most knowledge of statistical analysis. In sum, students learned more if they entered the course knowing less.

Course characteristics explain more than 50 percent of the variation in student learning. Time of day, class size, and quiz scores were not statistically associated with Improvement. However, examination and group project performance were significant positive predictors of statistical knowledge gain. These results are consistent with research in cognitive psychology that suggest examinations are learning devices that make course content more recallable than other activities that pre-expose students to material on which they will be evaluated (Little, et al., 2012; Little and Bjork, 2010; Little and Bjork, 2011). Examinations increase students' subsequent learning of course information by making ensuing study more effective (Little and Bjork, 2010; Little and Bjork, 2011), and the more time students spend studying, the more they learn (Arum and Roksa, 2011). The positive effect of group projects on learning is noteworthy. Students that earned high grades on groupwork, increased their knowledge of statistics more than students receiving lower grades. This suggests working collaboratively motivates students (though group interaction) to learn material related to content assessed on the posttest (McKinney and Graham-Buxton, 1993; Rau and Heyl, 1990; Yamarik 2007).

As indicated by comparison of standardized regression coefficients ($\beta = .141$ versus $\beta = .382$), group projects have an effect size less than half that attributed to students' performance on examinations. It is a challenge to explain this difference in view of the array of factors (many of which were not controlled in the present study) that can affect student learning. Some reasons to consider, include group differences in student ability, motivation, statistical knowledge, or group free riders. The latter explanation is supported by faculty observations and student comments. While working on their group projects, a few students complained to the professor about members not fulfilling their responsibilities, i.e., free riders. Therefore, some groups may have been more self-selective than others. Maybe the most conscientious students avoided free riders and found similarly motivated classmates. As a result, those groups received higher grades than groups composed of less committed students, and as individuals, the more conscientious students demonstrated more learning at the end of the course. Consequently, the positive effects of group project performance on statistical knowledge gain, may reflect the formation of homogeneous groups.

[3] An independent *t*-test comparing the mean ages of women (30.1) and men (29.1) revealed no statistically significant differences.

Pedagogical Implications

Pretest-posttest assessment, once put into practice (and evaluated), can be used to improve teaching effectiveness. For example, posttest content on which students performed poorly can receive greater attention and class time when the course is next taught. Likewise, a pretest can detect the knowledge loss associated with extended time between mathematics coursework, such as that experienced by nontraditional students. This information may alert faculty of the need to review and/or refer such students for remediation services. Finally, pretests can also identify students with prior knowledge of course content, enabling faculty to devote less time to those areas in the future.

While the results of this study provide support for collaborative learning strategies, it also suggests some modifications to groupwork. First, faculty should make it difficult for students to free ride. For example, McKinney and Graham-Buxton (1993) recommend averaging individual and group grades on projects. Instructors could insist each student contribute at least one section to the project and require a table of contents identifying individual work. This would enable faculty to assign each student a grade for his or her contribution as well as awarding them a collective group grade. Second, professors might consider establishing permanent groups at the beginning of the semester. The groups could be formed voluntarily, assigned randomly, or based on ability (e.g., determined by a pretest or students' background in mathematics) in which students are placed in either mixed- or similar-ability groups (Borresen, 1990; Cumming 1983). These project modifications would provide faculty an opportunity to compare the relative effects of different group conditions on learning outcomes.

Conclusion

The results reported in this study suggest faculty take some precautions before committing to teaching strategies that have not been empirically associated with student learning. Nevertheless, the data are by no means representative of all institutions of higher education, and the conclusions drawn are best viewed as tentative. Therefore, I suggest the following areas for future investigation.

First, research is needed to identify course characteristics that improve learning at different types of institutions and on diverse student populations. Modifications in course design and implementation may be required for the effective application of instructional innovation in different environments. Second, more studies are required that connect pedagogical practices to actual student learning (i.e., direct assessment). Using student evaluations of teaching, attitude surveys, and even course grade point averages as learning outcomes do not adequately measure whether a particular technique increased students' skills and knowledge. Faculty should consider using gains in information content-learning to evaluate course outcomes (Gelles, 1980). Third, there is a need for more quasi-experimental assessments of pedagogy in college courses. This would include research designs that employ a systematic method of comparison, utilizing both pretest-posttest and experimental and control groups (Baker, 1985; Chin, 2002). For example, faculty assigned to teach multiple sections of statistics might use a "new" method of instruction in one section and compare the amount learned with a traditionally taught course.

This study has implications for higher education in the areas of pedagogy, student learning, and assessment. The results should interest faculty, in general, and those teaching statistics, one of the most challenging courses in the undergraduate curriculum, in particular. Investigation of teaching effectiveness and student learning are important, both for basic scholarship and because accountability studies by the federal government, state legislatures, and accrediting agencies have become increasingly outcomes based. Faculty seeking new ways to teach should continue to experiment with their pedagogy. At the same time, they must also systematically assess learning outcomes and be prepared

to make modifications in the application of such techniques when empirical evidence of student learning is not linked to the instructional activity.

Appendix

Appendix 1. Statistical Analysis Course Pretest and Posttest Content Areas.

Statistical Analysis Course Pretest and Posttest Content Areas

Item#	*Topic*
1.	Organizing Raw Data - Descriptive Statistics
2.	Frequency Distributions - Descriptive Statistics
3.	Contingency (Cross-Tabulation) Tables - Descriptive Statistics
4.	Contingency (Cross-Tabulation) Tables - Descriptive Statistics
5.	Histogram - Descriptive Statistics
6	Scatter plot - Descriptive Statistics
7.	Skewness - Descriptive Statistics
8.	Percentiles - Descriptive Statistics
9.	Central Tendency (Mean) - Descriptive Statistics
10.	Central Tendency (Mode) - Descriptive Statistics
11.	Central Tendency (Median) - Descriptive Statistics
12.	Variance and Standard Deviation - Descriptive Statistics
13.	Normal Curve - Inferential Statistics
14.	Normal Curve - Inferential Statistics
15.	Confidence Interval - Inferential Statistics
16.	Hypothesis Testing - Inferential Statistics
17.	Hypothesis Testing - Inferential Statistics
18.	Hypothesis Testing - Inferential Statistics
19.	Hypothesis Testing - Inferential Statistics
20.	Hypothesis Testing - Inferential Statistics
21.	*t* Test - Inferential Statistics
22.	*t* Test - Inferential Statistics
23.	Analysis of Variance (ANOVA) - Inferential Statistics
24.	Analysis of Variance (ANOVA) - Inferential Statistics
25.	Chi-Square - Inferential Statistics
26.	Correlation
27.	Correlation
28.	Regression
29.	Regression
30.	Multiple Regression

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Introducing and Evaluating a "Study Smarter, Not Harder" Study Tips Presentation Offered to Incoming Students at a Four-Year University

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Abstract: This paper: (1) briefly outlines a study tips presentation that uses both evidence from the cognitive and educational psychology literatures as well as demonstrations to teach students how to study more effectively, and (2) provides empirical evidence about whether this study tips presentation affects students' study habits. We provide a brief overview of the presentation, a handout that summarizes the tips, and a reference list rich with sources that support the efficacy of these study approaches. We also summarize a study we conducted to evaluate the effectiveness of the presentation. Thirty-two students completed a questionnaire about their typical study strategies before and three months following the presentation. Additionally, 102 students who did not attend the presentation (control group) completed the study strategies survey, and their responses were compared to those from 74 students who had attended the presentation sometime between 3 months and 3 years and 3 months earlier. Finally, the 74 presentation attendees rated their memory for, utilization of, and perceived influence of the eight study tips. Results support the efficacy of the "Study Smarter, Not Harder" presentation as a way to improve students' understanding and utilization of effective study approaches.

Keywords: study tip instruction, undergraduate students, academic success, cognitive psychology

Students frequently arrive at college eager to learn, but poorly versed in study strategies that will help them succeed in their courses. Students often spend a fair amount of time studying, but may spend that time using ineffective techniques (Gurung, 2005; Karpicke, Butler, & Roediger, 2009). Likewise, faculty may be ill-equipped to assist them with studying more effectively and efficiently (Dunlosky, Rawson, Marsh, Nathan, & Willingham, 2013), often relying on what they believe would be helpful without being familiar with the empirical literature (Gurung, 2011). Although not a heavily researched topic, a few studies have suggested that students may falsely believe that they know the best study approaches when they do not (see Bjork, Dunlosky, & Kornell, 2013, for an overview). One error students make, particularly students who struggle academically, is overestimating how much they know and how long they will be able to retain what they have learned (Hacker, Bol, Horgan, & Rakow, 2000). Students may suffer from an "illusion of knowing," a belief that they comprehend something better than they do (Glenberg, Wilkinson & Epstein, 1982; but see also, Maki & Serra, 1992) or a perception that they are more skilled in a given domain than they actually are (Kruger & Dunning, 1999). Past studies demonstrate the importance of students' study habits, linking students' study

strategies to their academic success in the classroom (Bartoszewski & Gurung, 2015; Gurung, 2005; Gurung, Daniel, & Landrum, 2012). Thus, research focused on improving students' study approaches has the potential to influence students' academic lives broadly and positively.

In perhaps one of the most comprehensive empirical overviews of the varied effectiveness of different study approaches, Dunlosky et al. (2013) evaluated ten common study strategies by examining their generalizability across settings, across learners, across materials and across types of outcome measures. They reviewed the educational and cognitive psychology literature pertaining to each and found that not all strategies are equally effective. In the conclusion of their article, they recommend that students be taught how to use study strategies to their advantage. This is not a new recommendation, as many past researchers have emphasized the importance of educating students about study techniques that work well (Marshak, 1984; Pressley, Goodchild, Fleet, Zajchowski, & Ellis, 1989). Despite this, we could find very few studies in the literature that involve teaching students study techniques and then evaluating whether the study tip training positively influences academic success. In 1999, Beidel, Turner, and Taylor-Ferreira published a study demonstrating that teaching test-taking strategies to elementary students with test anxiety can decrease their anxiety and improve their academic performance as measured by their grade point average. Additionally, Chen, Chavez, Ong, and Gunderson (2017) demonstrated that simply encouraging college students to self-reflect about (1) the resources they planned to use to prepare for exams, (2) why they were selecting those resources, and (3) how they would use them improved students' test scores in an introductory statistics course. Thus, evidence suggests that simple interventions can positively affect students' academic performance, but we were unable to find past research addressing whether direct instruction about effective study strategies can improve college students' approaches to studying in their everyday academic lives.

Dunlosky and colleagues (2013) point out that one barrier to faculty incorporating lessons on study approaches into their classes may be that they, themselves, do not know which strategies are effective or how to teach students to implement them. Thus, our paper has two goals: (1) to briefly outline a study tips presentation that uses both evidence from the cognitive psychology literature as well as demonstrations to teach students how to study more effectively that faculty can use as a model for utilization with their own students, and (2) to provide empirical evidence about whether this study tips presentation affects students' study habits so that faculty can decide whether the effort to teach students to study more efficiently is worthwhile. Although these study tips are based on evidence from the Cognitive and Educational Psychology literatures, they are general study tips that are applicable to college students regardless of their background or major.

The first and second authors originally generated the "Study Smarter, Not Harder" presentation in response to a request from students in our department for an evening workshop that taught them how to study more effectively. A member of our Learning Resource Center (LRC) attended and asked us to create a short one-page overview of our study tips for inclusion in a newsletter distributed to all incoming students at our university. The following semester (August of 2012), the LRC asked us to share our presentation as part of a student orientation program on campus. Since then, we have regularly presented these study tips to students on our campus, largely during optional student orientation events: College 101 (August 2012, September 2013, and September 2014), Stress Less Week (April 2014), and the newer Become Your Best Bulldog portion of Orientation Week (August 2015 and August 2016). Across the same period of time, we have also shared the "Study Smarter, Not Harder" tips and associated evidence with faculty at a national conference (see Gingerich & Lineweaver, 2011) and at professional development workshops on our own campus and on other campuses in hopes that other faculty members would, in turn, share the tips with their students. Both our student and our faculty audiences have represented a broad array of disciplines. Although we have received positive evaluations and feedback from student and faculty attendees immediately after these

sessions, we did not have any data that indicate whether students ultimately use the tips in their classes after attending our session. We designed this study to evaluate the effectiveness and usefulness of our presentation by asking students who have attended one of our sessions to complete a brief survey about their study habits and their perceptions of the study tips.

We hypothesized that "Study Smarter" informed students would report using study strategies that relate to the eight tips we present more often than and would perceive these strategies as more effective than strategies unrelated to the tips. We expected these views to be stronger after the presentation than before the presentation, and we expected them to be stronger in students who attended the presentation compared to a control group of students who did not. We also expected "Study Smarter" students to remember the eight study tips we presented, to report using them in their coursework, and to perceive them as contributing positively to their academic success. We conducted this study because we wanted to determine whether these tips are helpful to students and whether any effect of attending the presentation persists across time.

Method

An Overview of the "Study Smarter, Not Harder" Presentation

We created the "Study Smarter, Not Harder" presentation to teach faculty and students eight tips for maximizing study time and study effort. The one-hour presentation includes empirical evidence in support of most of the tips combined with multiple demonstrations designed to illustrate each in a convincing and memorable way. The eight tips include (1) Pay Attention, (2) Skim Listen Read Repeat (SLRR), (3) Don't Rote Memorize, (4) Study A Little A Lot, (5) Quiz Yourself, (6) If at First You Don't Succeed, Try Something Else, (7) It's Never Too Early, and (8) Take Care of Yourself. (See Appendix 1 for the handout that briefly summarizes each of these tips.) Additionally, our reference list highlights many additional empirical articles that support each of the tips. For brevity and readability, we did not incorporate these references into the text of our article. This reference list is by no means exhaustive (the literature on many of these tips is quite extensive), but rather offers a sampling of studies in the literature that provide evidence that each of these tips should positively influence students' learning in academic settings. We offer this as a resource for faculty who would like to teach students to study more effectively. Another wonderful resource is a recent article by Putnam, Sungkhasettee, and Roediger (2016). A careful reading of their paper will reveal much of the same advice we offer here with additional empirical support for these tips. Finally, we also invite interested readers to email us (tlinewea@butler.edu or mhall2@butler.edu) if they would like an up-to-date, complete version of our power point presentation that they can share with others or that they can modify for their own purposes.

Participants

One hundred and seventy-six students at a mid-sized private mid-western university participated in this study. The participants were divided into two groups. The first group was comprised of attendees (n = 74), students who had attended one of our "Study Smarter, Not Harder" presentations in the past and who agreed to participate in the study by completing our online questionnaires. We recruited attendees through a personal email invitation sent to 223 students who had attended a 2013, 2014, or 2016 presentation (no information was available for students who had attended the 2015 session, and 2012 attendees were likely to have graduated by the time we conducted this study). The second group included non-attendees (n = 102). We recruited these control group students from our general Psychology Department undergraduate participant pool through Sona, an online participant

management system. Thus, all of our control group students were enrolled in a psychology course ranging from Introductory Psychology (primarily non-majors) to an upper level psychology course (primarily Psychology majors or minors) at the time of their participation. On average, the students were 19.5 years old (SD = 1.26), and were in their sophomore year. The majority of participants were female (82%). The attendee and non-attendee groups were not reliably different in age (t (174) = .53, p = .59), class year (t (174) = .37, p = .71), or gender, X^2 (n = 176) = .73, p =.69.

Materials

Demographic Questionnaire. This questionnaire assessed participants' demographic characteristics such as their age, gender, class year, and which presentation (if any) they had attended. It also asked the participants who had attended Become Your Best Bulldog in 2016 to indicate their name. This allowed us to link their baseline data to their post-presentation data.

Study Strategies Questionnaire. Created for the purpose of this study, this questionnaire asked all participants to indicate how effective they believed 20 study strategies to be (1="not effective" to 5="highly effective") and to specify how often they utilize the same 20 strategies (1="never" to 5="always") as part of their typical study approach. We drew several of these strategies from those described by Dunlosky et al. (2013) and supplemented them with study strategies that students frequently report using (e.g., looking over notes or using flashcards) and strategies that directly related to our presentation (e.g., skimming reading before class or changing ineffective strategies). Ten of the strategies related to tips from the presentation and ten did not. (Please see Appendix 2 for a full copy of the questionnaire.) We tallied participants' responses for tip-related and tip-unrelated strategies, with higher scores indicating a more positive perception of the effectiveness and a higher reported usage of the strategy type (possible range = 10 to 50).

"Study Smarter" Questionnaire. Only attendee participants completed this questionnaire, which was also created specifically for this study and which directly assessed the perceptions of each of the eight study tips from the "Study Harder, Not Smarter" presentation. Each of the attendees rated the eight tips on how well they remembered it (1="do not remember" to 4="vividly remember"), how often they use it (1="not at all" to 4="a lot"), and how much they believe it has positively influenced their academic success (1="not at all" to 4="a lot"). For the questions about frequency of use and perception of positive influence, we also included an option for students to indicate that they could not remember the tip well enough to rate it; in this case, we excluded these responses from analysis. (Please see Appendix 3 for a full copy of the questionnaire.) Possible scores on each of the three subscales ranged from 8 to 32, with higher scores indicating better memory, greater utilization, and more positive perceptions of the study tips.

Procedure

Each participant completed the study online. We used Limesurvey, an open source online survey application, to build the online assessment that encompassed all of the questionnaires. The majority of the participants only completed this online portion, which was available for one month from November 1st, 2016 to December 1st, 2016. However, a subset of the attendee group (i.e., those who attended the 2016 Become Your Best Bulldog "Study Smarter, Not Harder" presentation (n = 32)) also provided baseline data by filling out a hard copy of the Study Strategies Questionnaire immediately before the study tips presentation began.

When taking the online survey, attendees completed all three questionnaires in a specified order: first the Demographic Questionnaire, next the Study Strategies Questionnaire and, finally, the "Study Smarter" Questionnaire. Non-attendees followed the same procedure, except their survey did

not include the "Study Smarter" Questionnaire. For attendees, the elapsed time from their attendance at the presentation to the time they completed the online survey ranged from three months (2016 attendees) to three years and three months (2013 attendees). The attendees whom we recruited through email received either a $5 Amazon gift card or extra credit in a psychology course in return for their time. Non-attendee control participants received extra credit in a psychology course for their participation.

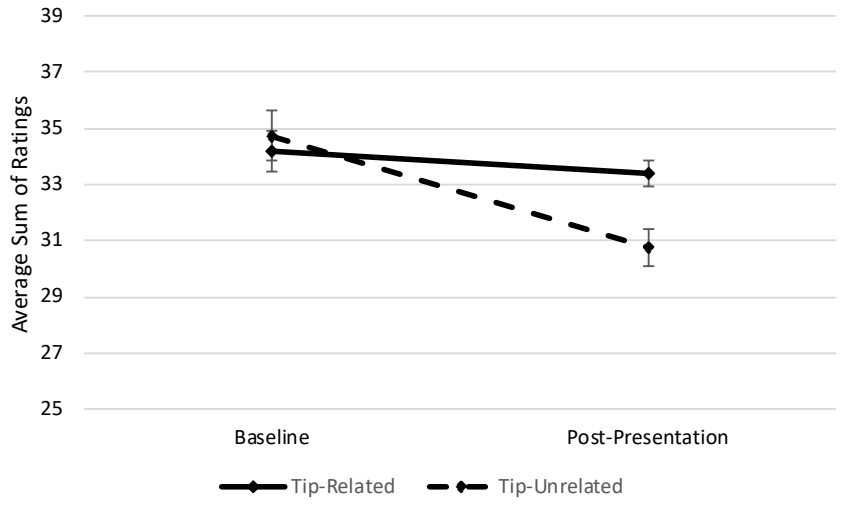
Results

Hypothesis 1: Perception and Usage of Common Study Strategies Before vs After the Presentation (Study Strategies Questionnaire)

To evaluate changes in attendees' perceptions of and usage of common study strategies that were related versus unrelated to the eight presentation tips from before to after the presentation, we ran two 2 (Strategy: Tip-Related vs Tip-Unrelated) x 2 (Time: Baseline vs Post-Presentation) repeated-measures ANOVAs. Both factors were within-subjects. Data were available only for the 32 attendees of the 2016 Become Your Best Bulldog session (i.e., the only presentation at which we administered the Study Strategies Questionnaire immediately before sharing the tips) who also participated in the follow-up online study (three months after the presentation). The dependent measures in the two analyses were (1) ratings of strategy effectiveness and (2) ratings of frequency of strategy use.

For strategy effectiveness, the main effect of Strategy neared significance (F (1, 31) = 3.54, p = .069, η_p^2 = .10), and the main effect of Time reached significance, F (1, 31) = 9.29, p = .005, η_p^2 = .23. However, these two main effects were qualified by a significant Strategy x Time interaction, F (1, 31) = 14.38, p = .001, η_p^2 = .32. See Figure 1, panel A. At baseline, before hearing the presentation, students who attended the presentation rated the tip-related strategies and the tip-unrelated strategies as similarly effective, F (1, 31) = 0.40, p = .53, η_p^2 = .01. However, approximately three months later, they believed that the tip-related strategies were significantly more effective than the tip-unrelated strategies, F (1, 31) = 32.02, p < .001, η_p^2 = .51. Interestingly, this was due to a decrease in the ratings of effectiveness of the tip-unrelated strategies from baseline to post-presentation, F (1, 31) = 15.08, p = .001, η_p^2 = .33; perceptions of the tip-related strategies were stable across the two assessments, F (1, 31) = 1.23, p = .275, η_p^2 = .04.

(A)



(B)

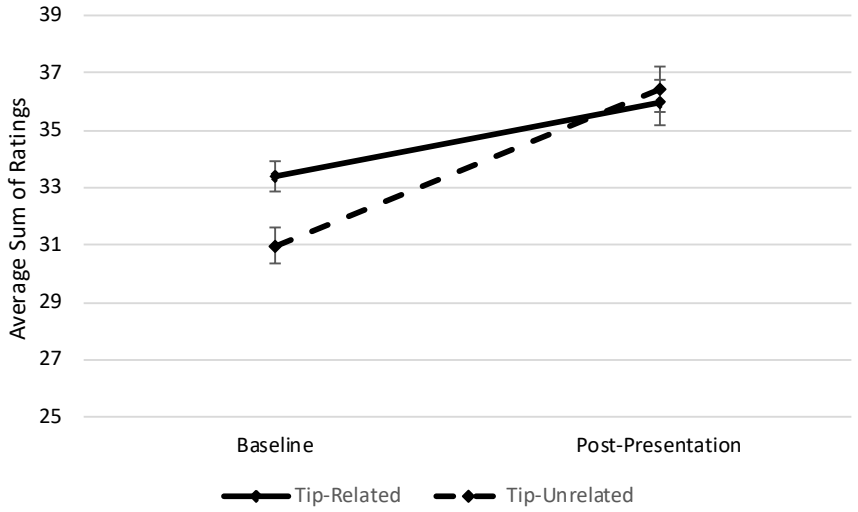


Figure 1. Changes in students' perceptions of strategy effectiveness (A) and reported likelihood of strategy use (B) before versus after hearing the "Study Smarter, Not Harder" presentation.

For strategy effectiveness, students rated tip-related (solid lines) and tip-unrelated (dashed-lines) strategies equivalently at baseline, but tip-unrelated strategies as less effective than tip-related strategies after the presentation. For strategy use, students reported using both tip-related and tip-unrelated strategies more frequently after the presentation than at baseline.

For strategy use, the main effect of Strategy did not reach significance (F (1, 31) = 2.24, p = .144, η_p^2 = .07), but the main effect of Time was statistically significant, F (1, 31) = 33.92, p < .001, η_p^2 = .52. Again, this main effect was qualified by a significant Strategy x Time interaction, F (1, 31) = 6.84, p = .014, η_p^2 = .18. As shown in Figure 1, panel B, the pattern of means was somewhat different for use than it was for effectiveness. Participants reported using the tip-related strategies more often than the tip-unrelated strategies at baseline (F (1, 31) = 9.58, p =.004, η_p^2 = .24), but three months later, their reported use of the tip-related strategies was similar to their reported use of the tip-unrelated strategies, F (1, 31) = 0.23, p = .64, η_p^2 = .01. The increases in reported use of both tip-related and tip-unrelated strategies from baseline to post-presentation were statistically significant, Tip-Related: F (1, 31) = 8.45, p =.007, η_p^2 = .21; Tip-Unrelated: (F (1, 31) = 39.33, p < .001, η_p^2 = .56.

Hypothesis 2: Attendees' vs Non-Attendees' Perceptions and Usage of Common Study Strategies (Study Strategies Questionnaire)

To determine whether students who attended the "Study Smarter, Not Harder" presentation had more positive perceptions of tip-related study strategies and were more likely to use these strategies in their everyday lives than students who did not attend the presentation, we ran two 2 (Strategy: Tip-Related vs Tip-Unrelated) x 2 (Group: Attendee vs Non-Attendee) repeated measures ANOVAs. Strategy was a within-subjects factor, whereas Group was a between-subjects factor. The dependent measures mirrored those from the previous set of analyses: 1) ratings of strategy effectiveness and 2) ratings of

frequency of strategy use. Data were available for all 176 participants, but only reflected students' ratings after having attended the presentation; we did not include baseline data in these analyses.

For effectiveness, there was a significant main effect of Strategy, F (1, 174) = 104.19, $p < .001$, $\eta_p^2 = .38$. Participants perceived tip-related study strategies (M = 32.36, SD = 3.07) as significantly more effective than tip-unrelated study strategies (M = 29.56, SD = 3.85), regardless of whether they had attended the presentation or not. The main effect of Group neared, but did not reach, significance, F (1, 174) = 3.25, $p = .073$, $\eta_p^2 = .02$. The interaction between Strategy and Group also failed to reach significance, F (1, 174) = 0.27, $p = .61$, $\eta_p^2 = .002$.

Figure 2 illustrates attendees' and non-attendees' utilization ratings of tip-related and tip-unrelated study strategies. For usage, the main effect of Strategy was again statistically significant (F (1, 174) = 16.34, $p < .001$, $\eta_p^2 = .09$). Unexpectedly, both groups reported greater use of tip-unrelated than tip-related study strategies, perhaps due to the popularity of the tip-unrelated strategies (e.g., highlighting, reviewing notes) we selected for comparison with the tip-related strategies. The main effect of Group was again not significant, F (1, 174) = 1.56, $p = .21$, $\eta_p^2 = .01$. Unlike for effectiveness, for strategy use, the interaction between Strategy and Group was statistically significant, F (1, 174) = 5.39, $p = .021$, $\eta_p^2 = .03$. As shown in Figure 2, presentation attendees reported significantly greater use of tip-related strategies than controls (F (1, 174) = 5.84, $p = .017$, $\eta_p^2 = .03$), but, not surprisingly, the two groups did not differ in their reported use of tip-unrelated strategies, F (1, 174) = 0.05, $p = .83$, $\eta_p^2 = .000$.

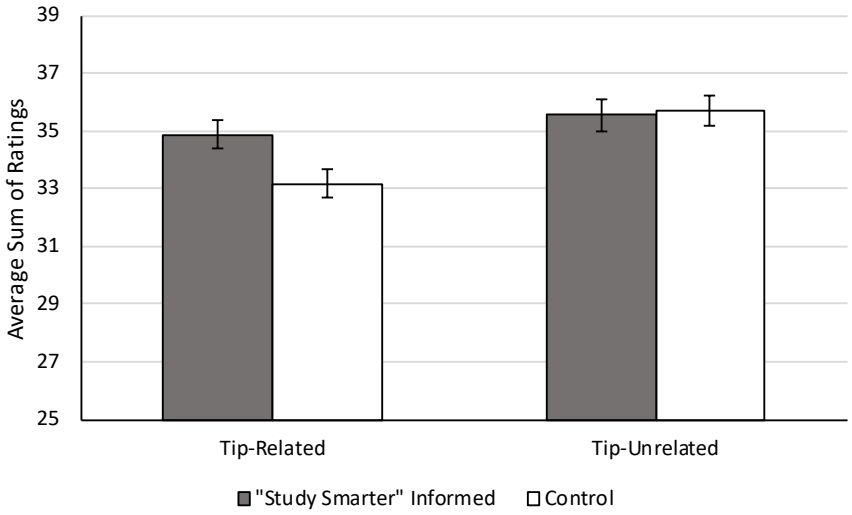


Figure 2. Reported usage of tip-related and tip-unrelated study strategies by students who attended a "Study Smarter, Not Harder" presentation (dark bars) versus controls (white bars). Presentation attendees reported a greater use of tip-related strategies but not tip-unrelated strategies compared to students in the control group.

When we further examined attendees' vs non-attendees' reported usage of each study strategy in a series of one-way ANOVAs, we found that the two groups reported using each of the tip-unrelated strategies to a similar extent, but attendees reported that they utilize four of the ten tip-related strategies more often than controls. The differences between attendees and non-attendees self-reported usage neared statistical significance for two of these strategies (Getting Plenty of Sleep and Skimming Readings before Class), and reached statistical significance for the other two (Having Fun

with Friends and Eating Healthy Foods). See Table 1 for group means and standard deviations, as well as for inferential statistics from this series of one-way ANOVAs.

Table 1. Means (SD) and inferential statistics for tip-unrelated and tip-related strategies on the Study Strategies Questionnaire by group

	Attendees	Non-Attendees	$F(1,174)$	p
	Tip-Unrelated Strategies			
Highlighting/Underlining	3.61 (1.12)	3.87 (1.08)	2.50	.116
Recopying notes from class	3.22 (1.27)	3.22 (1.33)	<.001	.998
Looking over notes	4.43 (0.70)	4.46 (0.75)	.064	.800
Using the keyword mnemonic	2.86 (1.14)	3.02 (1.03)	.882	.349
Summarizing	3.47 (0.91)	3.36 (1.02	.546	.461
Creating flashcards	3.19 (1.17)	3.32 (1.23)	.535	.465
Interleaving practice	2.80 (0.97)	2.68 (1.00)	.647	.422
Taking frequent brain breaks	3.59 (1.02)	3.54 (1.08)	.118	.731
Rereading slides/handouts	4.24 (0.82)	4.22 (0.98)	.039	.845
Reading through a study guide	4.14 (0.97)	4.03 (0.93)	.536	.465
	Tip-Related Strategies			
Getting plenty of sleep[a]	**3.65 (0.96)**	**3.37 (1.07)**	**3.11**	**.079**
Minimizing distractions	3.30 (0.93)	3.23 (1.04)	.222	.638
Skimming reading before class[a]	**3.12 (1.02)**	**2.80 (1.11)**	**3.77**	**.054**
Having fun with friends[*]	**3.57 (1.04)**	**3.21 (1.02)**	**5.34**	**.022**
Practice testing	3.49 (1.14)	3.59 (1.10)	.356	.552
Making material meaningful	3.70 (0.87)	3.51 (0.94)	1.92	.168
Distributing practice	3.30 (0.87)	3.09 (1.01)	2.07	.152
Regularly exercising	3.34 (1.11)	3.36 (1.19)	.020	.888
Eating healthy foods[*]	**3.64 (0.80)**	**3.28 (0.93)**	**6.86**	**.010**
Changing strategies if not working	3.77 (0.82)	3.73 (0.97)	.104	.747

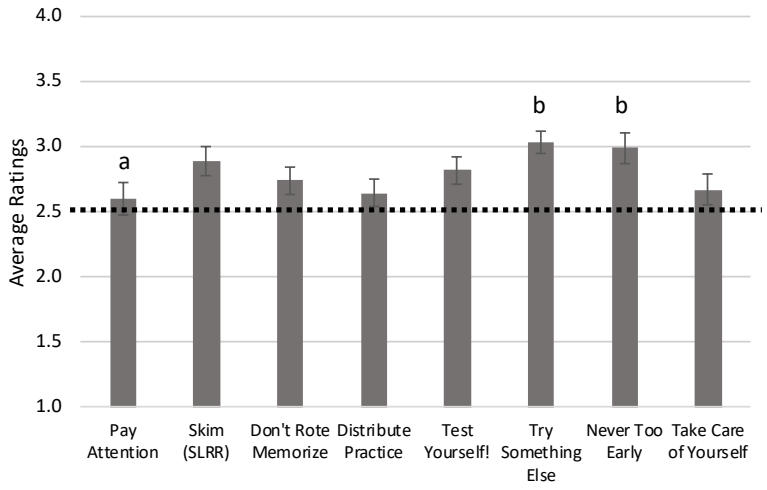
*significant difference between groups ($p < .05$)
[a]near significant difference between groups ($p = .079$; $p = .054$)

Hypothesis 3: Study Tip Memorability, Incorporation into Study Approach, and Perceived Influence on Academic Success ("Study Smarter" Questionnaire)

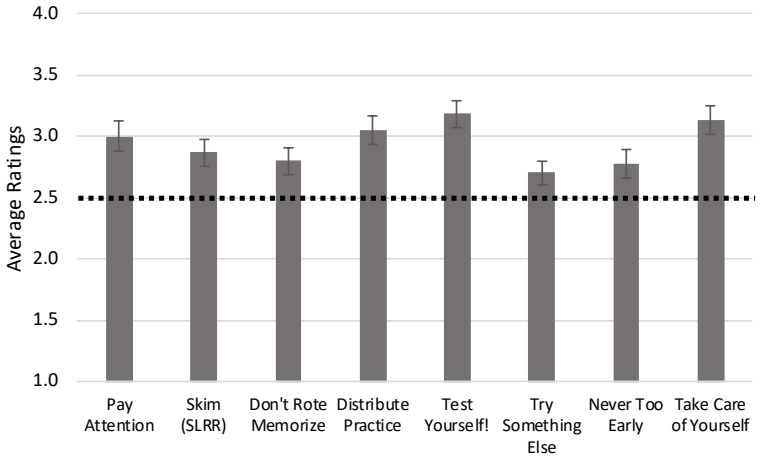
To examine whether presentation attendees remembered the eight specific study tips that we highlighted during the presentation, incorporated these tips into their typical study approach, and believed that these tips positively influence their academic success, we ran three series of one-sample *t*-tests. We set our critical value at 2.5. For tip memorability, the critical value of 2.5 was half way between a response of "Vaguely Remember" and "Largely Remember." For tip incorporation, the critical value of 2.5 represented a response half way between "Somewhat" and "Quite a Bit." Finally, for perceived positive influence of the tips, the critical value of 2.5 indicated a response between "Somewhat" and "Quite a Bit" when participants indicated the extent to which they felt the study tip had a positive influence on their academic success. Figure 3 shows the mean ratings for the

memorability (panel A), incorporation (panel B), and perceived positive influence (panel C) of each study tip, and Table 2 summarizes the inferential statistics associated with each *t*-test.

(A)



(B)



(C)

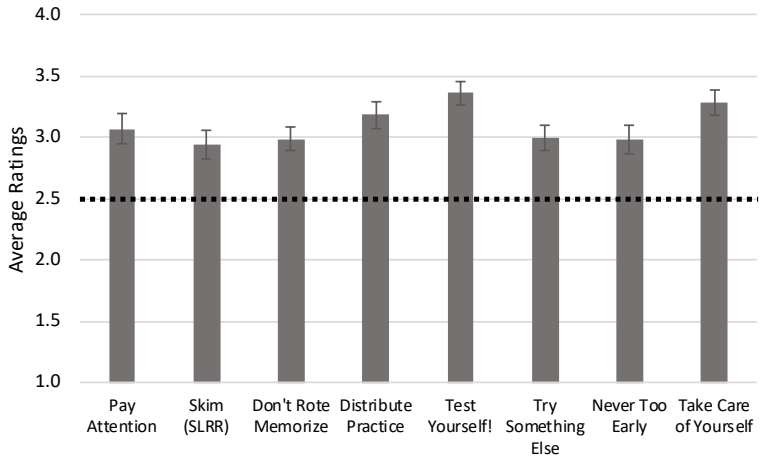


Figure 3. Presentation attendees' ratings of memorability (A), utilization (B), and perceived influence (C) of each of the eight study tips. Five of the eight study tips surpassed the critical value (dotted line) for memorability; tips denoted with superscript a were remembered worse (near significant effect), whereas those denoted with superscript b were remembered significantly better than the tips on average. All of the study tips surpassed the critical value for utilization and perceived influence with no significant differences among the eight tips.

We included data from all 72 presentation attendees in the tip memorability analysis. On average, presentation attendees remembered five of the eight study tips at the 2.5 level (i.e., half way between "Vaguely Remember" and "Largely Remember") or above. The tips they significantly remembered were: Skim, Listen, Read, Repeat, Don't Rote Memorize, Quiz Yourself, If at First You Don't Succeed, Try Something Else, and It's Never Too Early. Average ratings for the other three tips, Pay Attention, Distribute Practice, and Take Care of Yourself, did not exceed the 2.5 critical value set in the analysis.

Participants had the option of not rating their incorporation of each tip if they felt that they did not remember it well enough to say. We excluded data from these participants in the incorporation analysis. Thus, the number of participants contributing data to each of these one-sample *t*-tests varied, as shown in Table 2. Based on the responses of the students who remembered the tip well enough to rate it, the average ratings for incorporation of the tips significantly surpassed the 2.5 critical value (i.e., half way between "Somewhat" and "Quite a Bit") for all eight of the study tips. See Figure 3 and Table 2. Thus, students who attended the "Study Smarter, Not Harder" presentation reported including all of the study tips that they remembered into their typical study approach.

Finally, for perceived positive influence of the tips, participants again did not rate any tip they felt they did not remember well enough, so the number of participants in each analysis varied (see Table 2). Based on responses from those students who rated the perceived influence of the tips, average ratings for all of the tips significantly surpassed the critical value (i.e., half way between "Somewhat" and "Quite a Bit"). See Figure 3 and Table 2 for details. Thus, participants felt that all of the study tips they remembered were positively influencing their academic success.

Table 2. Statistics associated with the one-sample t-tests for each of the eight study tips on the "Study Smarter" Questionnaire

Study Tip	*n*	*t*	*p*
		Remember It	
Pay Attention	72	0.79	.432
Skim, Listen, Read, Repeat	72	3.50	.001
Don't Rote Memorize	72	2.18	.033
Distribute Practice	72	1.30	.199
Quiz Yourself	72	3.03	.003
Try Something Else	72	5.97	<.001
It's Never Too Early	72	4.13	<.001
Take Care of Yourself	72	1.42	.159
		Incorporate It	
Pay Attention	61	3.91	<.001
Skim, Listen, Read, Repeat	68	3.22	.001
Don't Rote Memorize	64	2.71	.009

Distribute Practice	61	4.66	<.001
Quiz Yourself	61	6.43	<.001
Try Something Else	67	2.12	.038
It's Never Too Early	67	2.34	.022
Take Care of Yourself	62	5.42	<.001
	Feel It Positively Influences Academic Success		
Pay Attention	58	4.64	<.001
Skim, Listen, Read, Repeat	67	3.85	<.001
Don't Rote Memorize	67	5.04	<.001
Distribute Practice	61	5.88	<.001
Quiz Yourself	64	9.00	<.001
Try Something Else	69	4.84	<.001
It's Never Too Early	66	4.14	<.001
Take Care of Yourself	64	7.95	<.001

To directly compare the memorability, incorporation, and perceived influence of the eight tips, we ran three repeated-measures ANOVAs. In all three analyses, the independent variable was Tip (with eight levels representing each of the eight tips), and the dependent variables across the three analyses were participants' ratings of (1) how well they remembered the tip, (2) the extent to which they incorporate the tip into their typical study approach, and (3) the extent to which they believe the tip positively influences their academic success.

For memorability, the main effect of Tip reached statistical significance, F (7, 65) = 3.57, p = .003, η_p^2 = .28. Tests of within-subjects contrasts compared the average rating associated with each tip to the average mean rating of all of the tips combined and indicated that If At First You Don't Succeed, Try Something Else (F (1, 71) = 9.48, p = .003, η_p^2 = .12) and It's Never Too Early (F (1, 71) = 4.78, p = .032, η_p^2 = .06) were both remembered significantly better than the tips on average. See Figure 3. Pay Attention was remembered less well than the tips on average, although this difference only neared significance, F (1, 71) = 3.48, p = .066, η_p^2 = .05.

The main effect of Tip did not reach significance for either the extent to which students incorporated the eight tips into their study habits (F (7, 32) = 1.89, p =.105, η_p^2 = .29) or the extent to which students felt the tips positively influence their academic success, F (7, 35) = 1.39, p = .240, η_p^2 = .22. Note that the effect size for each of these two repeated measures analyses were similar to the effect size for tip memorability. However, because cases were excluded listwise in these analyses, the number of participants contributing data was greatly reduced (Incorporation: n = 39; Influence: n = 42), leading to non-significant F-tests.

To determine whether the memorability, likelihood of incorporation, and perceived positive influence of the study tips withstood time, we compared the ratings of students who attended College 101 in 2013 (n = 13), College 101 in 2014 (n = 19), Become Your Best Bulldog in 2015 (n = 4) and Become Your Best Bulldog in 2016 (n = 36) in a series of three multivariate ANOVAs with ratings for each tip on the "Study Smarter" Questionnaire as the dependent variables. Table 3 summarizes the mean ratings from attendees of each of the four sessions. Because Session was an independent variable with four levels, we used Wilks' Lambda multivariate statistic to determine statistical significance in order to protect against potential violations of the homogeneity of treatment difference variances assumption.

Tip memorability ratings differed significantly based on which presentation session students attended, F (24, 177.52) = 2.97, p = .001, η_p^2 = .28. Significant differences were apparent in how well

attendees at more recent vs more remote sessions remembered Pay Attention ($p < .001$), Skim, Listen, Read, Repeat ($p < .001$), Don't Rote Memorize ($p = .046$), and It's Never Too Early ($p = .028$). For Pay Attention, the students who had attended the most recent session (just three months prior to the study) reported remembering the tip significantly better than those who had attended any of the sessions that had occurred more than a year earlier (all ps $\leq .001$). The students who attended the most recent session also reported remembering Skim, Listen, Read, Repeat and It's Never Too Early better than both the students who attended College 101 in 2013 (both ps $\leq .042$) and the students who attended College 101 in 2014 (both ps $\leq .012$), but not better than those who attended Become Your Best Bulldog in 2015 (both ps $> .053$). Finally, students who heard the presentation at the most recent Become Your Best Bulldog reported remembering Don't Rote Memorize significantly better than students who heard the presentation at College 101 in 2014 ($p = .011$), but not better than students who attended College 101 in 2013 ($p = .052$) or Become Your Best Bulldog in 2015, $p = .55$. No other group comparisons reached significance. The rated memorability of the other tips (Study A Little A Lot, Quiz Yourself, If At First You Don't Succeed, Try Something Else, and Take Care of Yourself) did not differ significantly based on which presentation students attended (all ps $> .076$).

The main effect of Session also reached significance for incorporation of the tips, F (24, 81.81) = 2.02, $p = .01$, $\eta_p^2 = .36$. The reported likelihood of incorporating Pay Attention (F (3, 35) = 5.54, $p = .003$, $\eta_p^2 = .32$), Skim, Listen, Read, Repeat (F (3, 35) = 3.10, $p = .039$, $\eta_p^2 = .21$), Quiz Yourself (F (3, 35) = 2.89, $p = .049$, $\eta_p^2 = .20$) and It's Never Too Early (F (3, 35) = 3.36, $p = .030$, $\eta_p^2 = .22$) varied based on which presentation the students attended. The pattern of mean differences was more complicated for incorporation than it was for memorability, and it did not appear to be the case that students who attended the presentation most recently were the most likely to incorporate the tips into their study approach. See Table 3 for details.

Table 3. Mean (SD) Ratings for each of the eight study tips on the "Study Smarter" Questionnaire by presentation session

	College 101 2013	College 101 2014	Become Your Best Bulldog 2015	Become Your Best Bulldog 2016
	Remember It			
Pay Attention[3]	1.62 (0.96)[a]	2.00 (0.75)[a]	2.00 (0.82)[a]	3.33 (0.63)[b]
Skim, Listen, Read, Repeat[3]	2.31 (1.03)[a]	2.47 (0.96)[a]	2.50 (0.58)[a,b]	3.36 (0.68)[b]
Don't Rote Memorize[1]	2.46 (0.97)[a,b]	2.37 (0.96)[a]	2.75 (1.26)[a,b]	3.03 (0.77)[b]
Distribute Practice	2.85 (0.69)	2.84 (0.90)	2.50 (1.00)	2.47 (0.97)
Quiz Yourself	2.85 (0.80)	2.79 (0.63)	3.25 (0.96)	2.78 (1.05)
Try Something Else	2.85 (0.69)	2.74 (0.73)	3.00 (1.16)	3.25 (0.69)
It's Never Too Early[1]	2.69 (1.11)[a]	2.63 (1.01)[a]	2.50 (1.00)[a,b]	3.33 (0.86)[b]
Take Care of Yourself	2.54 (0.97)	2.63 (1.01)	2.50 (1.29)	2.75 (1.00)
	Incorporate It			
Pay Attention[2]	2.20 (0.45)[a]	2.83 (0.75)[a]	3.00 (1.41)[a,b]	3.46 (0.65)[b]
Skim, Listen, Read, Repeat[1]	2.40 (0.55)[a,b]	3.33 (0.52)[b,c]	2.00 (1.41)[a]	3.23 (0.82)[c]
Don't Rote Memorize	2.20 (0.45)	3.33 (1.03)	3.00 (1.41)	2.88 (0.82)
Distribute Practice	3.20 (0.84)	3.67 (0.52)	3.00 (0.00)	2.96 (1.00)
Quiz Yourself[1]	2.60 (0.55)[a]	2.83 (0.98)[a,b]	4.00 (0.00)[b]	3.35 (0.69)[b]
Try Something Else	2.60 (0.89)	2.83 (0.75)	3.00 (1.41)	2.85 (0.61)
It's Never Too Early[1]	1.80 (0.45)[a]	3.17 (0.98)[b]	2.50 (0.71)[a,b]	2.96 (0.82)[b]

Take Care of Yourself	2.80 (0.84)	3.00 (0.89)	2.50 (0.71)	3.31 (0.87)
	Feel It Positively Influences Academic Success			
Pay Attention	2.25 (1.26)	2.70 (0.82)	3.50 (0.71)	3.42 (0.64)
Skim, Listen, Read, Repeat	2.50 (1.29)	3.20 (0.79)	1.50 (0.71)	3.15 (0.83)
Don't Rote Memorize	2.50 (1.00)	3.00 (0.82)	3.00 (1.41)	2.96 (0.72)
Distribute Practice	3.00 (1.15)	3.40 (0.84)	2.50 (2.12)	3.27 (0.83)
Quiz Yourself	3.00 (0.82)	3.20 (0.92)	4.00 (0.00)	3.35 (0.69)
Try Something Else	2.75 (0.96)	3.10 (0.88)	3.00 (1.41)	3.27 (0.72)
It's Never Too Early	2.25 (0.50)	3.10 (0.74)	3.50 (0.71)	3.15 (0.97)
Take Care of Yourself	2.50 (1.00)	3.20 (0.63)	2.50 (0.71)	3.27 (0.87)

Note: Tips followed by a superscript showed significant differences between groups based on the session attended: $^{1}p < .05$, $^{2}p < .01$ or $^{3}p < .001$. Means and standard deviations with different superscripts differed from one another in post hoc analyses with Tukey's test (all ps < .05).

Unlike tip memorability and incorporation, the perceived positive influence of the study tips did not differ depending on which session students attended, F (24, 90.51) = 1.25, p =.24, η_p^2 = .24. Thus, students felt that the tips were positively influencing their academic success to the same extent regardless of whether they learned the tips three months earlier or three years and three months earlier.

Discussion

We had two primary goals in conducting this study and writing this manuscript: (1) to briefly outline a study tips presentation that uses both evidence from the cognitive and educational psychology literatures as well as demonstrations to teach students how to study more effectively regardless of their discipline, and (2) to provide empirical evidence about whether or not this study tips presentation affects students' study habits. Our hope is that faculty teaching a wide range of types of courses will find themselves better informed about how to help their students study effectively (Dunlosky et al., 2013) and may even undertake the task of explicitly teaching students how to maximize their studying (Marshak, 1984; Pressley, Goodchild, Fleet, Zajchowski, & Ellis, 1989). Of course, we are also happy to provide a copy of this presentation to students who may themselves be interested in learning how to "Study Smarter, Not Harder."

Our study, which involves both pre-presentation and post-presentation data, as well as a comparison of responses from presentation attendees to those of a non-attendee control group, consistently supports the efficacy of our one-hour study tips presentation. At the same time, several of our findings, particularly those that compare the eight tips to each other, are somewhat unexpected.

In general, we found strong support for our presentation's effectiveness. Without directly asking students about the study tips, we found that students who attended our presentation changed their views regarding the effectiveness of different types of study strategies from immediately before the presentation to three months after the presentation. Interestingly, rather than enhancing their already positive perceptions of tip-related strategies, the presentation appeared to challenge students to think more critically and to alter misconceptions they may have had about less effective study approaches (Bjork et al., 2013; Gurung, 2005; Karpicke, Butler, & Roediger, 2009). As such, their endorsement of tip-unrelated strategies decreased significantly following the presentation relative to before it, while their beliefs about the effectiveness of tip-related strategies remained stable. It is important to note that this fine-tuning of students' understanding of effective study strategies also corresponded with their transition from high school to college since most of them attended the "Study Smarter, Not Harder" presentation as part of their first-year orientation to the university. Thus, students may have had opportunities to put into practice and to gather their own evidence about what

works and what does not work in the new and challenging collegiate setting during the three months (September, October, and November) that intervened between the presentation and their post-presentation assessments. This may account for the finding that students reported using both types of study strategies (those related to and those unrelated to the study tips) significantly more frequently after the presentation than before. Facing the increased rigor of the college classroom may have inspired students to study more ("study harder"), utilizing a wider range of approaches than they had previously. At the same time, after those three months, they were "smarter" in that they recognized that not all approaches are equally effective.

We documented more evidence that attendance at our presentation helps students "study smarter" when we compared the study habits of students who attended our presentation to those of students who had not. Although both attendees and non-attendees perceived tip-related strategies to be more effective than tip-unrelated strategies overall, the students who attended our presentation reported actually using the tip-related strategies more often than their non-attending peers. These findings are particularly noteworthy because the students who served as non-attendee controls in this study were all enrolled in Psychology courses, with some of them being upper-level Psychology majors who may have learned about some of the tips and the empirical evidence to support them in one or more of their prior Psychology classes. It seems likely that we would have found even larger differences between attendees and controls in these analyses if we had included a more academically diverse and general student population as a comparison group, such that they were more similar to our attendees in background and familiarity with psychological principles. Despite this disadvantage, "Study Smarter" informed students indicated that they incorporate Sleep Tight, Skim Listen Read Repeat, Have Fun, and Eat Right into their study approach to a greater extent than students who did not have the benefit of attending the presentation. This is particularly fascinating as three of these four study strategies relate to the Take Care of Yourself portion of the "Study Smarter" presentation. At the same time, when we asked attendees what they remembered from the presentation, they did not report a strong memory for the Take Care of Yourself tip—this was one of the three tips that was not remembered significantly well. Although future research would be necessary to replicate or to more clearly elucidate possible reasons for these seemingly contradictory findings, one possible explanation is that students learned the importance of taking care of themselves and came to view self-care as an important part of their academic success through their attendance at the presentation, but they did not explicitly recall learning it in that context.

Relatedly, we were surprised that students only remembered five of the eight study tips significantly well. We were also surprised at which of the tips failed to surpass this level of memorability. Students did not remember Pay Attention, the first study tip, and the tip we spend the most time discussing during the presentation, particularly well, with its memorability also decreasing significantly within a year after the presentation. We support this tip with both empirical evidence and with a demonstration that our audiences appear to enjoy. We wonder whether its position as first in the presentation or the extensive amount of time we spend on it undermines its effectiveness. Alternately, students may choose not to remember this tip because they resist the strong recommendation that they eliminate distractions and avoid dividing their attention while studying or because they feel that they are already paying attention fully since they were academically successful in high school, although it is likely that they are not avoiding distractions (Clay, 2009; Gurung, 2005; Rosen, Carrier, & Cheever, 2013). Students also did not report remembering Study a Little a Lot (the tip that encourages them to distribute their studying across time) or Take Care of Yourself (but see the previous paragraph) particularly well. Perhaps these three study tips are considered common sense or have been emphasized to students repeatedly by parents and teachers in the past, causing students to feel that they were already well informed on these suggestions prior to attending our presentation. This may have led them to pay less attention to these tips during the presentation, to share them less

with others after the presentation (reducing their likelihood of being solidly encoded), or to fail to attribute them specifically to the presentation, resulting in less long-term retention and recognition of these tips as being from the "Study Smarter, Not Harder" presentation. Of course, whether or not students report remembering the tips is much less important than whether they use the study strategies, as it is the strategies that students use that predict their academic success (Bartoszewski & Gurung, 2015; Gurung, 2005; Gurung, et al., 2012). Thus, even though students may not explicitly remember Take Care of Yourself as one of the tips from our presentation, our results show that they do view sleeping well, eating right, and having fun as important aspects of their academic approach, suggesting that they are "Studying Smarter" even if they do not know why.

In contrast to the tips that students did not remember well, students did explicitly recall five of the eight tips. Three of these five tips are very concrete: Don't Rote Memorize, Skim Listen Read Repeat, and Quiz Yourself. These may also represent new recommendations rather than simply reiterating what students have learned previously about studying. For example, few teachers and faculty teach students to use self-quizzing as a more effective study approach than re-reviewing material despite its well-established superiority for promoting learning (Dunlosky, et al., 2013; Karpicke & Grimaldi, 2012). Two of these three tips (Skim Listen Read Repeat and Don't Rote Memorize) also involved fairly straightforward and short demonstrations, which could have contributed to their memorability (although Pay Attention also involved a demonstration, but students did not remember it well). In fact, we use an example from Bransford and Johnson (1973) to demonstrate the importance of putting new information into context during the Skim, Listen, Read, Repeat portion of the study tips presentation. One of the authors (T.L) experienced this demonstration in her Developmental Psychology class in 1990 and remembered it when it was time to create this presentation in 2010 (20 years later). Likewise, we were not surprised that students remembered a humorous YouTube video associated with It's Never Too Early called "I am worried about my grade" (http://bit.ly/1PqS6Ho). We were, however, not expecting students to remember If At First You Don't Succeed, Try Something Else as well as they remembered other tips in the presentation. In actuality, students remembered this tip significantly better than the eight tips on average. This is a tip that we cover very briefly towards the end of the presentation, offering neither empirical evidence nor a demonstration in support of it. Perhaps this tip sticks with students because of its catchy and unexpected ending to a common phrase.

Finally, as further support for our presentation, students reported incorporating all of the tips they remembered into their study approach, and they felt that the tips they remembered contribute positively to their academic success. Students' positive perceptions of the tips were consistent across time, remaining significant more than three years after students attended the presentation. Thus, teaching students how to study, especially early in their collegiate career, has the potential to affect their academic success positively across their entire college trajectory. This suggests that providing instruction on how to effectively study may be most valuable during students' transition from high school to college when they have the most time to put those strategies to use. This may also be a time when students are most open to new ideas about studying as they prepare for the new academic demands placed on them in the college environment. Future studies would be necessary, though, to determine whether these speculations are correct and whether empirical evidence can support them.

Although our results reinforce the efficacy of our presentation and support our hypotheses, our study has some limitations that suggest directions for future research. First, our study only included college students as participants. We have not presented our study tips to students at other levels, and, thus, we do not know whether high school or even middle school students would benefit in the same way from explicit instruction into how to study more effectively. The only other study we could find in the literature that examined an intervention designed to teach students test-taking strategies in order to improve their performance (Beidel et al., 1999) was conducted with elementary

students. Thus, there is a real gap in the literature with regards to the potential to improve the performance of students at other academic levels through study approach instruction.

A second limitation of our study is that our sample was self-selected. The students who attended the "Study Smarter, Not Harder" presentation elected to spend 60 minutes learning how to study more effectively rather than choosing to spend that time in another way. These students are unlikely to be representative of the full range of college students. In fact, it is likely that these students are more motivated than average and may, perhaps, be starting at a more advanced academic level than the general college student population. Thus, we cannot determine how struggling or remedial students might respond to this type of presentation. In fact, it is possible that the students who could gain the most from our presentation may be less likely to attend this type of session, especially given that struggling students may be overconfident in the study strategies they utilize (Bjork, et al., 2013; Hacker, et al., 2000). A future study either with a more broadly representative population or specifically targeting struggling students would help determine whether less academically successful students are able to gain as much, or even more, from this type of instruction in study skills.

Third, our study included a control group, but the control group did not experience any form of intervention, and we were not able to assign students to either the control group or the study skills intervention group due to our research design. Future studies could use a more experimental approach, randomly assigning students to either attend or not attend (wait list control group) the presentation or randomly assigning students either to the study skills intervention or to a comparison intervention such as training focused on time management skills.

Finally, we do not have any objective data regarding students' academic success. Thus, we cannot determine whether students who attend our presentation are actually more academically successful than those who do not. Chen et al. (2017) recently demonstrated that students who are more self-reflective about their approach to studying perform better on examinations. Thus, the "Study Smarter, Not Harder" presentation has the potential to improve students' performance both by making them more thoughtful about their studying and by informing them about which strategies are most likely to lead to success. However, only through collecting additional future data about students' GPA or performance in particular classes could we directly assess whether students' perceptions of how the study tips we share with them relate to their academic success are, indeed, accurate.

Despite these limitations, our study offers empirical evidence that college students remember, utilize, and believe their academic success benefits from explicit instruction in how to "Study Smarter, Not Harder." Attending an hour-long study tip presentation also gave students a better understanding of effective versus less effective study approaches. We encourage faculty to use the resources provided here and to request additional resources from us, if desired, in order to help their own students "Study Smarter, Not Harder."

Acknowledgements

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Appendix

Appendix 1. Study Tips Handout.

Study Smarter, Not Harder: Tips for Maximizing Your Study Time and Effort

1. Pay Attention: When studying, focus only on studying, minimizing distractions (extraneous noises, telephone calls and texts, email, crowds). You will get your studying and your socializing done much more efficiently if you set aside separate times to tackle each.

2. Skim, Listen, Read, Repeat (SLRR): Skim the assigned readings prior to the class when they will be discussed, listen to lecture, reread the assignment carefully paying special attention to the sections covered in class, and repeat as necessary. You will get more from class if you have skimmed the assignment prior to the lecture, and you will get more from the reading if you return to it after the professor has explained key concepts.

3. Don't Rote Memorize: Try to make sense of the information you are learning. Relate it to everyday life and to personal experiences. Make sure you understand what you are learning and how it all fits together. If you don't understand it, ask your professor to explain it again during class or during office hours.

4. Study A Little A Lot: Study every subject several times a week. Review your notes the evening after each class or the next day rather than waiting until just before a quiz or examination to review what you have learned. Studying for an exam will take much less time if you have reviewed your notes several times in the interim than if you wait and cram. You may want to create a study schedule that sets aside specific times during the week for reviewing your notes from each class.

5. Quiz Yourself: When reviewing your notes, don't just reread them. Be sure to quiz yourself. Flashcards are one method of achieving this, but you can also simply look away from your notes and practice recalling the information on your own. Explain key concepts to your roommate or parents. If you can't do it, you are not yet ready for the exam. Keep quizzing and explaining until you are sure you can recall the information without relying on your book or notes.

6. If At First You Don't Succeed, Try Something Else: If you are not doing as well in a class as you would like, get help. Consult with the professor, use the learning resource center, utilize tutoring that is available, and find other students who are having greater success and ask them for tips. If you keep approaching the class in the same way, you will likely get the same result. Find another approach.

7. It Is Never Too Early: Semesters go fast. Do not fall behind. Keep up with the readings and the written assignments, and, if you are not able to, reprioritize your time. Once you fall behind, your work in all of your classes will start to suffer.

8. Take Care of Yourself: Sleep. Eat. Have fun. Taking care of yourself physically, mentally, and emotionally is even more essential to your success in college as studying is.

Appendix 2. Study Strategies Questionnaire.
Bold font added to differentiate tip-related from tip-unrelated (non-bolded) strategies.

There are many different ways to approach studying and learning. We are interested in which study habits you use and which habits you think are most effective. Below, you will find a description of a few techniques. Please read it carefully before continuing.

Technique	Description
1. Elaborative interrogation	Generating an explanation for why an explicitly stated fact or concept is true
2. Self-explanation	Explaining how new information is related to known information, or explaining steps taken during problem solving
3. Summarization	Writing summaries (of various lengths) of to-be-learned texts
4. Highlighting/underlining	Marking potentially important portions of to-be-learned materials while reading
5. Keyword mnemonic	Using keywords and mental imagery to associate verbal materials
6. Imagery for text	Attempting to form mental images of text materials while reading or listening
7. Rereading	Restudying text material again after an initial reading
8. Practice testing	Self-testing or taking practice tests over to-be-learned material
9. Distributed practice	Implementing a schedule of practice that spreads out study activities over time
10. Interleaved practice	Implementing a schedule of practice that mixes different kinds of problems, or a schedule of study that mixes different kinds of material, within a single study session

1. To what extent do you use the following study habits? Please circle a number next to each habit:

	Never	Rarely	Sometimes	Often	Always
Highlighting/underlining	1	2	3	4	5
Minimizing distractions (like technology or noise)	1	2	3	4	5
Recopying notes from class	1	2	3	4	5
Getting plenty of sleep	1	2	3	4	5
Distributed practice	1	2	3	4	5
Reading through a study guide	1	2	3	4	5
Changing strategies if yours are not working	1	2	3	4	5
Summarization	1	2	3	4	5
Practice testing	1	2	3	4	5
Taking frequent brain breaks to check email or Facebook after short bursts of studying	1	2	3	4	5
Eating healthy foods	1	2	3	4	5

Making material meaningful (e.g., elaborative interrogation, self-explanation, imagery, etc.)	1	2	3	4	5
Looking over your notes	1	2	3	4	5
Interleaved practice	1	2	3	4	5
Skimming reading before class and carefully reading after class	1	2	3	4	5
Regularly exercising	1	2	3	4	5
Rereading the professors slides or handouts	1	2	3	4	5
The keyword mnemonic	1	2	3	4	5
Having fun with friends	1	2	3	4	5
Creating flashcards	1	2	3	4	5

2. Imagine that you are trying to maximize your learning. How effective do you think each of the following things would be? Please circle a number next to each item below:

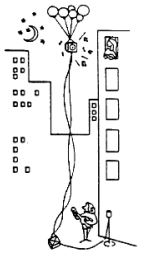
	Never	Rarely	Sometimes	Often	Always
Recopying notes from class	1	2	3	4	5
Eating healthy foods	1	2	3	4	5
Minimizing distractions (like technology or noise)	1	2	3	4	5
Distributed practice	1	2	3	4	5
Looking over your notes	1	2	3	4	5
Having fun with friends	1	2	3	4	5
Interleaved practice	1	2	3	4	5
Creating flashcards	1	2	3	4	5
Practice testing	1	2	3	4	5
Regularly exercising	1	2	3	4	5
Getting plenty of sleep	1	2	3	4	5

Summarization	1	2	3	4	5
Rereading the professors slides or handouts	1	2	3	4	5
Taking frequent brain breaks to check email or Facebook after short bursts of studying	1	2	3	4	5
Changing strategies if yours are not working	1	2	3	4	5
The keyword mnemonic	1	2	3	4	5
Making material meaningful (e.g., elaborative interrogation, self-explanation, imagery, etc.)	1	2	3	4	5
Skimming reading before class and carefully reading after class	1	2	3	4	5
Reading through a study guide	1	2	3	4	5
Highlighting/underlining	1	2	3	4	5

Appendix 3. "Study Smarter" Questionnaire

The following questions ask about your memory for and perception of each of the study tips that were presented as part of the "Study Smarter, Not Harder" session you attended.

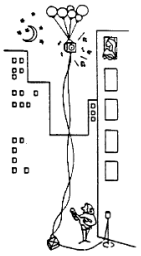
For each tip, please indicate the extent to which you remember the tip and the demonstrations or evidence that accompanied it.

	Do Not Remember	Vaguely Remember	Largely Remember	Vividly Remember
"Pay Attention" (with finding the city names in red and raising your hand to a sound multitasking demonstration)	1	2	3	4
"Skim, Listen, Read, Repeat  (SLRR: with demonstration)	1	2	3	4

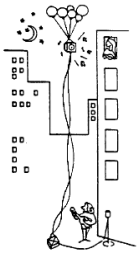
"Don't Rote Memorize" (with largest object/longest word demonstration)	1	2	3	4
"Study A Little A Lot" (with Massers/Spacers math research study explanation)	1	2	3	4
"Quiz Yourself" (with repeated study, concept map, and self-test research study explanation)	1	2	3	4
"If at First You Don't Succeed, Try Something Else"	1	2	3	4
"It's Never Too Early" (with 'I'd like to talk to you about my grade' student/professor video)	1	2	3	4
"Take Care of Yourself" (with photos at Butler of Eating Right, Sleeping Tight, Exercising, and Having Fun)	1	2	3	4

For each tip, please indicate the extent to which you have incorporated it into your approach to studying.

	Not At All	Somewhat	Quite a Bit	A Lot	Could Not Say Because I Do Not Remember the Tip
"Pay Attention" (with finding the city names in red and raising your hand to a sound multitasking demonstration)	1	2	3	4	n/a

"Skim, Listen, Read, Repeat  (SLRR: with demonstration)	1	2	3	4	n/a
"Don't Rote Memorize" (with largest object/longest word demonstration)	1	2	3	4	n/a
"Study A Little A Lot" (with Massers/Spacers math research study explanation)	1	2	3	4	n/a
"Quiz Yourself" (with repeated study, concept map, and self-test research study explanation)	1	2	3	4	n/a
"If at First You Don't Succeed, Try Something Else"	1	2	3	4	n/a
"It's Never Too Early" (with 'I'd like to talk to you about my grade' student/professor video)	1	2	3	4	n/a
"Take Care of Yourself" (with photos at Butler of Eating Right, Sleeping Tight, Exercising, and Having Fun)	1	2	3	4	n/a

Finally, for each tip, please indicate the extent to which you feel it has positively influenced your academic success as a college student.

	Not At All	Somewhat	Quite a Bit	A Lot	Could Not Say Because I Do Not Remember the Tip
"Pay Attention" (with finding the city names in red and raising your hand to a sound multitasking demonstration)	1	2	3	4	n/a
"Skim, Listen, Read, Repeat  (SLRR: with demonstration)	1	2	3	4	n/a
"Don't Rote Memorize" (with largest object/longest word demonstration)	1	2	3	4	n/a
"Study A Little A Lot" (with Massers/Spacers math research study explanation)	1	2	3	4	n/a
"Quiz Yourself" (with repeated study, concept map, and self-test research study explanation)	1	2	3	4	n/a
"If at First You Don't Succeed, Try Something Else"	1	2	3	4	n/a
"It's Never Too Early" (with 'I'd like to talk to you about my grade' student/professor video)	1	2	3	4	n/a

"Take Care of Yourself" (with photos at Butler of Eating Right, Sleeping Tight, Exercising, and Having Fun)	1	2	3	4	n/a

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An Empirical Exploration of the Perceived Effectiveness of a 'Flipped Classroom' in a Business Communication Course

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Abstract: This paper explores a causal model, using Structural Equation Modelling (SEM), in order to understand how the perceived effectiveness of the 'flipped classroom' and students' satisfaction with this technique can be affected by students' engagement in the 'flipped classroom' activities as well as the complexity and task orientation of such activities. The findings of the study confirm that the perceived effectiveness of the 'flipped classroom' can be calculated by its contribution to the improvement of students' general skills, knowledge and learning motivation. Students' engagement in the 'flipped classroom' activities is the key factor influencing perceived effectiveness and students' satisfaction, while the complexity and task orientation of the 'flipped classroom' also play a role in determining perceived effectiveness and satisfaction, although indirect and always mediated by engagement.

Keywords: Flipped classroom, learning effectiveness, engagement, complexity, task orientation

The introduction of teaching innovations promotes improvements in the classroom experience and the academic performance of students. This idea is especially defended in university contexts, where scholars have reported better learning outcomes and improved student satisfaction when innovative teaching methods (e.g., technology-mediated classes) are incorporated to the learning process (Lee, 2011; Hu & Hui, 2012).

Following this line of thought, in recent years, many professors and researchers have begun to study the 'flipped classroom' as a teaching innovation with clear potential to enhance the learning experience of university students (Strayer, 2012; Toqeer, 2013; Butt, 2014; Mok, 2014; Findlay-Thompson & Mombourquette, 2014; Prashar, 2015). The premise of the 'flipped classroom' technique, also sometimes referred to as 'inverted classroom', is to 'flip' the traditional sequence of activities developed in more conventional teaching models that are primarily instructor-centered.

More precisely, in a traditional instructor-centered classroom, the teacher delivers lectures during class time and gives students homework to be done after class. In a 'flipped classroom' things are done the other way round: The teacher delivers lectures before class in the form of different types of materials, and spends class time engaging students in learning activities that involve collaboration and interaction among students (Butt, 2014; Hoffman, 2014). In recent years, scholars have reported that the use of this technique provides greater flexibility in teaching, improves student attitudes towards learning and reduces student stress and failure rates, thus accounting for better learning outcomes (Mok, 2014). Therefore, the 'flipped classroom' has started to be applied in many educational fields such as business, humanities or health and medicine, among others.

Along this line, most discussions of the 'flipped classroom' technique are focused on theoretically defending the benefits of the technique (Toqeer, 2013; Kovach, 2014) or describing a robust methodology to conduct such activities effectively in the classroom (Mok, 2014; Hoffman, 2014). However, there are still few studies that have explored what students think of the 'flipped classroom' technique and whether they perceive it as useful, effective and satisfactory in university teaching. More precisely, do students feel more satisfied when the 'flipped classroom' activities are implemented? Do perceived learning outcomes exclusively depend on the application of this new teaching technique? Alternatively, are there also other cognitive variables that contribute to the perceived effectiveness and students' satisfaction in a 'flipped classroom'? In this regard, knowing students' opinions concerning the 'flipped classroom' technique would be especially interesting for teachers and educational institutions because students' satisfaction is directly related to the effort they put in their studies and, as a consequence, their success and learning rates.

Based on engagement theory (Kearsley & Shneiderman, 1998), the Technology Acceptance Model (TAM) (Davis, 1989) and service quality theory (Grönroos, 1984), in this paper the authors explore students' perceptions of the effectiveness and satisfaction with the 'flipped classroom' and they relate them to student engagement in the flipped activities, the complexity of the technique and the orientation of the tasks assigned to students. The application of these three theories to the study of teaching innovations suggests that simply exposing the student to a particular set of new activities may or may not work (Astin, 1984). First, engagement theory suggests that teaching must elicit sufficient student effort and investment of energy to bring about the desired learning and satisfaction outcomes. Additionally, the TAM proposes that the effectiveness of an innovation is directly affected by how effectively the pedagogical innovation functioned in terms of its ease of use; that is, the technique effectiveness is inversely correlated to the complexity of the technique (Meso & Liegle, 2005). Thirdly, scholars have also based on marketing theories, such as the service quality theory, to corroborate that students' perceptions of the teacher's way of lecturing and the assurance about his/her competence and knowledge are the most important dimensions of educational quality that impact perceived effectiveness and students' satisfaction (Duque 2014). As suggested by Fraser and Treagust (1986), these issues are represented in the extent to which class activities are clear and well organized (i.e., task orientation).

To explore these ideas, the authors first test the perceived effectiveness of the 'flipped classroom' by evaluating how the application of this technique contributes to improve students' a) general skills (critical thinking, synthesis, etc), b) knowledge about the course content and c) learning motivation. Subsequently, the perceived effectiveness of the 'flipped classroom' is related to students' engagement, task complexity and task orientation and satisfaction.

The study is implemented with data collected from 150 students who were enrolled in a business communication course taught in the third year of the Bachelor in Business Administration at a Spanish university. Although this research context may look too narrow and interdisciplinary concerns cannot be evaluated based on the scope and size of the surveyed sample, the authors believe that the findings reported in this paper may still represent an interesting initial step to

advance the academic knowledge on students' self-reported perceptions of and satisfaction with the 'flipped classroom' activities.

The rest of the paper is organized as follows. In the second section, the literature review and the hypotheses are presented. The third section summarizes the methodology used to conduct the study, paying particular attention to the explanation of the 'flipped classroom' activities developed in the course, the sample collection and the measurement scales. Afterwards, the research findings are presented, differentiating between the study of the reliability and validity of the measurement scales and the test of the research hypotheses. In the fifth section, the conclusions are discussed and the authors present the limitations and future lines of research derived from the study.

Literature review and hypotheses development

Perceived effectiveness of the 'flipped classroom'

The lecture model has traditionally dominated higher education. Despite the revolution caused by the Internet in terms of interactivity and flexibility for teachers and students, still tradition dictates and most universities continue reserving several hours a week for lectures (Butt, 2014). However, scholars have recently suggested that perhaps the lecture model might not be the most effective approach for student learning because, when compared to innovative methods, students in traditional classes feel much less excited and engaged in learning (Butt, 2014).

The 'flipped classroom' technique was proposed and popularized in the early twenty-first century by Baker (2000) and Lage et al. (2000) with the aim of improving the effectiveness of classroom teaching in higher education. Simply put, this methodology flips the delivery of materials and theoretical content outside in-class hours, usually before actual teaching, to use these classes in conducting interactive and collaborative activities that deepen on the key concepts of the course and that support student active learning (Butt, 2014). In a 'flipped classroom' the teacher is moved from the center of the process to a margin, acting as technical support for student work instead of a transmitter of knowledge, as it normally happens in lectures (Hoffman, 2014). In this technique, the transmitters of knowledge are the students themselves, who explain theoretical content to their classmates within small workgroups or in activities involving the whole class (Toqeer, 2013; Findlay-Thompson & Mombourquette, 2014).

Two things are critical for a 'flipped classroom' to work: (1) students are physically in the classroom when the 'flipped classroom' activities are implemented, and (2) students have read, watched and prepared the materials provided by the teacher before the session takes place (Mok, 2014). To students, the syllabus and teaching material in a 'flipped classroom' may not look particularly different to those in more traditional models, but the way of accessing these materials is different (Butt, 2014). As such, the 'flipped classroom' could be seen as a stepping stone to less structured and inquiry-based learning environments such as lectures (Hmelo-Silver, 2004).

The little academic research on the 'flipped classroom' that has been developed to date indicates that the general opinion of students about this teaching innovation is usually positive (Butt, 2014; Prashar, 2015). For example, Lage et al. (2000), Gannod et al. (2008) and Schullery et al. (2011) find favorable impressions of their students in introductory microeconomics, software engineering and business courses. Additionally, Strayer (2012) finds that students in a 'flipped classroom' become more open to co-operation and innovation as the semester progress.

Nonetheless, previous findings suggest that the mere participation of students in an innovative activity is no guarantee of success of the teaching technique (Astin, 1984; Orús et al., 2014). Instead, teachers have to place special emphasis on ensuring that the development of the activity is productive and attractive to students (Prashar, 2015). On the contrary, the mere

imposition of new activities, unknown to the student and involving an additional workload without a clear performance in terms of learning, could even prove counterproductive to the progress of teaching and students' perceptions. As suggested by Prashar (2015, 132), 'there is a pressing need to reform the traditional didactical methods to make learning both enjoyable and effective. In that direction, Bloom's revised taxonomy emphasizes collective creation. Further, the flipped classroom approach shifts the lower levels of taxonomy outside the class using interactive technologies, enabling instructors to spend more class time at the upper end of the taxonomy, with tasks that stimulate students to apply, analyze, evaluate, and create'.

These ideas refer to the perceived effectiveness of the pedagogical technique as a key construct to understand the success of teaching innovations (Alavi, 1994; Leidner & Fuller, 1997). Effectiveness refers to the changes in skills, knowledge and attitude of the students after the completion of an activity or course (Lee, 2011). As suggested by Alavi (1994), this construct is defined in terms of self-reported learning and evaluation of classroom experience. Specifically, learning scales developed by Alavi (1994) to measure the effectiveness of collaborative learning include three dimensions referred to perceived skill development, self-reported understanding of basic knowledge and learning motivation during in-class time.

Based on these ideas, the first goal of the paper is to evaluate the effectiveness of the 'flipped classroom' technique as perceived by university students in a business communication course. Specifically, the authors suggest that perceived effectiveness of the 'flipped classroom' is achieved when the activities (a) allow students to work and develop their general skills; (b) contribute to the internalization of the key concepts of the course and (c) make class attendance more engaging, attractive and motivating for students. Thus, the first hypothesis suggests that:

H1: The perceived effectiveness of a 'flipped classroom' is composed of three dimensions related to the improvement in students' (a) general skills, (b) knowledge and (c) learning motivation.

Perceived effectiveness and satisfaction

Once the innovative technique has proved effective, then satisfaction with the technique is guaranteed (Duque, 2014). Satisfaction refers to the feelings and attitudes of students towards learning activities (Lee, 2011). Feeling happy or having a positive attitude means satisfaction. Instead, feeling unhappy or having a negative attitude means dissatisfaction (Lee, 2011). Scholars have traditionally considered that learning satisfaction is one of the major items to measure learning achievement and many have highlighted that this should be one of the main goals that higher education pursued (Appleton-Knapp & Krentler, 2006). According to this suggestion, the second goal of the paper is to propose and test a causal model that assist teachers in understanding how they can improve their teaching effectiveness and the satisfaction of their students when using the 'flipped classroom' technique.

To explain the relationship between perceived learning effectiveness and student satisfaction, scholars frequently understand education as a service context and they build their arguments on the traditional service literature. Specifically, scholars liken perceived learning effectiveness to perceived service quality (Appleton-Knapp & Krentler, 2006; Duque, 2014). Perceived service quality is defined as the consumer's overall impression of the relative inferiority/superiority of the organization and its services (Bitner & Hubbert, 1994). Additionally, satisfaction is the consumer's general dis/satisfaction with the organization based on all encounters and experiences with that particular organization (Bitner & Hubbert, 1994). In the context of higher education, this definition represents a cumulative approach that assesses the complete student experience. Thus, overall

student satisfaction is based on the students' general experience of the course performance, which positions perceived effectiveness as a direct antecedent of student satisfaction (Duque 2014). As Appleton-Knapp and Krentler (2006) also describe that student's perceptions of the course performance are the clearest elements determining satisfaction. Thus, the authors propose the following hypothesis:

H2: The perceived effectiveness of a 'flipped classroom' has a significant and positive effect on students' satisfaction with this technique.

Engagement

In order to improve learning and satisfaction outcomes, scholars have given a special relevance to student engagement in learning activities (Astin, 1984; Pike et al., 2012; Hu & Hui, 2012; Hsieh, 2014). Student engagement refers to the amount of physical and psychological energy that the student devotes to the academic experience (Astin, 1984). A highly involved student is one who, for example, devotes considerable energy to studying and interacts frequently with colleagues and teachers during in-class and out-class hours (Hsieh, 2014). Conversely, a typical uninvolved student neglects studies, spends little time on campus, abstains form interaction with classmates and has infrequent contact with faculty members (Hsieh, 2014).

As reported by Kearsley and Shneiderman (1998), the engagement theory provides an adequate theoretical framework to understand the role of student engagement in the achievement of positive learning outcomes. This theory emphasizes active participation of the student in the learning process and suggests that learning will be greatest when the learning environment is structured to encourage active participation by the student (Astin, 1984; Kuh et al., 2005). Two key principles of this theory state that: '(1) The amount of student learning and personal development associated with any educational program is directly proportional to the quality and quantity of student involvement in that program and (2) the effectiveness of any educational policy or practice is directly related to the capacity of that policy or practice to increase student involvement' (Astin, 1984, 519). This theory is closely related to the experiential learning theory proposed by Kolb et al. (1990), who suggests that people learn by doing; that is, by engaging in learning activities, students internalize what they learn and can absorb and reflect on the learning experience (Hu & Hui, 2012). By deeply engaging in learning, students undertake more effort to meet the learning requirements and accomplish the learning goal by acquiring focal knowledge or skills (Robinson & Hullinge, 2008).

These ideas have been empirically supported by the findings of Astin (1984), Pike et al. (2012), Hu and Hui (2012) and Duque (2014). For example, Astin (1984) demonstrates that being academically involved is strongly related to satisfaction with most aspects of college life, including satisfaction with teaching methods. Thus, students who put more effort and energy into their academic experience obtain better learning and better personal development. Similarly, Duque (2014) finds that student engagement is as important as perceived service quality in explaining students' cognitive learning outcomes, which in turn explain a high percentage of satisfaction and affective learning outcomes. Hu and Hui (2012, 783) state that 'whether a particular learning medium improves or hinders students' learning effectiveness and satisfaction may depend on how that medium engages students in (designed) learning activities. (…) The combined results of several studies suggest that learning engagement is an important mediator for determining learning outcomes'. Based on these ideas, two new research hypotheses suggest that:

H3: Students' engagement in the 'flipped classroom' activities has a significant and positive effect on the perceived effectiveness of a 'flipped classroom'.
H4: Students' engagement in the 'flipped classroom' activities has a significant and positive effect on students' satisfaction with this technique.

Complexity

Additionally, the TAM (Davis, 1989) provides theory with the relevant construct of ease-of-use (vs. complexity, in its negative form) that should never be omitted when exploring students' acceptance of teaching innovations (Arbaugh, 2000; Meso & Liegle, 2005; Lin & Chen, 2013; Kumar et al., 2014). Although the TAM is a leading model used to explain adoption of Information Technology (IT) by people in business, industry and educational contexts (Meso & Liegle, 2005), in the present paper the authors extend the application of this theory to a broader context of teaching innovation that does not consider IT but the 'flipped classroom' as the pedagogical innovation to be explored.

The TAM states that the factors that propel the diffusion of an innovation are its ease-of-use (vs. complexity) and its usefulness. Within the context of a university course, students are expected to feel attracted to that teaching techniques that are easy to follow and directly relevant to the course requirement tasks that they must complete (Meso & Liegle, 2005). Specifically, beliefs that a new teaching technique is useful and easy to use influence the students' attitudes toward the technique and thereby their decision to engage in the activities assigned by the teacher (Arbaugh, 2000). While usefulness is already inherent in the perceived effectiveness of the 'flipped classroom' previously discussed in the paper, ease-of-use/complexity is yet to be included in the research of the 'flipped classroom'.

Specifically, a teaching technique is easy to use if it provides intuitive-like features that include cues or similar artifacts to guide the student through well-established procedures of converting teaching materials into coherent knowledge. Such an easy-to-use technique simplifies the learning procedure by allowing the student to focus on the content of the course, rather than on how to operate the technique. On the contrary, the complexity of the 'flipped classroom' may mitigate the students' ability to grasp and understand the core body of knowledge being disseminated in the course. Complexity also relates to emotional exhaustion (Duque, 2014) that reflects feelings of fatigue, frustration, burnout, and discontent with studies (Schaufeli et al., 2002). The complexity of a teaching innovation can generate negative thoughts and anxiety regarding students' capabilities, which can further lower perceptions and generate more anxiety, thus reinforcing the probability of inadequate performance (Bresó et al., 2011).

Thus, according to pedagogical research, effective teaching tools enhance the learning capability of students and make the mastery of difficult principles simpler (Janicki & Liegle, 2001). Research points out that the teaching tools that prove to be more effective in most cases are those that: (1) are easy to learn, (2) map a clear and direct path from the problem to its correct solution, allow for hand-on-learning or learning-by-doing rather than passive learning such as demonstrations by the teacher, and (3) minimize the technical barriers between students and the core knowledge being disseminated in the course (Meso & Liegle, 2005).

According to these ideas, it is expected that students' engagement in the 'flipped classroom' activities as well as the perceived effectiveness and satisfaction with this technique will be affected directly and negatively by the degree of complexity that students perceive in the 'flipped classroom' activities. This suggestion derives into three new research hypotheses:

H5: The complexity of the 'flipped classroom' activities has a significant and negative effect on students' engagement in the 'flipped classroom' activities.

H6: The complexity of the 'flipped classroom' activities has a significant and negative effect on the perceived effectiveness of a 'flipped classroom'.
H7: The complexity of the 'flipped classroom' activities has a significant and negative effect on students' satisfaction with this technique.

Task orientation

Finally, the authors also base their theoretical model on the service quality theory (Grönroos, 1984) to propose that task orientation is a key and direct antecedent of student engagement, perceived effectiveness and satisfaction. Task orientation refers to the extent to which teachers provide students with class activities that are clear and well organized (Fraser & Treagust, 1986). Lin and Chen (2013) relate task orientation to pedagogical/educational quality, in the sense that the achievability and practicability of a good task orientation (i.e., answering the what, how and when questions) leads to forming pedagogical/educational quality. Consequently, these scholars apply the TAM principles to suggest that task orientation is a direct antecedent of perceived learning usefulness when it comes to use of e-learning techniques. Along this line, the application of the service quality theory to the context of higher education (Stodnick & Rogers, 2008; Duque, 2014) suggests that the most important dimensions of quality that impact learning and satisfaction outcomes are reliability on the teacher's way of lecturing, assurance about the teacher's competence and knowledge, and the empathy of the teacher. The service quality theory proposes that this educational quality affects students' perceived learning and satisfaction directly and positively.

Along this line, previous literature suggests that teachers play a major role in students' learning in virtually any environment. For example, Lee et al. (2007) empirically confirm that the value of the learning perceived by students is positively influenced by the organization/clarity of teaching assignments. Specifically, in the research of Lee et al. (2007) student satisfaction is defined by students' attitude towards teachers, courses, instruction method and e-learning technology. Similarly, Duque (2014) corroborates that perceptions of educational quality also influence perceived cognitive learning outcomes directly and positively. Subsequently, course and instruction organization/clarity would have direct influences upon satisfaction too. Based on these ideas, the last three hypotheses of the paper are proposed:

H8: The orientation of the 'flipped classroom' activities has a significant and positive effect on students' engagement in the 'flipped classroom' activities.
H9: The orientation of the 'flipped classroom' activities has a significant and positive effect on the perceived effectiveness of a 'flipped classroom'.
H10: The orientation of the 'flipped classroom' activities has a significant and positive effect on students' satisfaction with this technique.

Figure 1 shows the conceptual model that is proposed and tested in this paper.

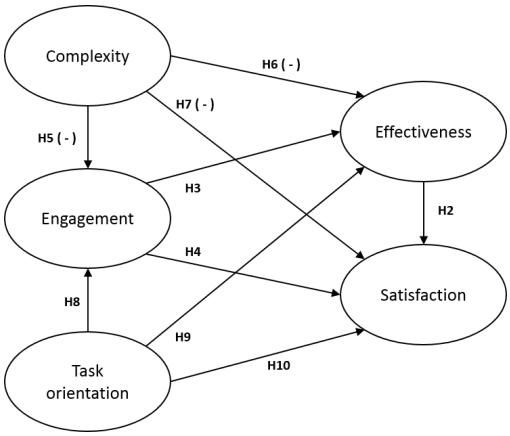

Figure 1. Conceptual model.

Method

The hypotheses test was carried out through an empirical research based on surveys among students enrolled in a business communication course taught in the third year of the Bachelor in Business Administration at a Spanish university. The authors chose this course due to its mandatory character that assured a large sample to implement Structural Equation Modeling (SEM) to test the conceptual model. This course represented six European Credit Transfer and Accumulation System (ECTS) credits, with an allocation of 63 hours of classroom activities and 87 hours of autonomous study and out-of-class activities (150 total hours). The evaluation method was divided into three parts: (1) two midterm exams; (2) a team project (delivered at the end of the semester); and (3) five in-class activities, based on the 'flipped classroom' technique and distributed among the lessons 1, 4, 5, 6 and 8 of the course. The 'flipped classroom' sessions had a total duration of 10 hours that represented 15% of the total hours of classroom activities. According to this percentage, the 'flipped classroom' activities accounted for 15% of the final grade of students. Additionally, midterm exams represented 50% of the final grade while the team project accounted for 35% of the student qualification.

Traditional and innovative teaching models were combined with the aim of gradually testing the success of the 'flipped classroom' technique (instead of implementing it as the only teaching method in the course). As suggested by Prashar (2015), the 'flipped classroom' may not be appropriate as a unique pedagogical technique because students need structured learning tasks to develop interest initially. Once course foundation is built through face-to-face instruction, the 'flipped classroom' technique can be implemented to facilitate application of concepts, analysis of practical cases, and synthesis of new problem-solving frameworks through active classroom discussion (Prashar, 2015).

Along this line, an additional introductory session was also organized at the beginning of the course, where the teacher explained the 'flipped classroom' technique to students, she set the goals to be achieved and she specified the dynamics of the sessions, the materials to be used and the instructions for the development of the 'flipped classroom' activities.

The dynamics of the 'flipped' activities were organized as follows. At the beginning of the semester, students were organized into teams of five people that collaborated during the five activities. For each activity, they were assigned a concept/idea to study, related to the theoretical content that was being worked at that time on the course, and whose materials were provided through the virtual communication tool of the course with a notice of two weeks regarding the 'flipped classroom' session. Finally, the day of the 'flipped classroom' session each team had to

explain the work developed to colleagues, explaining the assigned concept/idea and its peculiarities within the theme that was being worked in the course. After the exhibition, a round of consultation and debate was opened, where the team had to solve all the questions raised by their classmates. At the end of the session, the teacher presented a summary of the main ideas discussed that day during the session.

As an example, one of the 'flipped' activities was orientated to the study of the different types of sales promotions that companies use in the market. This activity was designed as part of the sales promotion lesson, which took part almost at the end of the semester. Two weeks before the 'flipped' session, the teacher provided several materials on sales promotion in an online course created for this purpose in the Moodle platform. Each team was assigned one type of sales promotions chosen among the following: (1) immediate price reductions, (2) coupons, (3) demos and sampling, (4) free products, (5) repurchase of products and (6) competitions. Using the materials provided by the teacher (or any other useful information found through primary or secondary data), each team had to gather information on their sales promotion technique and collect practical examples that would help better understanding of it by the rest of classmates. The day of the 'flipped' session, the team spokesperson had to explain the sales promotion technique and the examples in the classroom, in a maximum time of 10 minutes (through a PowerPoint presentation). In addition, both the spokesperson and his team had to act as teachers, answering questions that arose about the technique in a 5-10 minute discussion that opened upon completion of the team presentation. Once the debate was finished and students considered that they had enough information about the sales promotion technique, a new team would take the stage and the same procedure would start for a new sales promotion technique.

Data was collected after the students completed the last 'flipped classroom' activity of the course, in December 2014. In the 2014-2015 academic year, 223 students were enrolled in the course. Nevertheless, only 197 students participated in the 'flipped classroom' activities. The rest of students was only enrolled part-time or was studying abroad with an Erasmus grant. Out of the 197 students involved in the activities, 150 valid questionnaires were collected (response rate = 76.14%).

Since the way that the 'flipped classroom' was implemented in this business communication course cannot be classified as a 'flipped course' in the same way that this term is typically used in academic literature (because most of the time when this technique is employed, the entire course is flipped), this consideration has significant implications for the measurement of all the constructs in the research model presented in this paper. In order for students' responses to exclusively refer to their evaluation of the 'flipped classroom' instead of intermingle other aspects such as their perceptions of regular lectures and the team project, different sections were included in the questionnaire referring to each part of the course independently (lectures, team project and the 'flipped classroom' activities). Section 1 referred to regular lectures; Section 2 referred to the team project and Section 3 referred to students' perceptions of the 'flipped classroom' activities. The surveys were completed in the classroom. Thus, the teacher had the opportunity to stress the importance of the students clearly differentiating their perceptions of each type of teaching method in order for all the students to complete the survey successfully.

Table 1 shows the scales used in this research to measure each of the variables in the conceptual model. In all cases, 7-point Likert-type scales were used, where 1 means 'strong disagreement with the statement' and 7 means 'total agreement with the statement'. A 12-item scale measured the perceived effectiveness of the 'flipped classroom' based on the improvement of three dimensions: (1) general skills (Alavi, 1994); (2) knowledge (Alavi, 1994; Leidner & Fuller, 1997) and learning motivation (Leidner & Fuller, 1997). All the items were taken from the papers by Alavi (1994) and Leidner and Fuller (1997). Student engagement, task orientation and satisfaction were measured with 3-item scales taken from the papers by Fraser and Treagust (1986) and Fraser et al.

(1986). Finally, the complexity of the 'flipped classroom' technique was evaluated by means of a 4-item scale taken from Orús et al. (2014).

Table 1. Measurement scales

Latent factors	Items
Engagement	ENG1) I put much effort into what I did in these activities; ENG2) I paid special attention to what my classmates explained during these activities; ENG3) There were opportunities for me to express my opinions in these activities
Complexity	**The activities carried out following the "flipped classroom" technique...** COM1) required investing much time; COM2) required too many advanced knowledge; COM3) required technological resources inaccessible to me; COM4) had little impact on the final grade for the course
Task orientation	ORI1) I knew exactly what had to be done in these activities; ORI2) Class activities were clear so everyone knew what to do; ORI3) Activities in these classes were clearly and carefully planned
Effectiveness	**The activities carried out following the "flipped classroom" technique...** **Skills:** SKI1) increased my ability to think analytically; SKI2) increased my ability to synthesize; SKI3) allowed me to learn to interrelate the most important ideas; SKI4) increased my ability to critically analyze problems; SKI5) gave me more confidence to express my ideas; SKI6) allowed me to learn to value other viewpoints **Knowledge:** KNO1) helped me better understand the content of the course; KNO2) improved my understanding of basic concepts; KNO3) helped me to acquire knowledge during in-class hours **Motivation:** MOT1) helped in making classes more interesting; MOT2) helped in making classes more entertaining; MOT3) helped me to be more attentive during classes
Satisfaction	SAT1) Roughly speaking, I'm satisfied with these activities; SAT2) I was always looking forward to participating in these activities; SAT3) After participating in these activities, I used to have a sense of satisfaction

Findings

Multidimensionality of the perceived effectiveness of the 'flipped classroom'

The first research goal of the study was to corroborate the multidimensional structure of the perceived effectiveness of the 'flipped classroom' (H1). For this purpose, the authors implemented first-and second-order Confirmatory Factor Analyses (CFA) of the scale with the statistical software EQS v.6.1. The findings showed adequate values in terms of reliability, convergent validity, discriminant validity and goodness of fit (Hair et al., 2010). Thus, the multidimensionality of the scale was confirmed and the hypothesis H1 was supported (Tables 2 and 3).

Along this line, the findings of the second-order CFA showed that the three dimensions of the effectiveness scale loaded quite similarly to this construct ($0.91<\beta_i<0.95$). Thus, the improvement in general skills, knowledge and learning motivations is a very reliable indicator to guarantee the perceived effectiveness of the 'flipped classroom'. The findings of this study also showed that the implementation of the 'flipped classroom' activities was especially successful in the context of the present research. As it is shown in Table 2, out of the three dimensions composing perceived effectiveness, the 'flipped classroom' was especially effective in terms of improving students' learning motivation (Mean=5.66, s.d=1.27), although effects were also very positive in terms of knowledge generation (Mean=5.52, s.d=1.11) and acquisition of general skills (Mean=5.34, s.d=0.88).

Table 2. First-order confirmatory factor analysis of the "effectiveness" scale

Latent factors	Mean	s.d	Items	β*	R^2	Cronbach α	AVE
Skills	5.34	0.88	SKI1	0.83	0.69	0.90	0.60
			SKI2	0.76	0.58		
			SKI3	0.81	0.66		
			SKI4	0.80	0.65		
			SKI5	0.71	0.51		
			SKI6	0.72	0.51		
Knowledge	5.52	1.11	KNO1	0.79	0.63	0.86	0.66
			KNO2	0.81	0.66		
			KNO3	0.84	0.71		
Motivation	5.66	1.27	MOT1	0.92	0.84	0.92	0.79
			MOT2	0.97	0.93		
			MOT3	0.77	0.59		

Discriminant validity**			
	Skills	**Knowledge**	**Motivation**
Skills	-	0.87 (0.04)	0.78 (0.04)
Knowledge	[0.79-0.95]	-	0.80 (0.05)
Motivation	[0.69-0.86]	[0.69-0.90]	-

* p<0.05; Goodness of fit: S-Bχ^2(df)=62.83(51), p=0.12; NFI=0.91; NNFI=0.97; CFI=0.98; IFI=0.98; RMSEA=0.04
** The figures over the diagonal indicate the correlation (and error) between pairs of latent factors. The figures below the diagonal represent confidence intervals.

Table 3. Second-order confirmatory factor analysis of the "effectiveness" scale

Latent factors	Dimensions	β	t-test
Effectiveness	Skills	0.92	8.92*
	Knowledge	0.95	8.15*
	Motivation	0.91	7.24*

* p<0.05; Goodness of fit: S-Bχ^2(df)=51.77(49), p=0.37; NFI=0.92; NNFI=0.99; CFI=0.99; IFI=0.99; RMSEA=0.02

Causal relationships

The second research goal of the study was to explore the role of student engagement, complexity of the 'flipped classroom' technique and task orientation as direct antecedents of the perceived effectiveness and students' satisfaction (H2 to H10). For this purpose, the authors first tested the reliability, convergent validity, discriminant validity and goodness of fit of all the scales in the analysis by means of a new first-order CFA. In all the cases, the findings showed satisfactory values (Table 4). The descriptive statistics show that students' perceptions of the task orientation (Mean=5.35, s.d=1.19) and effectiveness (Mean=5.46, s.d=0.95) of the 'flipped classroom' activities as well as their own engagement (Mean=5.33, s.d=0.92) and satisfaction (Mean=5.15, s.d=1.24) with the 'flipped classroom' were very positive, while the technique was not perceived as especially complex in terms of its usability (Mean=3.93, s.d=1.30).

Table 4. First-order confirmatory factor analysis of the causal model

Latent factors	Mean	s.d	Items	β*	R^2	Cronbach α	AVE
Engagement	5.33	0.92	ENG2	0.66	0.44	0.70	0.55
			ENG3	0.81	0.65		
Complexity	3.93	1.30	COM1	0.52	0.27	0.80	0.51
			COM2	0.92	0.85		
			COM3	0.77	0.60		
			COM4	0.58	0.34		
Task orientation	5.35	1.19	ORI1	0.80	0.65	0.89	0.72
			ORI2	0.96	0.92		
			ORI3	0.78	0.61		
Effectiveness	5.46	0.95	Skills	0.88	0.78	0.90	0.75
			Knowledge	0.86	0.74		
			Motivation	0.86	0.75		
Satisfaction	5.15	1.24	SAT1	0.84	0.71	0.82	0.61
			SAT2	0.66	0.44		
			SAT3	0.83	0.68		

Discriminant validity**

	Engagement	Complexity	Orientation	Effectiveness	Satisfaction
Engagement	-	0.10 (0.10)	0.68 (0.07)	0.78 (0.06)	0.83 (0.06)
Complexity	[(-0.10)-0.30]	-	(-0.13) (0.09)	0.03 (0.09)	0.01 (0.10)
Orientation	[0.54-0.81]	[(-0.31)-(-0.05)]	-	0.62 (0.06)	0.65 (0.06)
Effectiveness	[0.67-0.90]	[(-0.16)-0.21]	[0.51-0.74]	-	0.92 (0.02)
Satisfaction	[0.72-0.95]	[(-0.18)-0.20]	[0.53-0.77]	[0.86-0.98]	-

* $p<0.05$; Goodness of fit: S-Bχ^2(df)=104.31(80), p=0.04; NFI=0.88; NNFI=0.96; CFI=0.97; IFI=0.97; RMSEA=0.05
** The figures over the diagonal indicate the correlation (and error) between pairs of latent factors. The figures below the diagonal represent confidence intervals.

Additionally, the authors implemented a Structural Equation Model (SEM) with the statistical software EQS v.6.1 to test the value and significance of the nine relationships proposed in the causal model. As it is shown in Table 5, the findings indicated that the causal model fitted the sample well (Hair et al., 2010).

As to the results found (Table 5; Figure 2), the perception that students had of the 'flipped classroom' effectiveness had a positive and significant effect on the improvement of students' satisfaction with this technique ($\beta=0.68$, $p<0.05$). Thus, the findings of this research support the hypothesis H2. Students' engagement in the 'flipped classroom' activities also had direct and positive influences on perceived effectiveness ($\beta=0.68$, $p<0.05$) and students' satisfaction ($\beta=0.35$, $p<0.10$). Thus, the hypotheses H3 and H4 are also supported. On the contrary, complexity was shown to only have a direct and positive impact on students' engagement ($\beta=0.18$, $p<0.05$), while its direct effect on perceived effectiveness ($\beta=(-0.03)$, $p>0.05$) and satisfaction ($\beta=(-0.03)$, $p>0.05$) was not statistically significant. These findings contradict the expectations of the authors. Thus, the hypotheses H5, H6 and H7 are not supported by the findings of this research. Task orientation also had a direct and positive effect on students' engagement ($\beta=0.69$, $p<0.05$). This finding supports the hypothesis H8. Finally, the findings show that the direct effects of task orientation on perceived effectiveness ($\beta=0.03$, $p>0.05$) and students' satisfaction ($\beta=0.16$, $p>0.05$) were statistically insignificant. Based on these findings, the hypotheses H9 and H10 are not supported.

Table 5. Test of the relationships of the causal model

Hypotheses		β	t-test	Contrast
H2	**Effectiveness → Satisfaction**	0.68	3.93*	Supported
H3	**Engagement → Effectiveness**	0.68	4.81*	Supported
H4	**Engagement → Satisfaction**	0.35	1.91**	Supported
H5	**Complexity → Engagement**	0.18	2.23*	Not supported
H6	**Complexity → Effectiveness**	(-0.03)	(-0.36)	Not supported
H7	**Complexity → Satisfaction**	(-0.03)	(-0.46)	Not supported
H8	**Task orientation → Engagement**	0.69	6.18*	Supported
H9	**Task orientation → Effectiveness**	0.16	1.22	Not supported
H10	**Task orientation → Satisfaction**	0.03	0.36	Not supported

* p<0.05, ** p<0.10

Goodness of fit: S-Bχ^2(df)=98.33(84), p=0.14; NFI=0.89; NNFI=0.97; CFI=0.98; IFI=0.98; RMSEA=0.04

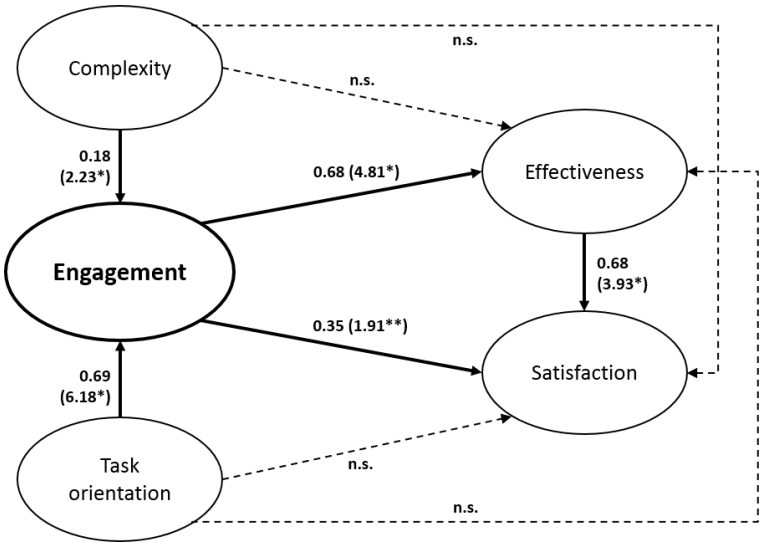

Figure 2. Findings.

Conclusions, limitations and future lines of research

In this paper, the authors have explored the 'flipped classroom' effectiveness, as it is perceived by university students enrolled in a business communication course. For this purpose, the authors have applied three educational and marketing theories that have been traditionally explored to understand the adoption of teaching innovations in higher education. The findings presented in the paper highlight that one of these theoretical approaches, engagement theory (Kearsley & Shneiderman, 1998), is the key framework to understand the perceived effectiveness as well as students' satisfaction with the 'flipped classroom'. This theory defends the essential role of students' engagement in the development of the innovative activities in order for them to be successful. As it will be discussed in this section, most of the findings of this paper can be better understood under the light of this theory.

As a first interesting finding, the empirical exploration of students' perceptions suggest that a 'flipped classroom' is highly appreciated among university students, with scores above 5 (out of 7) in terms of skill development, knowledge generation and the improvement of learning motivation.

Thus, the 'flipped classroom' is an effective teaching innovation in terms of learning outcomes in higher education. The 'flipped classroom' is especially useful for boosting students' motivation to learn and participate in classroom activities. As suggested by Çetin (2015), learning motivation is essential for the success of teaching in higher education contexts. Thus, university teachers could benefit significantly from the application of the 'flipped classroom' in order to achieve the necessary motivation of their students. It is also significant that the three dimensions of perceived effectiveness tested in this paper load significantly and very similarly to the second-order construct of perceived effectiveness. Thus, in addition to learning motivation, skill development and knowledge generation are also key features to assure the perceived effectiveness of the 'flipped classroom'.

The findings of the paper also confirm the role of students' engagement, task complexity and task orientation as significant antecedents of perceived effectiveness and students' satisfaction. Out of the three variables, engagement is presented as the key feature to understand both perceived effectiveness and satisfaction. This idea is supported by its direct effects on perceived effectiveness and satisfaction as well as the mediating role that engagement plays in the effects of complexity and task orientation on perceived effectiveness and satisfaction. These findings are explained by the engagement theory previously explored in this paper. Engagement theory suggests that students learn more by doing and highly engaging in activities because this way they can absorb more information and they internalize what they learn more strongly. By deeply engaging in class assignments, students undertake more effort to meet the teacher's requirements and accomplish the learning goal largely (Robinson & Hullinger, 2008). Along this line, the empirical findings of the present paper align with the experimental data reported by Hu and Hui (2012), who demonstrate that the effects of technology-mediated learning on learning effectiveness and satisfaction are mostly mediated by learning engagement. These scholars confirm that the use of passive teaching techniques (i.e., preprogrammed video contents to deliver learning materials) negatively affects learning engagement, which in turn reduces perceived learning effectiveness and satisfaction.

The service quality theory (Grönroos, 1984) also assist the authors to understand the findings of this research, although only partially. Specifically, this theory suggests that task orientation is a crucial component of perceived service quality in educational contexts and, consequently, it plays a significant role in the perception of teaching effectiveness and students' satisfaction. In the present paper, the findings confirm the relevance of task orientation to engage students in the 'flipped classroom' activities. The correct organization of the activities derives into better perceptions of effectiveness and satisfaction too. However, these effects are only indirect and mediated by students' engagement.

On the contrary, the findings suggest that TAM is not an adequate theoretical framework to understand the 'flipped classroom'. In this regard, while the theory suggests that the complexity of a teaching innovation is negatively correlated with students' engagement, perceived effectiveness and learning satisfaction, this research demonstrates the opposite effects, in the sense that complexity increases students' engagement in the 'flipped classroom' activities and, consequently, it also has indirect and positive effects on perceived effectiveness and students' satisfaction. TAM considers that the complexity of the teaching innovation may mitigate the students' ability to grasp and understand the core body of knowledge being disseminated in the course (Meso & Liegle, 2005). While this idea seems unquestionable, the authors of the present paper consider that a complex activity also involves investing more time in its development, while the student should also pay more attention and effort to solve the problem correctly. Thus, certain degree of complexity is desirable in order for students to devote more time and attention to the 'flipped classroom' activities. Otherwise, if the class assignment is too easy, the resolution of the problem may become routine for the

students, demotivating them and leading to the loss of interest in solving the assigned problems in the best way possible.

The findings presented in this research have several implications for higher education teachers. First, teachers can improve the classroom environment by implementing the 'flipped classroom' activities because such activities are highly effective in terms of skill development, knowledge generation and the improvement of learning motivation. As previously suggested in literature, it may not be advisable that teachers change completely from traditional lectures to the 'flipped classroom' (Prashar, 2015). However, the gradual implementation of flipped activities in combination with traditional methods highly benefits learning outcomes and students' satisfaction. In the case of the business communication course explored in this research, only 15% of the activities were flipped during the semester. In future academic years, a gradual increase in this percentage will be assumed to take the course closer to traditional approaches to the 'flipped classroom' (i.e., 100% flipped activities).

Nonetheless, it should also be noted that the previous findings of some scholars who have also explored teaching innovations (Orús et al., 2014) suggest that the implementation of an innovative teaching method such as the 'flipped classroom' may not be enough to guarantee its success. On the contrary, teachers have to place special emphasis on ensuring the effective development of these class activities. For this purpose, teachers should create and implement continuous methods of assessment of the acquisition of skills, knowledge and students' motivation, which are the three pillars of the perceived effectiveness of the 'flipped classroom' in higher education. By doing this, teachers should not only focus on knowledge acquisition, which used to be one of the main goals of higher education in the past. On the contrary, the new framework of the European Higher Education Area (EHEA) has turned the student into the main protagonist of the new educational scenario and point to a course design based primarily on general and specific skills and competencies, which are critical in the process of student self-learning.

Additionally, teachers also have to create inspiring activities based on features that are closely related to the students' interests and concerns. An interesting way to achieve this goal could be the proposal of brief surveys at the beginning of the semester to identify the factors that promote engagement. For instance, to improve engagement over the next academic years, a new survey will be applied at the beginning of each semester to students enrolled in the business communication course explored in this research. The goal of the survey will be to identify the main communication topics and teaching techniques that students appreciate better for their learning purposes, so that the content and teaching methods applied in the course can accommodate students' expectations better.

Along this line, the present research suggest that one key factor to improve engagement is task complexity. Accordingly, teachers should create activities with a certain degree of complexity because they improve the students' engagement in the 'flipped classroom' activities. Too simple activities become routine and do not require the students to make an extra effort, reducing their engagement and jeopardizing the perceived effectiveness of the technique and students' satisfaction. Therefore, and because the 'flipped classroom' activities implemented in the business communication course explored in this research were not perceived as significantly complex by students in the sample (Mean=3.93, s.d=1.30), in future academic years the complexity of the flipped activities will be gradually increased to make them challenging enough to motivate students' engagement, improve perceive effectiveness and boost satisfaction significantly.

As for the limitations of this paper, the sample chosen stands out because it is relatively small and it does not look across multiple institutions, degrees or educational levels. In this regard, the business communication course in which the data was collected for this study was only taught in the third year of the Bachelor in Business Administration of the Spanish university chose for the study. Therefore, the authors were unable to expand the study to other research contexts as to

compare the outcomes in different classroom environments (e.g., engineering, education, math, etc.). Nonetheless, students in diverse research contexts may show different learning approaches and, as a consequence, they may react differently to diverse learning styles. Therefore, future research should replicate the study with different samples of students, courses and degrees, to validate the perceived effectiveness of the 'flipped classroom' technique in areas other than university teaching of marketing courses. The sample size is also a limitation that can be overcome if the study is applied in a wider field of research. Additionally, the partially-flipped learning approach that was adopted in the business communication course explored in this research (i.e., only 15% of the activities in the course were actually flipped) may represent another limitation in terms of the generalization of the findings of the present study. In this regard, the fewer flipped activities a course have, the less there is that can be extrapolated by those who employ the flipped model more extensively. Finally, the study did not include moderating variables that could also have significant impacts on the perceived effectiveness of the 'flipped classroom' technique. For example, future scholars should control for the effects of multiple instructors or different student characteristics in the causal model.

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Achieving Inclusive Field-based Education: Results and Recommendations from an Accessible Geoscience Field Trip

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Abstract: Learners with disabilities are often denied field-based learning experiences in naturalistic disciplines. Geology can present substantial barriers due to rugged terrain in difficult-to-reach locations. In 2014, a field trip was executed with the dual purpose of 1) designing inclusion in field learning and 2) demonstrating to college faculty an accessible field experience. Direct observations of participants on the trip, as well as pre- and post-trip focus groups, illuminate the student and faculty field learning experience. Geoscience faculty have little guidance or support in understanding what disability is, how to reconcile accommodation with field-geology learning goals, and they cited instances where disability service providers acted as gatekeepers. The net effect of these ontologies is to reduce faculty empathy with, and thus their ability to be inclusive of, students with disabilities in field settings. Recommendations for instructors include taking campus disability-services administrators on field trips, opening and maintaining communications with disability service providers, and designing pedagogically sound field trips that align as much as possible to principles of universal design. An advocacy approach is described, which focuses on the students and the educational process, instead of on institutional compliance. Finally, geoscience faculty should conceptualize disability service providers as accessibility service providers.
Keywords: field trips, Earth science, accessibility, inclusive, disabilities.

Field-based Earth science education places students in an outdoor learning environment that focuses on processes that have shaped the Earth over billions of years. Field instruction is an experiential process that develops the understanding of the scale, rate, and timing of Earth processes such as mountain building, river channel movement and climate change (Garrison & Endsley, 2005). The importance of field experiences in the geoscience curriculum is well documented in geoscience education literature (Elkins & Elkins, 2007; Feig, 2010; Garrison & Endsley, 2005; Maskall & Stokes, 2009; McKenzie, Utgard, & Lisowski, 1986; Orion & Hofstein, 1994; Potter, Niemitz, & Sak, 2009; Thomas & Roberts, 2009; Thrift, 1975). Fieldwork discourse develops a student's scientific teamwork, self-management and communication skills (Petcovic, Stokes & Caulkins, 2014; Quality Assurance Agency, 2014). Aligned to these assumptions, a common component of traditional post-secondary geology curricula is completion of a field-based education component (QAA, 2014).

Field study typically requires traversing difficult terrain with few facilities and uncertain natural conditions where inclement weather, vegetative overgrowth, aggressive wildlife, and the potential for serious (temporarily disabling) injuries are common, ranging from scrapes, bumps, and

fractures to heatstroke and hypothermia. These conditions can present a significant barrier for students with physical and sensory disabilities (Cooke, Anderson, & Forrest, 1997). Many laboratory-based and computational geoscientific subdisciplines can provide varying levels of accessibility. Traditionally, however, geoscience as a whole has not lent itself well to those who are unable to work beyond a controlled laboratory or classroom setting.

Students with disabilities may encounter unique challenges in any scientific discipline, yet geoscience has the dubious distinction of the lowest representation of individuals with disabilities (Locke, 2005). Due to the field requirements in undergraduate geoscience curricula, or even in general education Earth science courses, individuals with disabilities face multiple barriers to obtaining geoscience credentials and degrees (Atchison & Feig, 2011; Cooke, et al. 1997; Hall, Healey, & Harrison, 2002; Healey, Roberts, Jenkins & Leach 2002; Locke, 2005; Hall & Healey, 2005; Norman, 2002; Stokes & Boyle, 2009). Despite this undesirable notoriety, inclusion of students with disabilities in field-based learning has formed the basis for previous studies (Cooke, et al. 1997; Hall & Healey, 2005; Hall, Healy & Harrison, 2002; Healey, et al. 2002; Locke, 2005; Norman, 2002; Stokes & Boyle, 2009). The researchers listed above argue that inclusion brings substantial advantages which benefit the geoscientific enterprise: a diversity of thought and experience, a broader talent pool, improved retention of geoscientists, and greater societal geoscientific literacy.

Accessibility Initiatives in the Geosciences

The International Association for Geoscience Diversity (IAGD) was formed in 2008 in response to the marginalization of students with disabilities and roadblocks to their pursuit of geoscience careers. This group of geoscience faculty, students and disability studies researchers aims to advise in the development of inclusive and accessible learning opportunities for students with diverse physical and sensory abilities. The term "diversity" in the IAGD is not specific to race or gender, but rather toward differently-abled students. This grassroots movement quickly developed into an international organization to not only support students with disabilities, but geoscience industry practitioners and academics with disabilities, as well as K-20 Earth science educators. Today, the IAGD is a 501c3 non-profit organization with a community-based network that spans across the United States and 30 countries. Furthermore, the IAGD has been formally accepted as an Associated Society of both the Geological Society of America and the Geological Society of London.

Inclusive geoscience education is growing an audience in both the science and education communities. Over the past eight years, the IAGD has consulted with organizations to enhance workforce accessibility, and partnered to produce instructional workshops and short courses for Earth science educators, and accessible geology field trips for students and faculty. Access and inclusion statements are also being developed to expand beyond the geosciences to other field-based STEM disciplines. In 2014, the Science Council (UK) published a *Declaration on Diversity, Equality, and Inclusion* statement which was signed on by member organizations including the Geological Society (GSL, London). This statement was followed up by the 2015 Higher Education Network (HEN) conference entitled *Accessible Fieldwork: Confronting Barriers to Inclusion*, held jointly by GSL and University Geoscience UK, an association of geoscience departments and schools based across the British Isles.

Later that same year, the American Geosciences Institute (AGI) hosted their annual Leadership Forum (2014), this one entitled: *Accommodating Geoscience Workforce Diversity: Including the Talents of All Geoscientists*. This workshop brought dozens of geoscience society leaders together to discuss the growing lack of individuals with diverse physical and sensory abilities pursuing academic programs and careers in the geosciences. Following the lead of the UK Science Council, AGI

collaborated with the IAGD to publish the *Consensus Statement on Access and Inclusion* (2015), to "increase awareness of the challenges we face and the responsibilities we have as a community, and provides examples of ethical practices toward this group of individuals" (para. 1) which has been adopted by dozens of AGI member organizations across the U.S. and abroad. In recent years, several other science organizations have begun developing policy statements that support the need for full inclusion of individuals with disabilities. For example, the Association for Science Teacher Education (ASTE) has created a *Position Statement on Equity and Inclusion in Science Education* (ASTE, 2017) that will support the overall inclusion and training of future science educators.

Ability Gatekeeping

Students with disabilities are often steered into disciplines that align to their perceived physical abilities rather than those that fit their academic strengths (Barga, 1996; Hill, 1994; Rodis et al., 2001). These traditional perspectives of disability in most institutions of higher education stem from a medical model (Oliver, 1996) which treats individuals as physically flawed. This model perpetuates negative bias toward disability, and places the burden for learning accommodation on individual students, or disability support services (Moriarty, 2007). Furthermore, students with disabilities face the additional task of self-advocacy within the institution and also the classroom (Houck, Asselin, Troutman, & Arrington, 1992). In direct contrast to this deficit perspective, the social model of disability (Shakespeare & Watson, 2002) views impairments as part of the human condition, but considers that barriers to full participation in society arise from the interaction between individuals and their social or physical environments. This approach promotes a more positive social perception of individual ability and shifts the focus to deconstructing barriers within teaching practices and learning environments that limit student participation. Aligned to this social model, disability theory suggests that: a) disability is an artifact of social construction, which can be taken down by b) voices of those with disabilities valued in society, and c) viewing impairment is a natural part of the spectrum of human variation (Denhart, 2008; Healey, et al., 2006; Shakespeare & Watson, 2002). This perspective emphasizes an individual's identity (Healey et al., 2006; Shakespeare & Watson, 2002), and suggests that everyone falls on a spectrum of ability.

In accordance with disability theory, Denhart (2008) determined that most students face barriers to participation and inclusion as a result of external factors (i.e. faculty and peer attitude and perception, physical space, logistics) rather than their own physical inabilities. In a study focusing on inclusive climate, Foster, Long & Snell (1999) concluded that many students maintain rapport with other students with disabilities, but do not perceive themselves as being included in the entire community of learning. Students with disabilities often describe themselves as working much harder than their peers, yet feel that they are often misunderstood by faculty, who view them as lazy or lacking effort (Denhart, 2008) when requesting support or specific accommodations. These experiences, in addition to a fear of stigma strongly discourage students from disclosing their disability in order to request academic accommodations (Denhart, 2008).

Among numerous concerns, faculty have been found to question the validity of disability diagnoses (McEldowney, McCrary, & Krampe, 2006; Orr, 2009), which creates an overall reluctance to support diverse student learning needs. This finding is made apparent by faculty attitudes that students with invisible (or hidden) disabilities were taking advantage of the system (McEldowney, McCrary, & Krampe, 2006). Becker and Palladino (2016) suggest that a relationship exists between this view and the teacher's sense of self-efficacy. Additional studies indicate that faculty feelings towards providing accommodation are also influenced by the type of accommodation requested, and the ease of implementing them (Bourke et al., 2000; McEldowney, McCrary, & Krampe, 2006). This may stem from time constraints that faculty feel when presented with required accommodations for

students with disabilities. If accommodation requires a certain level of adaptation of extant course plans, faculty may be reticent to make those adaptations (Utschig, et al., 2011). Given the logistical challenges and cognitive novelties involved in field-based education, geoscience faculty may find accommodation in the field even more challenging, or outright burdensome.

Statement of Problem and Research Questions

This research emerged from our work as practitioners to improve inclusion and accessibility. Our efforts have included interacting with institutional disability service providers (DSPs). The geosciences present specific challenges for institutional DSPs. These offices often have limited pedagogical experience in science, technology, engineering, and mathematics (STEM), let alone experience with providing resources and support for students working outside of a traditional classroom setting. We have identified four specific research questions:

- How do Earth science faculty currently accommodate students with disabilities in field settings?
- What barriers do faculty encounter to providing accessibility to students with disabilities?
- What do faculty need to know to provide accessibility in field settings?
- What recommendations can be made to institutions and faculty regarding accessibility and inclusion in the field?

Methods

We designed a field trip accessible to participants with mobility, sensory, cognitive and socio-behavioral impairments (Gilley, Atchison, Feig, & Stokes, 2015) as a natural laboratory for answering these research questions. In designing this natural laboratory, we hypothesized that faculty could be helped to identify barriers to inclusivity, how those barriers might be mitigated and overcome, and how accessible geoscience could be sustained at the curricular and institutional levels. Ultimately, it was our intention to foster a cultural shift in the perspective of access and inclusion for students with disabilities in the geosciences.

The Accessible Field Trip

The Geological Society of America (GSA) offers regular field trips to geologically important locations as part of its annual meeting programs. We conducted an accessible field trip during the 2014 GSA meeting in Vancouver, British Columbia (Atchison & Gilley, 2015). The trip was in the form of a "show-and-tell" style overview, with five stops that explored the local landscape as shaped by regional geologic activity, past and present. In part, we designed the trip to provide field access to geoscience students and faculty with disabilities. We also designed the trip to be a dynamic, workshop-style example for geoscience instructors, demonstrating how to design and execute an accessible field trip for students with disabilities. Both logistical and pedagogical aspects were demonstrated to participating faculty. Our purpose was to establish an opportunity for students and faculty to come together in the field setting, and to work with and learn from each other about field science and accessibility. For further details of the trip, see Atchison & Gilley (2015), Gilley, Atchison, Feig, & Stokes (2015) and Stokes & Atchison (2015).

Recruitment and Characteristics of the Study Population

Although the accessible trip included students, we focus exclusively on the faculty participants in this study. Trip participants were solicited primarily through IAGD social media, with additional recruitment via the GSA Annual Meeting's field frip listings and a Geoscience Education disciplinary listserv (email distribution list). Institutional Review Board (IRB) approval was secured at five institutions: three in the U.S., one in the U.K. and one in Canada. The multiple approvals reflect the affiliations of all project personnel.

The 14 faculty participants were a combination of tenured (n=9), tenure track (n=1), and part-time (n=2) faculty at universities and community colleges in the U.S., the United Kingdom, Canada, and New Zealand. One other participant was a graduate teaching assistant, and one other was a non-faculty academic professional. Of the group, six were male and eight were female; four self-identified having a physical, sensory, or cognitive disability. All faculty participants were each paired with a participating student with a disability during the field experience.

Fourteen of the fifteen student participants self-identified as having some form of disability. The students ranged in age from 18 to 40, and were from universities in the US and Canada. Six of the fifteen were graduate students and nine were undergraduate students; two members of the latter group were not geology majors. Ten of the fifteen students were female, and fourteen were White/non-Hispanic. Participants described in this paper have been assigned pseudonyms that do not reflect their ethnicity.

Theoretical Frameworks and Methodology

This study is phenomenological participant-action research situated in critical theory. Our location in the study is not that of detached observers, but rather active stakeholders (teachers) of students with disabilities. We seek to articulate best practices in field-based learning for this population, and to increase their access to geoscience curricula through the synthesis of a widely applicable, grounded-theory model (Glaser & Strauss, 1967). Furthermore, we seek to broaden the talent pool of future geoscientists through increased inclusiveness. Geoscience education research has an established tradition of participant action research (e.g., Basu & Middendorf, 2004; Blackhorse, Semken & Charley, 2003; Boundy & Condit, 2004; Feig, 2011; 2013; Gilley, Atchison, Feig, & Stokes, 2015; Jolley & Ayala, 2015; Libarkin & Kurdziel, 2006; Riggs, 2005; Riggs, Robbins & Darner, 2007; Semken, 2005; Williams and Semken, 2011).

We also claim an activist role in accordance with critical theory. Our larger goal is to address the educational problem of systemic barriers (Barton, 1998; Freire, 2000; Nairn, 1996, 2003) to inclusion and success for students with disabilities. Furthermore, faculty themselves, especially aging faculty, may need accommodation in the field. Through identifying barriers and proposing strategies to address them, we advocate for inclusiveness in Earth science literacy through field-based scientific study.

The data we generated are personal accounts, interpersonal interactions, strategies and attitudes, in accordance with a phenomenological approach (Creswell, 2013; Feig, 2011). Through observations and interviews, we documented the experiences of teacher-scientists who are confronted with the need and desire to teach Earth processes to students with disabilities.

Data Generation and Analysis

We conducted a pre-trip focus group with the faculty participants on the day before the trip. The focus group interview protocol asked the participants to respond to the following open-ended items:

- Talk about your experiences in taking students with disabilities into the field.
- What are you expecting on this trip tomorrow?
- What does "accessibility" mean to you?
- How you do think "accessibility" is going to be done on this trip?

Follow-up questions were asked based on participant responses to the above items. We conducted a focus-group discussion the day after the trip. The following protocol was used for the post-trip session:

- Tell me about your experience on the trip.
- Did you have any "A-ha!" moments with your students? Talk about those.
- Tell me about (something the researchers observed on the trip).
- Now that we've done the accessible trip, have your thoughts about "accessibility" changed? If so, how?
- What are your thoughts about accessible geology now?

We audio-recorded the focus groups and produced transcripts, which we theme-coded using simple serial indexing (Lincoln & Guba, 1985). We also collected data through direct observation on the field trip, accompanying groups and observing interpersonal interactions and cognitive tasks typically conducted on a geology field trip. We recorded our observations and theme-coded our field notes in the same manner as the focus group transcripts.

Reliability and Trustworthiness

We established reliability and trustworthiness of pre- and post-trip focus groups and field observations through the processes of excerpting data, triangulation, and member checking. We verified our participants' veracity of experience (Creswell, 2013) by triangulating our recorded observations in the field with detached, third party observers on the trip. Reliability of our interpreted meanings have been established via member checking and data excerpts (Lincoln & Guba, 1985).

Results and Interpretations

In accordance with practice in qualitative inquiry, our results, interpretations, and synthesis are not meant to consistently describe every situation that takes place in every field location in the past, present or future. Rather, we intend to illuminate and provide a "flavor" (Mason, 2002) of the processes operating during the construction and execution of an accessible field-based learning experience.

We have labeled the emergent themes we identified as "processes." This is consistent with the way we, as geoscientists, understand the physical Earth. This terminology describes dynamic systems in which social actors and educational problems operate. The processes we interpret to be operating, based on our results, are: 1) the search for what counts as disability; 2) locating identity; 3) learning goal impingement; and 4) the overprinting of education by regulation.

Process 1: Classifying Disability

In the pre-trip focus group, participants were first asked about their experiences taking students with disabilities into the field. For 22 minutes, these faculty members engaged in a lively debate over what

conditions are bona fide disabilities. Fred, a late-career professor with a mobility impairment, immediately asked the group to clarify what "disability" means. In his mind, disability means mobility and sensory impairments. Sophie, an early-career professor, suggested that learning disabilities "count," but acknowledged that hers may not be a common mindset. The group went on to debate the status of students with food allergies on a multi-day field trip, the exclusion of a student allergic to cheese from departmental pizza lunches, and students at-large with diabetes. The group decided that conditions related to metabolism were categorized as "medical," and the accommodation of these conditions, while logistically challenging, was procedurally comprehensible.

However, the group could not agree on an understanding of disability as a larger phenomenon. Cuthbert, a late-career professor, suggested that a majority of the persons present in the group had a disability by virtue of wearing prescription glasses: "What I'm saying is that there is disability and *disability*" (emphasis his). Fred replied to this by asking, "So any student problem is a disability? This is what I'm hearing." Maureen, a mid-career professor with a mobility impairment, immediately countered:

> *It clearly is not well defined, which is our problem. We want as scientists to categorize it, to say disability is… We can't do that, so we're frustrated by it. Obviously the thing that you have to make an accommodation for in your classroom… Well, that makes it a disability.*

The conversation quickly turned to accommodation-related paperwork, specifically the exam-accommodation forms commonly provided by campus DSPs. Fred expressed some frustration about receiving accommodation forms for what are, to him, invisible disabilities. Fred, Sophie, and Sven (another mid-career professor) discussed situations where students did not present DSP forms until after they had underperformed on an assessment. Sven expressed that "those pieces of paper…easily translate to your classroom, but then it's very difficult to determine how you translate those into field experience." The "metabolic/medical" category was brought up again, in the context of not being under the auspices of DSPs, and therefore leaving faculty unprepared to plan for or respond to events in the field. The participants alternately chafed at the presence of DSP services, and lamented their absence.

Fundamentally, though, what bothered the group most was their observation that disability is not a binary, present/absent phenomenon. Rather,

> *We think of it as you have disability and ability, that makes a black and white that really doesn't exist. What you have is a spectrum of abilities, and people that move back and forth along the spectrum as life changes. (Kim, early-career professor.)*

Cuthbert had another take on the spectrum: "*There is I think implicit a whole spectrum of unconscious bias, you will accept some disability, but you won't accept other disability."*

Interpretation. Geoscience faculty work in a naturalistic scientific field, and our habits of mind are rooted in description and categorization. We are therefore prone to spend an inordinate amount of time on questions like, "What is disability?" Non-geoscientists might be tempted to simply roll their eyes at this habit. However, this preoccupation has specific negative consequences. Our judgments of what "counts" are in fact value judgments. If we judge a particular impairment as "not" a disability, then we are unlikely to engage with it—and the student—to construct a safe learning environment. We would instead provide the minimum required accommodation, and attempt to mitigate further "disruption" of our teaching routine. Considering what counts is also the

result of wrestling with both positive and negative preconceptions of disability. If we choose to devalue a particular disability, we then carry a negative stereotype of it:

> *Is stupidity a disability?* (Fred.)

Process 2: Aggregation of Intersectionality, Adaptation, and Self-advocacy

The discussion of DSP paperwork bridged further discussion of the participants' experiences in taking students with disabilities into the field. The participants regularly grapple with the admixture of students with and without disabilities, and how their own responsibilities as teachers should be distributed. If twenty students are on a field trip, Fred asked, "and one disabled person, what are the responsibilities to the other 19 students?" Fred felt that having students with more than one type of disability would force him to choose which accommodations to prioritize on a field trip. Fred felt overwhelmed by non-uniform and multiple types of accommodations and their implementation.

Further, faculty are aware of the potential perception of "special treatment" of students with disabilities, and attendant shifts in classroom dynamics. Sven felt that to mitigate undesirable intersections, all members of the class should be made aware of the standardized accommodations issued by the campus DSP for any student with a disability.

The above exchanges, from the pre-trip focus group, describe the intersections of teachers and students both with and without disabilities. In the post-trip discussion, both Fred and Ephraim, a mid-career professor with a mobility impairment, described their positive experiences on the accessible trip. Both had, in the last few years, stopped conducting and participating in instructional and personal field excursions, respectively, owing to their disabilities, and because they felt self-conscious. After the accessible trip Fred in particular felt strong emotions as he said that the experience was "about the geology," and not his ability. Ephraim echoed this sentiment; frequently they themselves are the only persons in their classes who have mobility impairments.

During the accessible trip, we observed students placing themselves so as to maximize their engagement with the geology. On their part, the faculty experimented with strategies to facilitate multisensory experiences. On a typical geology class field trip, the expectation is that all students will walk to and examine an outcrop by sight, collect samples, and make sketches. On the accessible trip however, the expectations were that all participants would work inside their comfort zones, yet be responsible for sharing knowledge and information with each other. The trip leaders instructed participants who wanted to move themselves to a feature to bring back photographs, verbal descriptions, and rock samples. Those who did not want to go could stay back (e.g., on the level surface next to the bus). When the group reformed, the participants were to examine and interpret the images, words, and samples together.

The first stop was a beach, where sandstone cliffs lay about 100 meters from the shoreline. The purpose at the stop was to examine erosional features in the sandstone. The only paved, smooth surface to the beach and the cliffs bore a large "no wheelchairs" sign. Kira, a student who uses a wheelchair, decided (without explicit consent from the trip leaders) to move down the path anyway, determined to see the sandstones. Freya, a mid-career professor took a circuitous path along the beach below the smooth surface where Kira had stopped. As she was climbing up to Kira, Freya struggled with maintaining her balance, and Kira reached out her hand and pulled Freya up. In the post-trip focus group, Freya marveled at Kira's matter-of-fact attitude toward working in their dyad and assisting her partner. For Freya, this was an expression of Kira's agency.

At the second stop on the trip, students were examining different volcanic rock types at that location. This stop was situated along a terraced stream ~20 kilometers from a volcano. A sloping, rocky path led to the banks of the stream, and Maria, a student with low-vision, went down the path

a short way with Sophie, the early-career professor. Sophie looked for rocks, and another student came to ask Maria if she wanted to feel a lava flow. Sophie returned to the group with two rock specimens and a handful of sediment. The three of them prompted each other to feel and interpret the samples. Sophie placed Maria's fingertips on the crystal faces present in the rocks. Seeing this, Freya, who was also paired with a blind student, engaged her partner in a tactile experience with the rocks.

Sven, a mid-career professor, watched this unfold, and subsequently engaged his student partner with low vision in a tactile observation of the rocks. In the post-trip focus group Sven shared that he never asked his partner what she could and could not see. She was "quick to educate" Sven when she wanted assistance or input. He was shy in asking her because he "didn't want that to be part of her experience, I mean how many times of had she had to defend, describe, or sort of explain herself?"

At the final stop of the trip, the group was at the base of a large roadcut composed of an outcrop of granite that had been gouged by a glacier ~20,000 years ago. Glacial gouge marks have a distinctive shape, the orientation of which can be used to determine the flow direction of the ice sheet. Knowing this, and knowing the approximate location of these features, Maria (the student) left her service animal behind, scrambled up a series of low, wet boulders, and went ~50 meters upslope. One faculty participant who watched this reacted:

> *My risk assessment people just dropped dead.*

Maria pressed her face against the vertical surface of the outcrop, ran her hands over and across the gouges, and surmised the direction of past ice flow. She made a mental construction of the site in her determination to engage with this outcrop.

Interpretation. Fred's frustration at the highly variable nature of disability and accommodation belie his and others' preconceived notion of disability as binary; that is, present/absent whatever it may be, with a blanket accommodation that fits all student needs. For him, confronting the greater complexity of the "spectrum of ability" is an intersection with otherness. Professors Sven and Freya also intersected with student agency and self-advocacy, as it was clearly a new experience for them. The accessible trip allowed students to place themselves in a position to self-advocate owing to the established ground rules, which were pedagogically informed by universal design principles and emphasized access and inclusion, rather than singling out students with disabilities for accommodation. For professors such as Fred and Ephraim, the trip was less about agency in the field, and more about emotional satisfaction, as well as intellectual satisfaction as geologists who were enabled to engage professionally with the regional geology. Students and faculty felt actively adaptable to the setting, versus being passively accommodated.

We interpret these interactions, the self-advocacy we observed, and the agency expressed as an aggregate process. In geology, an *aggregate* is a collection of sediment into a rock. This metaphor is apt for describing how intersectionality, self-advocacy, and adaptation were coëval with each other during the accessible field trip. Faculty were compelled to examine how they were situated when they worked with their partners. The intersectionality they experienced enabled them to reflect on their preconceptions, to perceive ability as a spectrum and not as a binary phenomenon, and to facilitate meaningful multisensory experiences. They were receptive to student self-advocacy, which in turn generated more intersections between preconception and experience on the trip. Both students and faculty adapted to place themselves as novice/expert geologists to observe and appreciate the local geology.

Inclusive teaching is a difficult process, and requires an engagement with otherness. Geoscience teachers who express negativity toward otherness will be reluctant to embrace accessibility in the field.

Process 3: Rifting Between Learning Goals and Accommodation

Participants described dissonance between wanting to provide accommodation, but perceiving that accessibility comes at the expense of expected student outcomes. They wondered how a student can learn about an outcrop that they cannot access. Steve posed educational objectives against meeting "accessibility issues," and stated that while faculty may not want to admit it, occasionally tradeoffs exist between accommodation, accessibility, and the learning objective. He wanted to know how much it was necessary to alter the objectives in order to accommodate students with disabilities. After the accessible trip, Ephraim remarked that the majority of the participants had disabilities, and wondered how that "detracted" from the learning, and the geology, and the enjoyment of nature aspects. That said, Ephraim felt that because "not all eyes" were on him (and his disability) during the trip, then the "geology and education" parts of the trip did not suffer. The learning goals of the trip were structured around the theme and intention of field accessibility. As far as he was concerned, this was because the learning objectives scaffolded accessibility, and accessibility in turn scaffolded the learning goals.

As a teacher, Ephraim frequently confronts situations where a field trip he leads is organized to see one particular geologic phenomenon, but conditions (e.g., weather, construction, etc.) there preclude inclusion, so therefore another phenomenon is examined. During the trip, Ephraim wondered if he and others were "going off-script" by adapting to field conditions. He was very conscious of whether doing so would compromise the trip's geological objectives. The group agreed that "off-script" incidents are typical of field trips anyway. They were confident that going off-script yields valuable, unforeseen teachable moments. In their experiences, weather, road/trail construction, and even private landowners that deny access to their property can be welcome opportunities. Yet in contradiction to this, they were all conscious of a necessity to make sacrifices when a student cannot access a feature due to a mobility or sensory impairment. They felt risk-averse when presented with an accommodation need before a field trip. They were reluctant to "wing it" in this situation.

At the same time, the participants insisted that the best pedagogical approach to geology is the combination of classroom and field settings. One is hard pressed to find a geologist who does not. Yet our participants came into the accessible trip experience feeling that they would rather give alternative assignments to students with disabilities (problem sets, additional readings) or simply cancel the planned trip. They felt that the time demands of structuring an accessible trip, and the (to them) necessary trade-offs involved were too much of a challenge. After the trip, the faculty felt more positively about field accessibility, but they still struggled with reconciling learning goals and accessibility. Professors Sophie and Freya particularly resented feeling this dissonance. Sophie felt that accommodation (which for her "begins where adaptation ends") should arise as a response to situational randomness encountered on a field trip, but at the same time, not "lowering expectations out of kindness."

One feature of the accessible trip was the scheduling of breaks for rests, lunch and snacks, and restroom access. The faculty agreed that on a typical field trip, such arrangements are handled on an ad-hoc basis, and that usually "the field is the bathroom." This is because they want to maximize contact between the students and geologic features. The group reflected on how scheduling these breaks would impact both travel time and contact time. One trade they were comfortable with, though, was seeing less geology in exchange for multisensory experiences that

were shared by all students, with and without disabilities. After the accessible trip, they felt that it was possible to structure their future trips such that students who could not access a feature would be able to engage in a peer-to-peer exchange with students who could access it.

Interpretation. Our study population of faculty practitioners self-selected to engage with accessibility in this study, and we are mindful of their extant buy-in when interpreting these results. On the one hand, they are interested in engaging pedagogically with accessibility. On the other hand, their concerns about taking students with disabilities into the field are common. While scientists may be risk-averse, we are also predisposed to experimentation: "What if I did this? How about that? What parameters can I adjust in a situation?" While laudable, this experimentation is unsound because the experimental conditions are not reproducible; classroom situations and interactions with students are exceedingly variable. The same is true of field trips: the path chosen, the combination of students and their abilities, and even the weather will all vary from trip to trip. Nevertheless, our participants' responses suggest that, for them, altering a trip's learning objectives vis-à-vis a required accommodation is better than winging it.

Our participants unanimously insisted that the best pedagogical approach to geoscience teaching and learning is one that integrates classroom and field experiences. All too frequently, the attempt to reconcile accommodation and pedagogy results in two basic types of faculty response. The first is the "shot in the dark." Instructors may hastily, randomly or deliberately choose problem sets, readings or videos of similar trips as an alternative to field learning. This is an "easy" way for busy instructors to provide required accommodation. However, this strategy eliminates field-learning experiences for students with disabilities, while preserving them for the remaining population. We assert that the act of depriving selected populations of essential learning experiences would lead to feelings of low self-efficacy, anger, and resentment among Earth science faculty at-large. These feelings reduce overall teaching effectiveness. They further reduce engagement and buy-in to accessibility. Lastly, the shot-in-the-dark approach can be interpreted as discrimination, even if unintentionally so.

The second response is "one size fits all." In this approach, the instructor alters the curriculum so that *no* students have a field experience. Field trips are distilled into virtual trips, video clips, still images or written descriptions, and presented as, "If we could go there, you could see this." Outdoors learning is deleted entirely. The result of this action is that faculty feel an essential component of teaching has been taken away from them and their class. This too may lead to feelings of anger and/or resentment towards students with disabilities. In extreme cases, faculty may believe that their courses are "dumbed down," and that appropriate accommodation takes place at the expense of effective education. Buy-in and engagement are effectively eliminated. This ethos subsequently propagates through the institution and the discipline.

We again invoke a geologic metaphor, this time one of rifting. Rifting is the slow separation of plates of the Earth's crust. Eventually, these landmasses develop very different characteristics from each other, and their original configuration requires intentional study to observe and piece together. Accommodation and learning goals are difficult to reconcile not because they conflict, but because they drift apart.

Process 4: Education Subducted by Regulation

Faculty narrated their negative experiences with DSPs. They viewed DSPs as promulgating accommodation on a reactive, "checkbox basis." They see students pigeonholed into checklists of accommodations that are oriented exclusively towards evaluation and assessment (i.e., exams and quizzes). "For the midterm you need to do this," Ephraim was told, but "for the rest of the year, I don't know what the student needs, I don't know how to better help them learn, I don't know if I

need to give them more materials, just okay they need more time on a test, more time on this exam and that's kind of as far as it's really gone." Janice, a contingent faculty, said that DSPs strain relationships that shouldn't be strained. She described being told, "You need to get all your videos captioned in two weeks, or a week, or tomorrow."

Faculty participants narrated a number of instances when alternate assignments were outright proscribed to them as accommodations. Ephraim expressed his frustration this way: "Oh, you can do this alternate assignment for this student," then they're off on their own and they're not interacting with everyone. What's the point of that?" He described a suggestion that students be given a reading assignment instead of identifying rocks. This was an anathema to the geology faculty, given that rocks are the cornerstones of the discipline. He was frustrated at the instruction to separate his students and deny them the experience of having a rock in their hands. As Freya said, "Alternate reading assignment is not gonna cut it figuring out how sandstone and granite are different, and [you, DSP,] tell me how I can make this happen."

In instances where faculty felt they could facilitate a meaningful learning experience through an ad-hoc accommodation, they were frustrated by institutional policies that prohibit informal accommodations. They balked at the choice of either breaking the rules or letting the student struggle. They were angry at the implication that helping students without official paperwork made them "unethical," and by doing so they were somehow "cheating."

The discussion turned to the group's perception of accommodation being driven not by student needs, but by financial pressure or the potential for litigation. Vehicles with wheelchair lifts are expensive to use, and faculty were frequently denied their use by the institution. Janice's supervisor questioned why she couldn't do something on campus (the rocks are off-campus). Institutional polices, in their view, are crafted not for student success but to address liability issues.

Finally, some faculty described DSPs as limiting access to their programs. Maureen felt that she has had very little opportunity to interact with students with disabilities, because by the time they matriculate, they do not think that the geosciences are a viable option. She described these students as being "weeded out" by external forces. Sophie, the professor with a disability, related what her DSP told her when she was a student and indicated her interest in science:

> *'For the love of mercy, why are you doing something hard? If you have a special need, why, why, why work hard that way? Why go in that direction? You've got so many other issues, why are you going there?' And so that's what the science faculty and a student wanting to go in science kind of represents. It's exhausting going through school having been questioned so many times about why I was making the choices I was making and to have to convince other people of your right to be there just shouldn't be part of what a student has to go through.*

Ephraim had similar experiences. For him, however, the cause of such negative messages was the absence of a DSP staff member with a science background. Because of this, DSPs steer students away from science because of its perceived greater difficulty, and DSPs want to work within the familiar boundaries of non-science majors. Janice felt abandoned by her DSP because the staff did not have a familiarity with science. It was up to her to find information on accommodation and pedagogy.

The problem of DSPs lacking a science education knowledge base was driven home by Freya, who, in a moment of frustration, paid a visit to her DSP. At issue was the required accommodation of using the testing center. Freya's problem was that she would have to bring mineral specimens to the testing center. These specimens are required to remain in the geology lab classroom by her campus Environmental Health and Safety (EHS) Office, because they contain heavy metals such as lead and vanadium. She was caught in a choice between violating DSP policy

or EHS policy, both of which carry severe consequences. She found that her DSP was very receptive to her saying, "if you want the student to take the lab outside the classroom, tell me how we can work with each other." In the ten years since this incident, Freya has cultivated a healthy relationship with her DSP, to the point now that they use her as an "ambassador" to students with disabilities who have an interest in science.

Interpretation. Some DSPs act as gatekeepers of science. They strive to serve students with disabilities in good faith, particularly with regard to assessment. However, some DSPs may in fact be cutting off access to knowledge itself. We are compelled to view this as a social justice issue. Denying a group of students access to science, even indirectly, violates their rights, reduces the diversity of the future geoscientific workforce and undermines the advancement the human scientific enterprise.

Regulation and education are fundamentally at odds in this situation; the former impacts the latter, but the converse is not true. Litigation carries widespread and severe consequences. As a result, institutions will tend to focus on accommodation and compliance. However, *accessibility* at the classroom- and program-scale is localized and not checked for compliance. Accessibility, then, is a fuzzy educational problem relegated to the teacher; accommodation is a focused legal problem relegated to the institution. As long as institutions face down the possibility of culpability and legal action, regulation will always be prioritized over education—even if it is not more *valued* than education. We suggest that this process is pervasive in all settings, to the point that the unintended net effect of disability regulation may be to reduce the disabled student to an abstract construct of paperwork and potential litigation.

Our interest in connecting Earth science and disability education leads us to invoke the geological metaphor of subduction. Subduction is a geologic process that takes place when two plates of the Earth's crust collide such that one plate is forced under the other and is subsequently destroyed. Remnants of this subducted plate are turned into discrete magma bodies and intrude upward into the overriding plate. These bodies are compositionally distinct from the overlying plate, but are now a part of it, and secondary to it. Subduction illustrates well is our interpretation of the relationship between regulation and education; regulation overrides education and ultimately disperses education into itself.

Empathy Displacement: The Net Effect of the Four Processes

Our study participants were troubled by an information vacuum of what counts as disability. They described a lack of knowledge and guidance in situating themselves and their students. Participants struggled to reconcile accessibility with learning goals. They felt that their concerns for student learning and welfare were superseded by their institutions' compliance-oriented, shotgun approach to accommodation. Faculty described constraints on their teaching persona and environment, and described the stigmatization of students with disabilities. They narrated instances of DSPs acting as gatekeepers of science.

Each one of these lived and perceived truths impacts a teacher's expression of empathy for his or her students. It is not appropriate to say that their empathy is reduced or eliminated; our participants still clearly *felt* empathy, but they could not translate feeling into action. We label this phenomenon as "displacement" because empathy is not destroyed, it is moved aside. This label is particularly meaningful to Earth scientists, because displacement is a ubiquitous mechanism in Earth systems. For example, fault movement is measured as length of displacement of rock layers, and warmer air displaces cooler air as the sun warms the atmosphere. We find significance in drawing clear analogies between planetary processes and human interactions. Earth science teachers and learners are social actors that reside on the planet. Human-environment interaction is a core concept

in geoscience, and our analogy adds another aspect to this interaction. Perhaps, in more than an allegorical sense, empathy is an Earth systems process.

Empathy is also a hallmark of effective teaching (Palmer, 1998). Empathy displacement compromised the agency of our participants. Their empathy towards and concern for their disabled students is curtailed. The empathy-displacement process operated consistently among our participants, who brought to our study already high levels of empathy. This leads us to extrapolate the persistence of this process among the wider population of geoscience faculty, and to other faculty populations.

Discussion and Recommendations

We return to our fundamental research questions:

- How do Earth science faculty currently accommodate students with disabilities in field settings?
- What barriers do faculty encounter to providing accessibility to students with disabilities?
- What do faculty need to know to provide accessibility in field settings?
- What recommendations can be made to institutions and faculty regarding accessibility and inclusion in the field?

When it comes to the question of barriers for faculty, the lack of knowledge and information is certainly a barrier, as is lack of experience. The knowledge base and efforts required for accessibility include: 1) a basic understanding of the lived experiences of students with disabilities, i.e., empathy; 2) a repository of teaching strategies and techniques from which to draw, as well as a community of experienced peers; 3) collegial relationships with DSPs; and 4) an understanding of how to reshape their basic geology learning goals in a manner consistent with universal access. We consider these items to be a "to-do" list for accessible field learning, completed in the order presented. Each item on this list is discussed below.

The first item on this list is largely intrinsic to the faculty member himself or herself. The willingness to engage with students with disabilities is a prerequisite to understanding. Successful engagement enables the teacher to position students to self-advocate and take agency in the physical setting—accessing rocks—as well as in the cognitive domain—understanding rocks. We note that *successful* engagement is less on point here than the actual *willingness* to do engage. What if the teacher wants to engage, but does not know how? This teacher needs the community of peers noted in item two. In fact, the needed network of peers and the pedagogical repository exist for geologists in the form of the IAGD. Its members have voiced an interest in and commitment to inclusive learning. Our simple recommendation is for faculty to reach out, both to students and to each other: "Don't go it alone."

The IAGD also serves as a knowledge base, which is the second item needed for accessibility. The IAGD listserv and community forums regularly circulate queries on "tips and techniques" for a variety of situations. For example, a query was posted to the IAGD listserv (W.B. Whalley, personal communication, October 17, 2016) seeking advice and input regarding pedagogy appropriate for students with color vision deficiencies (CVD). Two days later, A. Jolley (personal communication, October 19, 2016) circulated a list of resources and scholarly articles to the listserv members. This is one example of a living network of experienced peers. The teacher who posted the original query then indicated his intention to use these resources to engage his student (W.B. Whalley, personal communication, October 21, 2016).

Backed by a supportive peer network, the faculty member should then reach out to DSPs, and we recommend that she or he visit the office in person to meet with the administrator-in-charge. During this visit, the faculty member should 1) explain the use and purpose of field learning, 2) outline the steps she or he has taken towards accessible design and 3) seek feedback on those steps. When a DSP acts as a gatekeeper or takes a strongly compliance-oriented approach to field learning, it should be assumed first that the office is in the position of having no exposure to or experience with field pedagogy. To assume that the DSP has no interest in accessible field learning is inappropriate. In fact, some of our faculty participants described their own successes with this tactic. In one instance, the request for testing at the DSP office was in conflict with laboratory safety concerns, and the faculty member said to the DSP, "tell me how we can work with each other." This was the beginning of her lasting and productive relationship with her campus DSP.

Some faculty will ask, "Why does it fall on us, the faculty, to reach out? Why can't they do it?" It is because the business of the DSP is service and support, and our business is teaching and learning. We are the only ones who can initiate a relationship based on teaching. We are the ones who are with the students in the classroom. We are the ones who have custody of the educational process. We know our curriculum and what our discipline requires of newly minted geologists, and we cannot wait for DSPs to spontaneously figure out what we need to accommodate students in the geosciences. And to be honest, we might react defensively to their unsolicited outreach.

That said, DSPs must reciprocate this outreach, taking an interest in accessibility, as well as accommodation. We recommend that faculty invite the DSP administrator to attend a field trip. This task is crucial. Such an invitation, extended on behalf of the desire to serve students, is compelling. If the administrator's schedule does not allow him/her to attend, we recommend inviting the campus chief academic officer, or even the chief executive. Even if no administrator joins the field trip, accessible learning is brought into the foreground by the invitation itself.

Despite our opposition to the overregulation of accommodation, we do see the need for enforcement in certain circumstances. There are faculty who disregard accommodation in order to "weed out the unfit"; who refuse to acknowledge that DSPs do more than prescribe extended time on exams; and who do not recognize the multidimensional nature of ability. In the absence of buy-in, enforcement is necessary.

Finally, the geology teacher must consider how all students can achieve the learning goals of the field trip. On a practical level, this means answering questions such as, "Do *all* the students really need to go up that particular slope to see that particular feature? Or can I organize the students such that some can go up there, make observations, and bring data back to the group?" Those data might be rocks, or a photograph of the outcrop, or a shared understanding. It may be possible to achieve learning goals through multisensory experiences. For example, on the GSA Accessible Field Trip, the group was presented with a tactile map of the local setting, using textures (e.g., sandpaper, puff-paint) to represent variations in the landscape (Gilley, Atchison, Feig, & Stokes, 2015). These maps were intended to accommodate low-vision participants, but all the participants interacted with them.

Moving Toward a Meaningful Faculty-DSP Relationship

We have specific recommendations for institutions regarding their disability service providers, and the DSPs themselves. First, we are highly critical of making compliance the top priority in what should be a praxis of accessibility. The fundamental issue here is whether the narrative of the DSP is one of compliance or one of social justice. Does the institution position the DSP in conflicting roles of advocate/enforcer? Is the DSP denied a curriculum specialist, or someone who can broker a discussion of barriers between faculty and DSP staff? Is the DSP chronically understaffed? If the

answer to any of these questions is "yes," then the DSP does not have the agency it needs to fulfill the mission it has been charged with.

With this in mind, disability service providers could take a more active role in defining their "brand" to the campus. Too many faculty, as we have seen here, view "disability" as a medicalized legal issue, bearing the threat of punitive action. DSPs could work to rebrand themselves as accessibility service providers (ASPs). Networks of faculty "ambassadors"[1] that have been successful in working with the DSP/ASP could be formed to facilitate the shift away from the misconception among faculty that the service providers "just do exams." The ultimate goal would be to replace, in words and actions, enforcement with education. Several goals can be accomplished when education displaces enforcement in an institution's technical core. A mission focus from compliance to education will generate buy-in among faculty, because faculty will see the service provider as a partner in teaching. The provider and the faculty are then a partnership that puts the student learning experience foremost, and works to *make* things happen versus *prevent* things from happening; being proactive versus reactive. Working together to open the door to the ethos of learning, versus working separately to shut the door to the threat of culpability.

All that said, if faculty claim to "are about the student first, as we generally do, then we must do our part in this partnership. We have a responsibility to design experiential learning with inclusivity in mind; to ask for help in its implementation; to listen to the student; to assume that the disability service provider will act in good faith. This last point is perhaps the hardest. It is all too convenient for faculty to label this partnership, and its give-and-take, as institutional meddling, hell-bent on diluting the purity of science, and as dismantling the dispensary of faculty knowledge. As teacher-scientists, though, we assert that "pure science" which is neither accessible nor inclusive is useless. Hence, any call for reform of DSPs must come with a call for reform of faculty attitudes and behaviors. Who wants to be useless?

Limitations and Future Research

Field experiences are site-specific, time-specific, and iterative. No two field trips are the same. Therefore, the lived experiences from which we have extracted meaning will not be repeated exactly. In addition, our participants were self-selected, and their engagement in the process is possibly higher than that of a random sample of geoscience faculty. Finally, our goals for how faculty should conceive of campus disability service providers is laudable. However, the hard truth is that faculty in general (speaking anecdotally, of course) tend toward a state of inertia, and that reconceptualization will, at best, be slow in coming.

A next logical step in the study of field trip design is to involve disability service providers in the design of accessible field experiences. This should be an action-research effort designed to integrate the multiple realities and lived experiences of disability service providers, field-science faculty, and students with disabilities. We are currently developing a theoretical model of an individual's "spectrum of ability" in the multiple instructional environments. Our model seeks to describe the interactions between ability and novelty space (Orion and Hofstein, 1994) in field-based learning.

Conclusion

Up to now, little has been documented about the experiences of geoscience students with disabilities in field settings. Our research shows that four processes work against accessibility and inclusion by

[1] Or in the case of the University of Plymouth, U.K., "Disability Champions."

reducing the empathy of faculty. Our participants reported that current practice of accessibility and accommodation is either guided by campus disability service providers, or left to them as faculty to figure out. What they struggle to figure out is:

- The search for disabilities that "count."
- The reticence of faculty to engage students with disabilities, thus providing them with opportunities for agency and self-advocacy in the field.
- The reconciliation of accommodation and learning goals.
- The overprint of education by regulation.

We assume that Earth science teachers outside our study population have similar circumstances. Furthermore, our findings can be extrapolated to other disciplines with field-based components, such as archeology or ecology.

The necessary elements of accessibility in the field include empathy, peer support and knowledge, partnerships with DSPs, and learning goals that are mindful of access and inclusion. We recommend that Earth science teachers proactively engage their institutional disability service providers to craft a partnership in accessible education. We also recommend that DSPs take an active role in rebranding themselves to the campus community. Such a partnership would emphasize the mission of DSPs as one of accessibility, focused on the education of students, rather than the enforcement of regulations.

The results we report here largely come from observations on the field trip—outdoors, in buses, next to rock outcrops. Faculty-student pairs mixed with each other in all settings. Field trip leaders provided narration and explanation supplemented with adaptive equipment, but minimal guidance during exploration phases. No accommodation regulation was formally promulgated, and no discussion of compliance took place. When faculty had accessible learning modeled to them, and then were trusted to carry it out, what emerged was an inclusive learning community. This community displayed tactics for other ways of knowing, and met the educational goals of the field trip. The learning goals were not reduced in number or in rigor. Going in, many of our participants were skeptical that these things could be accomplished on the accessible field trip. Many Earth science faculty at-large likely remain skeptical that the field is a place for students with disabilities, yet it happened on this GSA Accessible Field Trip. Accessible field learning is happening more often through opportunities offered by the IAGD and in many geoscience departments across the world.

Geologists have an expression for when we encounter something in the field that defies our expectations: "If it *does* happen, it *can* happen."

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Text Selection and Course Design: Faculty Perspectives on Critical Reading and Critical Thinking

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Abstract: This study of sociology faculty in twelve private colleges and universities compares teaching with textbooks and textbook alternatives in undergraduate classes. Faculty explain that textbooks provide a breadth of material that is organized and streamlined in a way that promotes consistency across instructors, facilitates content delivery to students with a range of abilities, and reduces course preparation time. Despite these benefits, faculty have a strong preference for textbook alternatives. Faculty argue that readings, like monographs and journal articles, develop students' critical reading and thinking skills. Additionally, when instructors design courses with alternative readings they engage their own critical reading and thinking, as they critique and synthesize the literature in their discipline in order to curate texts for the syllabus. We argue that teaching courses with alternative readings creates course experiences where students and faculty engage with a discipline together.
Keywords: textbooks, critical thinking, critical reading, sociology, course design

Texts are essential to course design. They shape how professors organize units, structure lectures, and assess learning. Despite the importance of choosing texts, systematic research concerned with why instructors choose textbooks or choose alternative readings is scarce. We surveyed thirty-six sociology professors at twelve small and medium private institutions to bring the pedagogy of choosing texts to the fore. This research asks, why do instructors choose textbooks, monographs, or other types of readings? How do instructors understand how the choice of one form of text or another shapes teaching and learning?

Our inductive qualitative analysis of open-ended survey interview questions, revealed that faculty view textbooks and their alternatives as fundamentally different. Faculty noted that textbooks had particular strengths, like providing a breadth of material that is organized and streamlined in a way that promotes consistency across instructors, ensuring that departmental learning objectives are achieved with a variety of instructors. They explained that the books facilitate content delivery to students with a range of abilities, and that textbooks reduce course preparation time for faculty. Still, the faculty in our study had a strong preference for teaching without textbooks.

Instructors saw alternatives to textbooks, like monographs and articles, as time-intensive to teach, but the best way to advance students' critical reading and thinking skills, a finding congruent with the academic literacy literature. In addition, instructors viewed the task of finding textbook alternatives as a way to engage their *own* critical reading and thinking skills in their teaching, a benefit rarely discussed in the literature. We argue that teaching courses with alternative readings creates a course experience where both students and faculty engage in evaluative reading and creative reasoning. Unfortunately, according to our participants, the conversations regarding course design around textbook alternatives are lacking on campus. The overwhelming majority of faculty in the study received no training or mentoring from their department or institution. Therefore, the paper concludes with advice from study participants for faculty interested in teaching with alternatives to textbooks.

Literature Review

Textbooks and Learning

One type of text that undergraduate students have extensive experience reading is the textbook. A nation-wide study of 2,711 faculty representing a full-range of educational institutions and disciplines found that 68% of US faculty required textbooks (Seaman & Seaman, 2017, p. 7). While textbooks have some benefits, including delivering extensive content in an image-rich format that students are familiar with, teaching and learning scholars tend to criticize this type of reading.

In sociology, complaining about undergraduate textbooks is a "venerable" (Schweingruber, 2005, p. 81) and "time honored" (Zipp, 2012, p. 307) tradition. For decades sociologists have critiqued textbooks as formulaic in structure and uniform in content, but while they lamented these shortcomings they explained that they are a product of professors wanting to reduce their course preparation time, students wanting easy readings, and publishers wanting a profit (Graham, 1988; Macionis, 1988; Ritzer, 1988). More recently scholars in sociology have analyzed textbooks to debate the foundation of knowledge in the discipline, often referred to as the "core" (Keith & Ender, 2004; Schweingruber, 2005). A current cleavage about teaching the core concerns whether instructors should prioritize content breadth or skill development (Ballantine et al., 2016; Greenwood & Howard, 2011). Many argue for both, but contend that textbooks tend to skim too much material because the primary goal of these books is to deliver as much content as possible (Ballantine et al., 2016; Greenwood & Howard, 2011; Zipp, 2012).

In other disciplines scholars argue that textbooks create a reading experience that bores students and reduces student engagement (Carnevele, 2006; Dardig, 2008; Shibley, Dunbar, Mysliwiec, & Dunbar, 2008). Part of the problem is that textbooks can reduce complexity in order to cover content in a way that is streamlined and accessible, giving little room for students to disagree or come up with original ideas (Pawan & Honeyford, 2009; Pugh, Pawan, & Antommarchi, 2000; Westhues, 1991). As Pawan and Honeyford (2009) explain, textbooks provide "an absolutist and passive approach to learning" because they do not invite students to read critically or personally define conclusions regarding content, instead they push students to accept the authority of external sources of knowledge (p. 27).

In sum, scholars in sociology and other disciplines identify problems with textbooks arguing that the books tend to be formulaic and over-simplified, which reduces student engagement and learning. The academic literacy scholarship reviewed below explains how alternative texts like journal articles and monographs, combined with active reading instruction, helps faculty teach students how to critically think and read in discipline specific ways.

Critical Thinking and Critical Reading

Academic literacy scholarship focuses on the particular ways of knowing and communicating within a discipline (Gee, 2010). This scholarship contends that areas of study have distinctive social and cultural practices that are reflected in textual styles and conventions, thus faculty need to teach students how to read assigned texts in particular courses and in particular majors (Gee, 2010; Van Camp & Van Camp, 2013). Importantly, the type of texts faculty assign, specifically textbooks or reading alternatives like journal articles and monographs, pose different opportunities for critical reading and more broadly, critical thinking.

It is commonly understood that critical thinking involves more than information recall about a body of knowledge. Rickles, Schneider, Slusser, Williams, and Zipp (2013) conceptualize critical thinking as a process that involves critical reasoning which is used to assess "the logical or empirical

sufficiency of a statement" and creative reasoning that "defends a logical and empirical statement that has been created" (p. 272). Faculty can improve student critical thinking skills by creating opportunities for students to assess thinking in the discipline (Broadbear, 2003). Broadbear (2003) argues that some types of assigned readings can advance this goal, as collections of complex texts can show expert disagreement, requiring students themselves to interpret and assess evidence, which promotes critical reasoning. Roberts and Roberts (2008) argue that this type of reading can also develop creative reasoning, where students read to construct their own arguments. Pugh, Pawan, and Antommarchi (2000) add that well-selected readings can be a platform from which instructors and students launch critical thinking in collaboration with each other (p. 25).

Simply assigning complex readings is insufficient. Professors need to actively teach undergraduates to read in order for them to develop academic literacy. Van Camp and Van Camp (2013) contend that professors mistakenly assume that students have college-level reading abilities. They conceptualize college-level reading as "critical reading," where a reader "can identify what a text does, and how" in order to evaluate the text and ultimately engage with it in their own thinking (Van Camp & Van Camp, 2013, p. 88). Evaluating a text and using a text to develop original thought are the critical reasoning and creative reasoning skills that together, comprise the Rickles et al. critical thinking conceptualization (2013). The concept critical reading does not duplicate the broader concept critical thinking. Critical reading brings attention to skills that are required to effectively critique and analyze texts. Critical reading then, functions as a building block for creating broader critical thinking outcomes, such as the ability to synthesize a literature, conduct original research, and write a research paper.

Professors can teach the skills needed to read and decipher difficult texts by providing scaffolding, learning tools, and regular assessments (Pugh et al., 2000). Multiple authors advise structured reading techniques that encourage students to slow down to ask and answer particular questions of the text they are engaged with (Keller, 2008; Macpherson Parrott & Cherry, 2011; Rautman, 2014; Roberts & Roberts, 2008; Williams, 2005). For example, regularly assigned small writing assignments that ask students to identify the thesis statement and supporting evidence in assigned texts promotes reading comprehension, critical reading, and student writing because students learn to model this style (Van Camp & Van Camp, 2013). Faculty can successfully develop student critical reading and critical thinking, but to do so they need to consciously work towards this goal in their course design, both through the selection of texts as well as teaching students how to critically read these texts.

Academic literacy scholarship contends that eschewing textbooks, and instead choosing more difficult texts that reflect norms in the discipline can develop student critical reading skills, which can lead to broader critical thinking learning outcomes. It is unclear whether this message has reached faculty. Most scholars in this area provide case studies focused on student data from their own courses that explain how particular assignments develop students' reading skills, critical thinking, and learning (Keller, 2008; Roberts & Roberts, 2008; Van Camp & Van Camp, 2013; Williams, 2005). The few studies that sample from a larger population of professors tend to be quantitative surveys about textbook adoption that are concerned with availability, new digital products, and cost, rather than learning outcomes like critical reading and thinking (Seaman & Seaman, 2017; Zogby International, 2004).

This study contributes to the literature by examining the text selection choices sociology faculty at multiple institutions make, and their perceptions of how their text choices influence their teaching and student learning. We find that faculty explanations of their teaching practices correspond to the literature. Faculty in our sample widely disparage textbooks and use alternative readings primarily to develop student critical reading and thinking skills. While the critical reading and thinking literature focuses on students, our focus on teachers reveals that faculty also value using alternatives

to textbooks because reviewing and selecting scholarly texts in the discipline engages their *own* critical reading and thinking as they design and teach courses.

Methods

To research text selection practices and how faculty understand these choices we designed a survey that included both closed-ended questions which we compiled with descriptive statistics and open-ended questions that we analyzed using qualitative coding. The qualitative results are the analytical core of this study. According to scholarship on qualitative methodology, open-ended survey questions generate responses which can provide "a window into human experience" (Ryan & Bernard, 2000, p. 769). Our research design relies on multiple personal narratives, or first-person experienced-based accounts where faculty analyze the data afforded by day-to-day teaching and describe solutions to the problems they encounter (Weimer, 2016).

Because the majority US faculty use textbooks (Seaman & Seaman, 2017, p. 7), we designed the study to increase the likelihood that our sample included faculty that use alternatives to textbooks in their teaching. The study used non-random purposive sampling to identify a pool of sociology faculty who were likely to have text selection autonomy, to teach small to medium-sized classes (at or below 50 students), and be employed by institutions that prioritize teaching. Our focus on sociology instructors stems from our own location in this discipline and our desire to advance our own pedagogy through research. We began with a population of colleges and universities in one western state, then excluded large research universities since faculty are more likely to be research focused, public universities because they tend to have large class sizes, and community colleges because faculty are often required to choose from a pool of pre-selected textbooks. Sixteen private colleges and universities with sociology departments fit our criteria. We identified one hundred and sixty-five sociology professors of all ranks at these institutions. After three e-mailed invitations to join the study we achieved a 22.9% response rate, with a final sample of thirty-six instructors at twelve institutions. Twenty-two respondents taught at least one class with a textbook and fourteen taught all of their courses without them.

The institutions had average class-sizes ranging from ten to twenty-nine students, and their selectivity measured by acceptance rates ranged from 14% to 71%. The faculty in the sample all taught undergraduates and, as shown in Table 1, include lecturers, assistant, associate, and full professors, the majority of which were White and female.

Table 1. Survey Respondent Characteristics (N 36)

Sex	*N*	*Percentage*
Female	24	67%
Male	11	31%
No answer	1	3%
Race/Ethnicity		
African-American	1	3%
Latino	1	3%
White	26	72%
Asian	3	8%
Other	3	8%
No answer	2	6%

Teaching Status		
Lecturer	6	17%
Assistant professor	14	39%
Associate professor	7	19%
Full professor	9	25%

Twenty-four professors in our sample attended liberal arts institutions when they were undergraduates, while twelve attended research universities. The faculty in the sample teach many different courses. The mean for distinct courses taught in the last five years was 6.1, and the range was from two to fifteen.

We pre-tested the survey questions with a small pilot using a convenience sample, resulting in some useful revisions. The final survey instrument included questions about text selection, benefits and costs for faculty and students, and instructor training. To reduce interviewer bias and improve reliability we took steps to ensure that we presented the research in a neutral way and avoided leading questions. In this vein we asked similar questions about teaching with textbooks and teaching with alternatives. For example, we asked about the benefits of textbooks as well as the benefits of using other types of texts. The survey was web-based, self-administered, and anonymous which increases the likelihood of honest responses (Neuman, 2006, p. 284). The open-ended questions allowed respondents to explain why they choose particular types of texts and how these choices shape course design, classroom teaching, and student learning. To analyze the responses we open-coded to inductively identify themes, which we compiled into a code book, then returned to the data to re-code using the code list (Ryan & Bernard, 2000).

The research has limitations. The sample is purposive. The results should not be generalized to the overall US faculty. The research does not assess student understandings of the connection between text choice and learning, or test student learning outcomes using quasi-experimental procedures. Instead, the research focuses on faculty. We explain, from a faculty point of view, why instructors choose certain types of texts and the outcomes of these choices.

Results

The results section starts with the descriptive statistics we generated from the study's closed-ended questions about faculty text selection patterns and attitudes. Then, we present our qualitative analysis of the open-ended questions to explain why our respondents choose textbooks or their alternatives, identifying critical reading and critical thinking in both students and teachers as a key concern. Table 3 presents the critical reading and thinking analytic framework of the comparison of textbook oriented courses and courses using textbook alternatives. We finish with a section on implications for practice which covers course design, teaching reading, preparing lectures, and the expense of required readings.

Faculty Text Selection Patterns and Attitudes

Faculty use a variety of reading material in their courses and most combine different types of texts. Figure 1 shows that faculty in the study were most likely to assign journal articles and readers in their lower division courses and most likely to assign journal articles and monographs in their upper division courses.

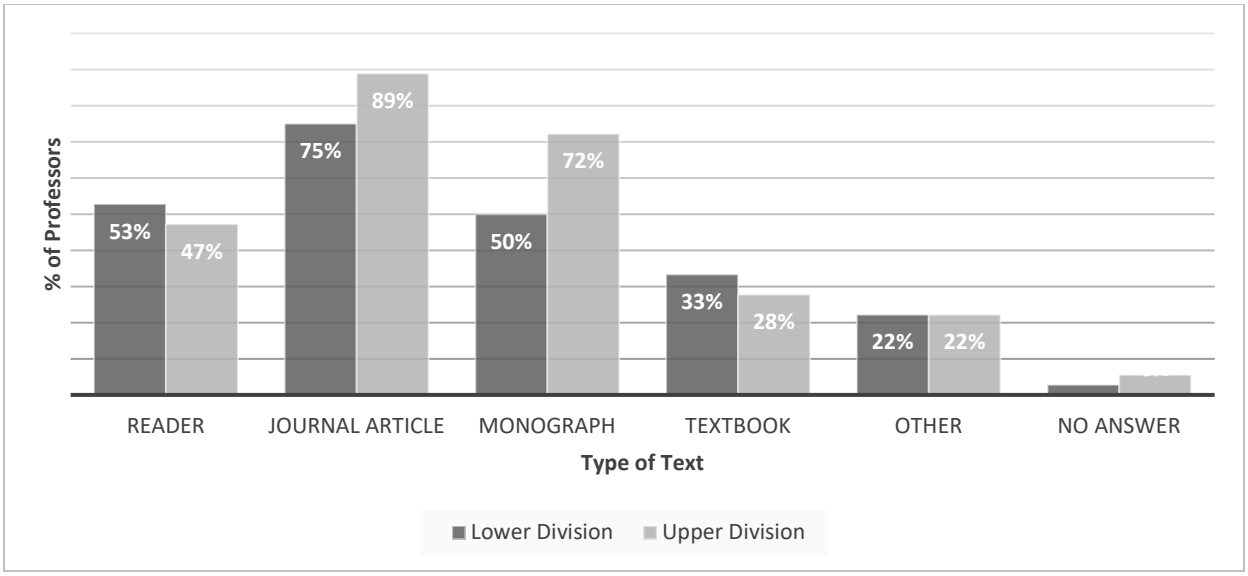

Figure 1. Text Selection in Upper and Lower Division Courses

Faculty were least likely to assign textbooks in all of their courses, not counting "other." Other reading sources used include newspaper and news-magazine articles, blogs, and specific book chapters. Faculty were more likely to assign readers and textbooks in lower division classes than upper division, demonstrating that faculty increase text complexity as students advance through the discipline. However, faculty commonly challenged lower division students with scholarly readings in their original published form, as shown by the inclusion of journal articles in 75% of lower division courses.

Faculty attitudes about student learning in courses with particular types of texts are shown in Table 2. We asked instructors to identify the type of course that best advances student learning. Many respondents thought courses with and without textbooks were equally beneficial, but more faculty identified courses without textbooks as better at advancing student learning, especially in upper division classes.

Table 2. Faculty attitudes about types of courses that best advance student learning

Lower Division	*N*	*%*
A Course With a Textbook	6	17%
A Course Without a Textbook	16	44%
Equal	14	39%
Upper Division		
A Course With a Textbook	0	0%
A Course Without a Textbook	26	72%
Equal	10	28%

No respondents believed that courses that use textbooks were the best choice for student learning in upper division classes, but 17% of instructors said textbooks were superior in lower division courses. In contrast, faculty were more likely to view courses without textbooks to be the best way to advance student learning, especially in upper division courses, with 72% of respondents taking this position. A fair number of respondents felt that courses with and without textbooks were both effective at advancing student learning, with 28% of respondents choosing "equal" for upper division courses and 39% choosing this response for lower division courses.

Explaining Text Selection Patterns and Attitudes: the Importance of Critical Thinking and Critical Reading

Our primary research goal was to understand how faculty see the relationship between text selection, teaching, and learning, therefore we asked faculty to explain the costs and benefits of particular texts. When asked close-ended questions, as shown in Table 2, many faculty said courses with textbooks and courses without textbooks were equal at advancing student learning. In contrast, faculty responses to open-ended questions demonstrated strong attitudes in support of teaching without textbooks, primarily because they argued that alternative readings develop critical reading and thinking skills. Our inductive qualitative analysis of open-ended survey interview questions, revealed that faculty construct textbooks and their alternatives as having key differences. In Table 3 we present the analytical framework.

Table 3. Critical Thinking and Critical Reading Dimensions of Textbooks and Textbook Alternatives

Dimensions	Textbooks	Textbook Alternatives
Text Qualities		
Coverage of Material	Breadth	Depth
Difficulty	Straightforward	Rigorous
Objectives	Deliver content	Contribute to the discipline
Teaching/Learning		
Faculty/Student Roles	Expert/Novice	Co-learners
Synthesis	Done by textbook	Done by faculty and students
Evaluation and Critique	Done by textbook	Done by faculty and Students
Role of faculty in course design	Replication	Creation

Assigning textbook alternatives, according to faculty, is useful for developing student critical reading skills which leads to critical thinking outcomes. Monographs and journal articles help promote critical reading because these texts represent the scholarly writing of the discipline in its original published form, therefore these rigorous, in-depth texts promote disciplinary literacy. Readers can start to identify what authors work to achieve in their texts and how they follow conventions, which students can ultimately model in their own thinking and writing (Van Camp & Van Camp, 2013, p. 88). Returning to the critical thinking concept introduced in the literature review, the evaluation and critique work is critical reasoning because students assess the logical and empirical quality of an individual text (Rickles et al., 2013, p. 272). The synthesis work that students do across multiple assigned readings is creative reasoning, as they create logical and empirical connections across texts (Rickles et al., 2013, p. 272). In addition, using textbook alternatives has critical thinking outcomes for faculty as well. While choosing multiple readings instructors evaluate and synthesize the literature in order to create a course. Faculty, though certainly not novices, engage their skills as they work through texts with students.

Teaching with Textbook Alternatives. When asked to explain how using alternatives to textbooks benefits students, the most common response was that original texts like monographs and articles provide depth and complexity that advance critical thinking. Instructors described monographs and articles as "real" and "actual research" which the academic literacy literature explains provides critical reading opportunities for students. As one faculty member wrote, for most "courses I prefer to create a context that requires students to do the critical work of analysis and organization themselves." This was seen as especially important in upper division courses as a faculty explained, "I expect upper-division courses to have nuance and complexity and I expect students to take responsibility for more

of the analytic work – to do that they need to practice engaging complex texts [and] arguments and they need to learn to connect [and] compare arguments [and] data."

In response to various questions faculty alluded to what critical reading and critical thinking meant to them. They described these processes as a way to "evaluate strengths and weaknesses," to "synthesize the readings and find meaning through their own efforts rather than through reading the conclusions drawn by someone else," and to have "critical discussions of research methods and analytic claims." They wrote that using monographs and articles in a course helps instructors encourage students to "grapple with ideas" and learn how to disagree with an author's arguments or critique their methods. In contrast, one professor stated, textbooks "appear to be objective and full of 'right' answers and 'right' perspectives" denying students the ability to be part of the intellectual conversation.

Many faculty disparaged textbooks as "boring," "overly generalized," "simplistic," and "dumbed-down" none of which promotes critical reading. One respondent explained that some textbooks "spoon-feed the material to students," other respondents described textbooks, with their "pre-digested" material and "summaries" as promoting "content consumption" and "memorizing." Not surprisingly, many identified these texts as detrimental to students. As one respondent said, textbooks "get in the way of intellectual engagement." The faculty in this study tended to value developing an analytical skillset over teaching a breadth of content, joining a group of sociological pedagogy scholars that also argue for praxis (Ballantine et al., 2016; Greenwood & Howard, 2011; Zipp, 2012).

Faculty also valued how textbook alternatives stimulated their own engagement. When faculty design courses using journal articles and monographs, they critically read texts, then curate content, all the while considering student capacity and interests. Through their selection of texts faculty are making an argument about the discipline, as these texts function as exemplars that illustrate classic works, key theories, current debates, research methodologies, and disciplinary writing. Collections of texts in a course demand synthesis, faculty create connections and identify conflicts across the reading materials but also create opportunities for undergraduate students to do the same, thus engaging and promoting critical and creative reasoning in a classroom community.

Faculty described their own critical reading and critical thinking work in designing courses with textbook alternatives as one of the benefits of not using textbooks. As one respondent wrote, when faculty use alternatives to textbooks, teaching "comes from the mind and the heart of the instructor." Another added, textbooks "are based on the editor's views – with this [textbook-alternative] technique, I am the editor of my own class materials." They explained that without textbooks it is important to "think deeply about what you are doing" and "engage intellectually with your discipline." Many agreed that this means in total that you have to spend "more time on your teaching." As one respondent said, teaching without a textbook requires "lots of work on the instructor's part" and respondents explained that this extra work takes place across most areas of teaching including syllabus construction, assessment design, and day-to-day in-class activities. In sum, there are critical thinking and critical reading benefits for students and faculty, as one responded explained, "Students and professors have to think harder and work together more to make sense of the material."

Teaching with Textbooks. When we asked respondents to identify the benefits of textbooks for students, they noted that textbooks can provide breadth, organization, and ease of use. Some respondents explained that textbooks are efficient vehicles for delivering extensive content. Content, of course, is a key component of many college courses and can be a necessary knowledge base for future classes. Others noted that textbooks can provide cohesive overall course structure, as one respondent explained, textbooks "provide a clear structure" and have a "logical flow." Professors noted that this organization can make learning more straightforward for students as a good textbook,

"outlines what they should learn [and] provides clear explanations." They further explained that this gives students a "sense of security" and allows "weaker students [to] have something to hold onto and aid them if they get behind." A few respondents identified supplemental materials as a benefit for students, mentioning glossaries, indexes, study guides, vocabulary lists, reflection questions, and online components.

A small number of respondents said that the homogeneity of textbooks helped students advance through the curriculum because they ensured similar types of exposure to the discipline in lower-division courses regardless of the professor. As one respondent explained, "textbooks make it likely certain core material will be taught in all sections [of the same course]," and conversely when "readings are used, sections of the same course are less similar because they don't cover the same material." Respondents also identified textbooks as a protection against bad teaching. As one respondent wrote, a textbook "minimizes the effects of poor teachers because even if the teacher isn't great, all students have access to the same information." Another wrote, "Use of a textbook guarantees the student will gain some basic knowledge of the field from the course."

When we directly asked respondents about the strengths of textbooks, they identified the benefits outlined above, however, respondents were more likely to criticize textbooks than other types of readings. As one respondent vehemently wrote, "use texts and you are miss-educating your students" and another disparaged, "I suppose if you have very large classes and no interest in teaching they [textbooks] are the only way to go." Others negated their positive comments with qualifying statements like, students "get a (I think false) sense of coherence if the book is well edited" or that textbooks can be good if they are not overly "textbooky."

When we asked respondents to explain the benefits of textbooks for instructors, faculty explained that textbooks make teaching "easy" and were "a time saver." Instructors saw textbooks as a way to save prep-time, including not having to choose a selection of readings, to write exams, or to organize a syllabus from scratch. As one explained, the "material is already organized and structured." Another said that using a textbook means "less work finding reading material and coming up with accompanying assignments." One participant explained, "someone else has done the main part of the work, so we don't need to reinvent the wheel." A few others noted that textbooks help in "sub-areas with which we are less familiar" and similarly, instructors can "teach a variety of subjects without worrying as much about their own expertise." In sum, a major benefit of textbooks for instructors was they reduce preparation time.

Faculty designing courses with textbooks replicate more of their course design and content, which saves time, while faculty who use alternatives to textbooks engage in more creation, which is time consuming. We argue that course creation work without a textbook requires more synthesis, evaluation, and critique, meaning that faculty are critically reading and thinking in order to design their courses. Thus, faculty and students have a co-learning role, where their critical reading and thinking skills are developed and practiced as they teach and learn together. This model does come with potential costs beyond the extensive faculty time investment. It reduces the ability to transmit the core foundational knowledge in the discipline and increases the potential for idiosyncratic teaching and learning.

Implications for Practice

According to the instructors we surveyed, designing courses using alternatives to textbooks can be difficult for faculty and learning without a textbook can be challenging for students. Unfortunately, according to our respondents there are few face-to-face conversations on campus about designing courses around textbook alternatives. In our study, the overwhelming majority of respondents received no training or mentoring from their department (89%) or their institution (94%) in text

selection and related teaching practices. When we asked how they learned to teach without a textbook, most said they modeled their classes from their own experiences as a learner. Others modeled their courses on their graduate education, as one wrote, "I thought about my graduate education and those seminars were frequently based on current readings and supplemented by classic works." A few noted that they learned from being a Teaching Assistant for professors with good teaching strategies. Only a few respondents mentioned that they talked to colleagues, borrowed syllabi, or read pedagogy literature. Certainly though, sociology instructors do share teaching ideas and resources through TRAILS, an online peer-reviewed library of sociology teaching resources, the Facebook group "Teaching with a Sociological Lens," which has over 4,000 members, and Twitter, where teaching focused accounts like @TheSocyCinema have over 14,000 followers. Still, this research suggests limited discussion about text selection making our question "what advice would you give to an instructor that is considering teaching without a textbook" useful. Here, we synthesize comments from our respondents to provide guidance for faculty that use textbook alternatives or are experimenting with them for the first time.

Course Design. When teaching without a textbook it is the job of the faculty to create the structure and sense of the discipline or sub-discipline that textbooks provide. Many of the respondents made clear the preparatory work involved with teaching with textbook alternatives. Without a textbook and accompanying supplemental materials, it is now the professor's job, as one respondent explained, to "ensure readings and course materials are tightly coupled with course objectives." During the course development phase one respondent noted that, "It is helpful to think through the main topics [and] issues you want to cover in the course before choosing specific readings." The respondent counseled that, "sometimes browsing a textbook is helpful to see how traditional textbooks carve up the topics." Once a professor has an overall structure of the course in mind, a respondent advised, "Pick three to four timely topical books" and "assure that they increase in their theoretical complexity as you go through the semester." Respondents recommended that monographs be "engaging" and "readable" but also that faculty need to be aware that, as one faculty explained, "there are things you might love that will never work in a class."

Teaching Reading. Our respondents, valued alternatives to textbooks, like research articles and academic monographs because these texts are more likely to have challenging content and reflect the practices of the discipline which promotes critical reading. As one faculty member explained, students "will learn far better by engaging with concrete examples of good…research, taken from a few areas of the discipline." However, academic monographs and research articles are primarily written for readers with more background and formal training in the discipline, creating challenges for undergraduate students. To address this, respondents recommended assigning regular graded and un-graded activities that provide structure and scaffolding to help students learn to critically read academic texts. Because of the challenges of difficult readings it is important as one instructor in our sample asserted, to "design assignments that assure reading and comprehension" and another advised to "assess students early and often." Describing assignments in detail is outside the scope of this paper, however the works cited includes numerous published examples of assignments that promote critical reading (Keller, 2008; Macpherson Parrott & Cherry, 2011; Roberts & Roberts, 2008; Van Camp & Van Camp, 2013; Williams, 2005).

Lecture. Professors identified organization as one of the key teaching and learning challenges in courses that do not use textbooks. One instructor noted that students "may have a harder time synthesizing the concepts they are reading in individual texts." We note that synthesis requires creative reasoning. A few others wrote that students can "get lost" without a textbook and that a textbook-free course "might feel disorganized." Many respondents shared that good lectures can address some of these problems. Lectures can help students situate particular readings into broader disciplinary ideas and practices. One professor counseled, "I think the professor really has to work long and hard at

making the books seamlessly work with each other." Without the structure of the textbook, it falls on faculty and students to create connections between individual readings and the discipline as a whole. In addition, to address the problem of students having partial learning, one instructor suggested that teachers "develop a solid set of lectures to provide all background so students get more out of the substantive readings you assigned." For lower division courses in particular a respondent said, "You have to be able to deliver the essential concepts…in other ways and then build those tools into the discussion of monographs, readers, media sources and other [materials]."

Cost. While pedagogy was the primary concern of the faculty we surveyed, they were also attuned to the financial burdens their students face. Texts can add to the cost of college. In the words of one respondent, textbooks are "exceedingly expensive." One textbook user explained, "I honestly feel bad sometimes having students pay the exorbitant prices." Some said that new editions makes it difficult to buy a used copy and to keep a copy on library loan, which increases cost. One respondent noted that the cost might keep students from buying the book resulting in lower reading compliance. Some remarked that the problem is most acute for low-income students. A nation-wide survey of faculty shows similar concerns about the high price of textbooks and fears that these prices reduce student purchasing of required books (Seaman & Seaman, 2017).

Our participants' worry about the cost of textbooks is part of current discussions about the increasing cost of college. The United States Congress requested a government investigation of the textbook industry to understand the role of textbooks in the increasing cost of higher education (United States Government Accountability Office, 2005). The research found that between 1986 and 2004 textbook prices nearly tripled, an increase twice the rate of inflation (United States Government Accountability Office, 2005, p. 2). Prices continue to grow. From January 2006 to July 2016 consumer prices for college textbook increased 88 percent (Bureau of Labor Statistics, 2016). Concerns over price have spurred a flurry of articles advocating for ditching textbooks and replacing them with free digital materials. Faculty from across academia argue that much free and up-to-date information from multiple perspectives is available on-line, through government websites and other reputable sources making textbooks relics of a pre-digital age (Carnevele, 2006; Talbert, 2007). Other faculty are retaining textbooks, but are choosing free or very little cost options that are open educational resources provided by non-profit organizations like OpenStax or state initiatives like the California Digital Open Source Library (Ozdemir & Hendricks, 2017; Seaman & Seaman, 2017). While none of our respondents advocated for abandoning hard-copy books altogether, they did suggest that alternative readings can reduce costs by providing free digital materials on course management systems, as well as lower-cost printed material.

Conclusion

Text selection is an important course design decision. This research sheds light on the types of texts faculty assign, focusing on textbooks and their alternatives, as well as how faculty understand the consequences of these choices on teaching and learning. The research adds to a literature that primarily consists of case studies and focuses on learners more than teachers. The sociology faculty we surveyed were more likely to assign journal articles, monographs, and readers than textbooks in both upper division and lower division courses. However, over half of the sample used textbooks in at least one of their classes. Inductive analysis of qualitative comments revealed that faculty view textbooks and alternative readings as fundamentally different. Faculty believed that courses using alternatives to textbooks best advance student learning, specifically critical reading and critical thinking, where students evaluate and critique texts in order to create their own analyses. However, they noted that textbooks excel at delivering large amounts of homogeneous content in an organized manner, which ensures that certain topics are explored regardless of the quality, training, or interests of particular

instructors. While faculty stated that textbooks can reduce the time it takes to design a course, they valued how choosing alternative readings engaged their own critical and creative reasoning as they selected texts and worked through the readings alongside students.

Most faculty in United States colleges and universities use textbooks. This study is not a critique of their practice. Our survey respondents, sociology faculty at small private institutions in one Western state, were chosen because we determined they would have a higher likelihood of teaching with a variety of texts due to their institutional context. Faculty at larger institutions and in other disciplines are faced with a different set of opportunities and constraints, as well as disciplinary cultures, which shape text selection and teaching. As Gee (2010) explains, literacy develops within particular contexts. Nonetheless, this research suggests that faculty should consider using textbook alternatives, which combined with purposeful teaching, can promote critical reading and critical thinking learning outcomes, as well as bring faculty and students together into a learning community. While some might believe that only the most prepared students are ready for disciplinary texts in their original form, faculty in this study taught in institutions with widely varying acceptance rates, suggesting different student preparation levels, yet they assigned difficult readings. In addition, faculty also commonly used journal articles and monographs in lower division courses populated by students new to the discipline. Careful curation of readings, combined with academic literacy instruction, is crucial for success.

Instructors suggest that teaching with textbook alternatives requires practices that differ from teaching with textbooks. This approach requires more investment in course design, including choosing topics and readings, and creating assignments and lectures that provide synthesis, organization, and background. They also suggest that investing more time in teaching literacy skills and assessing these skills is essential. As one professor counseled, aim high and "assume your students are capable of understanding research and theoretical monographs [and] articles with your guidance." The benefit for students and faculty is more authentic engagement with the discipline in their courses, giving them both opportunities to evaluate and critique texts and create their own analyses.

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Toward Hybridity: The Interplay of Technology, Pedagogy, and Content across Disciplines at a Small Liberal Arts College

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Abstract: Through semi-structured interviews with sixteen faculty members representing a variety of experience levels and departments, this piece illuminates faculty theories and ideas about digital pedagogy through the conceptual lens of TPACK (Mishra & Koehler, 2006), which delineates the overlapping considerations teachers in designing learning through technological knowledge, pedagogical knowledge, content knowledge. Findings reveal widespread similarities in attitudes toward teaching and learning across all different departments and indicate that, while faculty members had a range of content knowledge, pedagogical knowledge, and technological knowledge inferences, the greatest tensions and successes were articulated when faculty discussed issues located at the nexus of technological knowledge, content knowledge, and pedagogical knowledge.

> What our college means in today's world is a very different
> thing than what it meant in a pre-digital media world ...
> you went to college thinking about college as the smart phone . . .
> in [our state] there was one smartphone and if you could
> get into [our] College you would have access to it . . .
> and now you can access information everywhere but what
> you need is the ability to evaluate it . . .[we have] an
> opportunity to get to what was always the crucial issue . . . .
>
> *[Faculty member, 2016, *Smith College, personal interview]*

Upon my on-campus interview at *Smith College, the immense amount of green transported me to an entirely different era. Each classroom I visited featured a tight circle of no more than 10-15 thinkers, analyzing annotation-sprinkled paper texts with great fervor. "We don't use Powerpoints here," I was told by a newer faculty member by way of caution. "Our students aren't used to that kind of approach." My initiation into the culture of the small liberal arts college mirrors the complicated ethos that has been described on similar types of campuses (Spodark, 2003; Lohnes & Kinzer 2007). Technologies are tolerated with a great deal of skepticism here, and the exploitation that the e-learning industry has wrought, the notion that there is an easier way to outsource teaching and learning is one that breeds much discontent in a space that privileges face-to-face discussion, small teacher to student ratios, and critical discourse.

However, now that I've spent four years as an assistant professor at *Smith, it has become increasingly apparent that, contrary to the popular monolithic belief described above about faculty on small liberal arts campuses such as mine, there is a wide spectrum of difference in the ways in which faculty utilize and relate with newer tools for teaching and learning. During my appointment as a Faculty Fellow, I sought to make sense of exactly how faculty across disciplines are reckoning with questions that are situated at the intersection of student learning objectives, pedagogy, and technology.

Through semi-structured interviews with sixteen faculty members representing a variety of experience levels (from 1 year to 36 years at the institution) and departments (across all three campus

divisions: sciences, arts & humanities, and business), I capture faculty theories and ideas about digital pedagogy through the conceptual lens of TPACK (Mishra & Koehler, 2006), which delineates the overlapping considerations teachers in designing learning through technological knowledge, pedagogical knowledge, content knowledge. Findings reveal widespread similarities in attitudes toward teaching and learning across all different departments and indicate that, while faculty members had a range of content knowledge, pedagogical knowledge, and technological knowledge inferences, the greatest tensions and successes were articulated when faculty discussed issues located at the nexus of technological knowledge, content knowledge, and pedagogical knowledge.

Literature Review

Work around technology integration in higher education abounds (e.g. Fairchild et al., 2016; Zhang, 2010). Additionally, a body of scholarship exists the aims, particularities, and future potential within liberal arts colleges (Umback & Kuh, 2006; Clark, 1992; Breneman, 2010). In fact, Umbach & Wawrzynski (2005) point out that faculty at liberal arts colleges are more likely than faculty at other types of higher education institutions to engage their students through more "active and collaborative learning techniques", experiential learning opportunities, higher-order cognitive tasks, and high quality faculty/student interactions (p. 155). Nevertheless, a host of obstacles block technology integration at small liberal arts university, including lack of clear vision, the absence of leadership, the unavailability of a critical mass of technology, absence of incentives, and inadequate faculty participation (Spodark, 2003). However, institutional failings are not the sole factor to blame. In this article, I qualitatively examine the teaching beliefs that inform faculty decision-making around technology integration in small liberal arts colleges.

Faculty Beliefs & Teaching Practice

Despite the fact that teaching beliefs is a "messy construct" (Pajares, 1992), it is undeniable that that teaching practices emerge from a confluence of beliefs: beliefs about your students, your position as a teacher, the value of particular pedagogical approaches, the affordances/limitations of particular tools, and on and on. Pajares (1992), in fact, invokes Ernest (1989) and Nespor (1987) when arguing that affect-laden beliefs impact how a teacher teachers far more than knowledge of a particular discipline. Taylor (2003) points out that "some of the most critical barriers to change in educational processes are personal ones" (as cited in McQuiggan, 2007, p. 9). Perhaps one reason this is the case is because:

> Beliefs have great value in dealing with complex, ill-defined situations such as those teachers tend to encounter, in which there are large amounts of information available and no single correct solution. In such contexts, the episodic and unbounded nature of beliefs makes it possible to apply them flexibly to new problems. Moreover, the nonconsensual nature of beliefs makes them relatively immune to contradiction. (Ertmer, 2005, p. 30)

It naturally follows that beliefs are also notoriously resistant to change, particularly those central to particular identity practices (Pajares, 1992; Ertmer; 2005; Rokeach, 1968). Faculty members are most likely to experience incongruity between their existing educational beliefs and their lived reality through personal experiences, vicarious experiences, and social-cultural influences (Ertmer, 2005). There is a clear need, then to examine "the messy process through which teachers struggle to

negotiate a foreign and potentially disruptive innovation into their familiar environment" (Zhao, Pugh, Sheldon, and Byers, 2002; p. 483, as cited in Ertmer, 2005, p. 27)

Fairchild et al. (2016) examine this very process in their nuanced look into instructor "surprise and sense-making" when integrating technology into learning. Their series of interviews revealed three dialectical tensions: freedom vs. confinement; connectedness vs. fragmentation, and change vs. stability. In order to negotiate their way through these tensions, instructors utilized small-scale day-to-day adaptations (including an increased "tolerance for ambiguity") and larger-scale reframing practices (consisting of resistance, co-optation, or revision) (p. 103). This emphasis on a dance of both the macro and micro resonates with Zhang's (2010) insistence on a better understanding of learning cultures as complex systems with both macro-level elements (e.g. epistemological beliefs, power structures) and micro-level components (e.g. tools, activities). He contrasts this with more "reductionist, proceduralized" approaches attitudes toward teaching with technology which result in, rather than transformation, a domestication of newer tools to maintain the status quo (p. 1).

Ertmer & Ottenbreit-Leftwich (2010) conceptualize two types of beliefs impacting the transformation teachers are willing to enact using new tools: self-efficacy beliefs and pedagogical beliefs. Self-efficacy (Bandura, 1986), or the way in which an individual views their "competence to execute a particular task— [is] the strongest [predictor] of human motivation and behavior" (Pajares, p. 328). Because shifting teaching tools/platforms has the potential to relocate an experienced instructor into a more novice position, faculty can report feeling "unsettled", "bewildered" or "overwhelmed" (McQuiggan, 2007, p. 9). Faculty that lack confidence in their own ability to teach with technology might benefit from time dedicated to playing with technology; a focus on starting with successful experiences; knowledgeable peers to work alongside; access to suitable models; professional learning communities; and situating any kind of professional development within teachers' current/ongoing work (Ertmer & Ottenbreit-Leftwich , 2010, p. 262).

Pedagogical beliefs also play a central role, as Ertmer (2005) points out when she highlights Becker's (2000) finding that computers often serve transformative roles in instruction when teachers' personal beliefs resonate with constructivist pedagogies. Faculty also possess beliefs around the value of particular technologies for their purposes (Zhao, Pugh, Sheldon, & Byers, 2002; as cited in Ertmer & Ottenbreit-Leftwich, 2010). Beliefs about the cultural norms and expectations within a college/university also strongly impact professors' use of new media in learning. Somekh (2008) explains that "Teachers are not 'free agents' and their use of ICT for teaching and learning depends on the interlocking cultural, social, and organizational contexts in which they live and work" (as cited in Ertmer & Ottenbreit-Leftwich , 2010, p. 264).

In addition, faculty are often reacting to their perceptions of students' beliefs. While college students are active users of newer tools in dorm rooms and social spaces, they often experience reluctance when such tools are demanded in more formal learning environments (Lohnes & Kinzer, 2007). Spodark (2003) interviewed several undergraduates at a liberal arts college and cited that their attitudes revolved around quite traditional models of teaching and learning in which the professor utilized physical classroom spaces to pour knowledge into students' minds. This synthesis of institutional, faculty, and student beliefs around technology produce ripples that reach far beyond the college classroom; in fact, they funnel largely into how college graduates go on to take up digital practices in their future professions (Brown & Warshauer, 2006).

Theoretical Framework: TPAC

With the tangle of attitudes, histories, and competing perspectives that make up college classroom spaces, it is no small wonder that faculty ever make definitive decisions and transformations of practice. While the literature review above delves into the underlying *beliefs* that color the decisions

faculty make, Mishra & Koehler's (2006) TPACK framework highlights the dance of various *knowledge bases* that inform the ways in which we design learning experiences with particular tools at our disposal: knowledge around technology, pedagogy, and content. I argue, however, that deeply-held beliefs (around teaching, learning, context, and your students) inherently infiltrate all conceptualizations of pedagogical, content, or technological knowledge.

Mishra & Koehler (2006) well-recognize the incredibly "dynamic, ill-structured" environment in a classroom as well as the nuanced, non-neutral characteristics of the technologies utilized in these spaces (p. 1025). Their attempt to capture more of the complexity in teaching and learning with tools (beyond "what should I use" and moving toward "how should I use it?") is their introduction of the "TPACK model" (technological pedagogical content knowledge). (See Figure 1.)

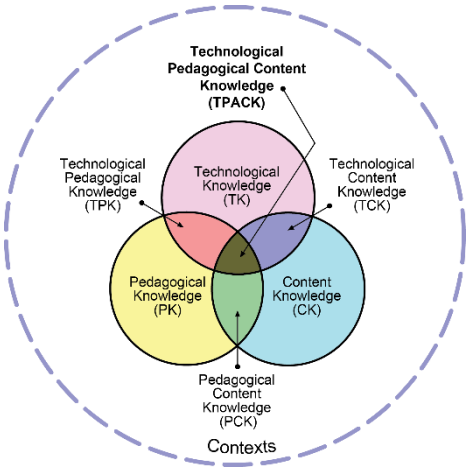

Figure 1: (Reproduced by permission of the publisher, © 2012 by tpack.org)

TPACK emphasizes the tangle of three separate but inter-related fields of content, pedagogy, and technology. Content knowledge signals the knowledge an instructor has about the actual subject matter being taught; for instance, a Biology professor's understanding of basic cell structure. Pedagogical knowledge, however, refers to the ways in which teaching and learning in a particular domain might emerge. For instance, a Biology professor may be influenced by constructivist epistemologies and might ask students to build their own cell structure using various provided candies. Technological knowledge, then, refers to knowledge about any tool used for teaching/learning purposes. In the case of our Biology professor, she may need to work an overhead projector to model how to do the activity. She may need to have knowledge about how sticky or flexible the candies are to ensure she has provided appropriate materials for construction.

Although these three processes have been artificially separated above, it is essential to understand that the three are always intermingling. Mishra & Koehler (2006), in fact, clearly recognized the folly of trying to operate any other way:

> Clearly, separating the three components (content, pedagogy, and technology) in our model is an analytic act and one that is difficult to tease out in practice. In actuality, these components exist in a state of dynamic equilibrium or, as the philosopher Kuhn (1977) said in a different context, in a state of "essential tension." The traditional view of the relationship between the three aspects argues that content drives most decisions; the pedagogical goals and technologies to be used follow from a choice of what to teach. However, things are rarely that clear cut,

> particularly when newer technologies are considered. The introduction of the Internet can be seen as an example of a technology whose arrival forced educators to think about core pedagogical issues (Peruski & Mishra, 2004; Wallace, 2004). So, in this context, it is the technology that drives the kinds of decisions that we make about content and pedagogy. (p. 1029)

So when a faculty member makes any course-related decision, she is necessarily drawing on all three knowledge sources (technological pedagogical content knowledge.) At particular moments, however, one piece may be foregrounded. For instance, as I first set up my video reflection platform for students I had to initially focus in on my technological knowledge just to add their accounts to my account. Then, as I began to type out the assignment sheet I had to think carefully about my pedagogical approach to best enable them to engage with the material. Then, as I responded to their video blogs I began to centralize my attention on my content knowledge about best practices in teaching literacy.

Mishra and Koehler advocate for instructor reflection at the levels of pedagogical content knowledge (PCK), technological content knowledge (TCK) and technological pedagogical knowledge (TPK). What teaching methods might work best with this particular content? What technologies might best enable students to project content mastery? What tool might work best for this teaching idea? Mishra & Koehler (2006) offer TPACK as a model that is greater than the sum of its parts:

> Thus, our model of technology integration in teaching and learning argues that developing good content requires a thoughtful interweaving of all three key sources of knowledge: technology, pedagogy, and content. The core of our argument is that there is no single technological solution that applies for every teacher, every course, or every view of teaching. Quality teaching requires developing a nuanced understanding of the complex relationships between technology, content, and pedagogy, and using this understanding to develop appropriate, context-specific strategies and representations. (p. 1029)

TPACK has spread like wildfire among teacher education circles but has done less to impact other fields in high education (Angeli et al., 2016). I use TPACK in this study as a grounding framework for the issues around teaching with technology that faculty members raised during interviews. Tracing whether an instructor's beliefs around teaching with new media resulted from a question of pedagogical knowledge, content knowledge, technology knowledge, or an interplay of multiple components enabled me to analyze the efficacy of the framework for making sense of patterns emerging from my own institution's norms and attitudes as we discussed teaching and new media across a range of disciplines.

Methodology

During the Spring semester of 2016, I launched an inquiry as part of my work as a Frueauff Digital Pedagogy Fellow in designing faculty development opportunities for the Fall of 2016. It quickly became apparent that my informal conversations with a range of faculty members across disciplines provided deep insight into lingering questions around teaching with technology in higher education, and I formalized my work into a study in order to bring light to the following questions (See Figure 2.)

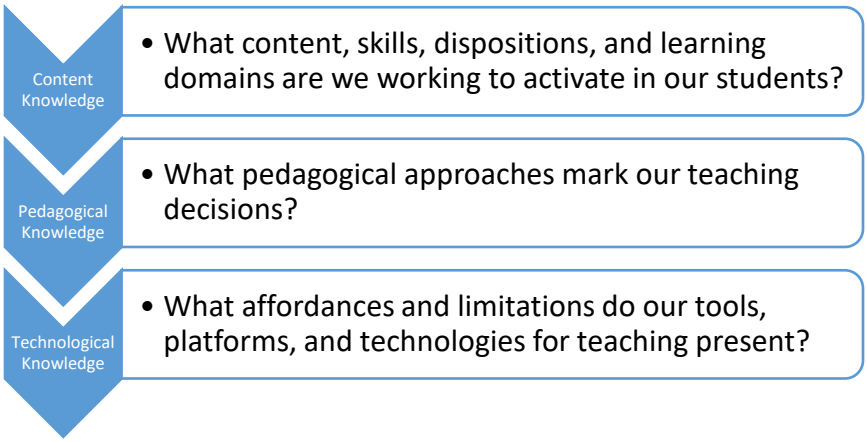

Figure 2: Research Questions Mapped On To TPACK Triad

Context

The study took place at a small liberal arts college (with around 850 students) located in a metropolitan area in the Deep South. Notably, the college had recently adopted a new curriculum, which focuses around four Student Learning Outcomes (referred to as SLO's): Problem Solving & Creative Practice, Communication, Thinking & Reasoning, and Integrative & Collaborative Learning. The faculty at *Smith are, from my estimation, unusually close-knit due to the size of the college and the fact that it is known as a fairly liberal institution in the heart of a very conservative state. The mission statement of the institution is linked to social justice "across the street and around the globe". There is a huge emphasis on teaching quality among faculty and administration, as illustrated by the heavy emphasis on professor evaluation scores in the Tenure and Promotion Process and the amount of opportunities/support provided for pedagogical inquiry and advancement.

Participants & Data Sources

I first emailed a purposeful sample of tenure-track faculty members with the explicit aim to include a wide range of disciplines (professors from the business school, sciences, and arts/humanities) as well as varied pool of experience levels (beginning, mid, and end of career). I specifically targeted this sample in order to get a full account of the ways in which faculty across different fields and ages/years of experiences were making sense of their technological pedagogical choices. I received a reply and consent to interview from sixteen faculty participants spanning fourteen different departments across campus. (See Table 1 for details). The mean of years of experience at the college was 12.38 years.

Participant	Department	Division	Years at College
1	Education	Sciences	36
2	Philosophy	Arts and Humanities	30
3	Philosophy	Arts and Humanities	30
4	Religious Studies	Arts and Humanities	20
5	Theater	Arts and Humanities	2
6	Biology	Sciences	2
7	Art (Studio)	Arts and Humanities	2
8	Art (History)	Arts and Humanities	26
9	Economics	Business	14

10	Political Science	Sciences	2
11	History	Arts and Humanities	14
12	Physics	Sciences	7
13	Math	Sciences	5
14	Anthropology	Sciences	14
15	English	Arts and Humanities	1
16	Psychology	Sciences	3

Table 1: Study Participants

Each digitally-audio-recorded 30-45 minute semi-structured interview was conducted much more like an informal conversation rather than a strictly-business pursuit. (See Appendix A for sample questions.) Conversation topics ranged from sharing life stories ("here is why I became a professor") to areas of dissatisfaction with our institution to laughter and joking. It is important to note that at the time of this study I was keenly aware of my status as a second-year Assistant Professor and engaged in these conversations in the way an anthropologist may seek to make sense of a new community. In other words, there were no "right answers" I was searching for to signal the best pedagogue, and I did as much work as I could to reassure faculty members that my inquiry was in no way evaluative. I also had a research student accompanying me to several interviews and he did conduct one interview completely on his own.

Analytical Methods

After transcribing the sixteen interviews, I began to engage in discourse analysis (Gee, 2011) to make sense of how faculty language produced specific socially situated teaching identities, or how each faculty member constructed their practices as a particular "who-doing-what" (Gee, 2011, p. 30). I initially sorted faculty utterances into three separate a priori code buckets that emerge from the TPACK framework (Mishra & Koehler, 2006) introduced above: foregrounding content, foregrounding pedagogy, or foregrounding technology. Once the initial data dump was concluded, I engaged in emergent, open coding practice (Saldana, 2015) to find sub-components for each large category. Some code labels were derived in vivo (Corbin & Strauss; 2008), such as when one psychology professor talked about her discipline as providing tools for everyday living when she called psychology a "toolkit for doing life". This phrase became a code under the larger bucket of "foregrounding content" which emerged as a theme across multiple interviews. Other codes emerged more generically; for instance whenever a faculty member talked about collaborative pedagogy I put the transcript unit under the larger bucket of "foregrounding pedagogy" with the code "collaboration".

Because I was quite interested in patterns across disciplines and repeating attitudes/ideas around these issues I also indicated a count beside each theme that emerged. Note that the count doesn't indicate the number of utterances, but rather indicates the number of faculty whose language pointed to the same code. For example, if a biology professor mentioned using hands-on experiences for content acquisition and a theater professor mentioned using improvisational drama games both might be coded for "active learning practices" and the category would be labeled with a number 2.

I then noted two attitudinal poles that emerged in conversations: "general optimism about new tools" or "pessimism about new tools". It quickly became apparent that these moments of positive or negative judgment generally arose when faculty were articulating the interplay between pedagogy, content, and technology in their reflections. The findings section below shares highlights

from the three main research questions and then ends with an examination of faculty's perceived limitations and barriers around the integration of new tools for teaching and learning.

Findings

RQ 1: What content, skills, dispositions, and learning domains are we working to activate in our students?

Unsurprisingly, faculty had a range of 21st century discipline-specific goals that drove their teaching practices. For instance, a faculty member in the education department discussed the need to increase teacher candidates' familiarity with technology tools that their future K-12 school settings might employ (e.g. Smart Boards, iPads, etc.) A mathematics professor saw her role to provide a theoretical background to empower future professionals in whatever application goals they may wish to achieve. A studio art professor works to enable students to "draw digitally, edit photos, make photos, and present work online professionally." A faculty member in physics spoke at length about the importance of "numeracy" and inspiring students to "play with" numbers. A business management professor emphasized student learning objectives around big data analysis and interpretation, explaining, "I focus on interpretation and that is because when those people go to work, nobody's going to say 'here's a pile of data, what's r squared?' they are going to say 'what does this mean'?"

Notice that while the business faculty member began her thoughts squarely in her disciplinary content area ("what's r squared?"), she didn't stay there long ("what does this mean?"). Again and again, my interviews with faculty broadened my understanding of content knowledge, and reaffirmed the miles of common ground that professors from math to business to English seek to cover. Professors emphasized competencies, skills, and dispositions far more often than they emphasized content coverage. For instance, a physics professor discussed one key goal: "[the] life skill, of taking responsibility for their own learning. You know . . . that's not a discipline-specific thing in any way, but when they view my role as someone that's there to assist them, mentor them, nudge them in the right direction; those students matter, they make a difference, they go really far."

Unsurprisingly, much of this common ground revolved around a new general curriculum the campus had recently created and voted on, which included the following student learning outcomes: integrative learning, collaboration, problem solving, creativity, critical/analytical thinking, and communication. (See Figure 2). This move to larger competencies is described by one biology faculty member as far more effective:

> For me, it's the core competency stuff- the critical thinking . . . I may not teach you every step in a pathway . . . so it's more important to me that they're able to make connections to this pathway over here and this pathway this other cell uses and overall they're doing the same thing in slightly different ways because the cell needs energy. Big picture more important than specific content . . . We can only focus on so much specific content. . . We cannot tailor one person's education to exactly what they want to do. . . competencies rather than the content.

The difficulty in cultivating generative collaboration in undergraduates came up in nearly all interviews, but only two specifically mentioned it as central to their mission. A philosophy professor explains its centrality:

> To be honest, we sort of cultivated the loner scholar for a long long time at [the college] and now we're moving in a better direction in my opinion . . . collaboration . . .knowledge is not a solitary Cartesian reflective thing, it's something we collaborate upon . . . we corroborate one another's claims and if we can't do that than we're in trouble basically . . . if I can't hold it up

for rational inspection and say what do ya'll think and not be pissed about it when I get a thumb's down, than I'm in sorry shape . . . and students too.

Collaboration at *Smith College is not only important in theory. It is part of the new curriculum recently created and adopted by faculty. As one of the student learning outcomes (SLO's), it has become part of the underlying point of the school. Figure 3 lists all of the new SLO's in order of the number of faculty who mentioned them by name during an interview.

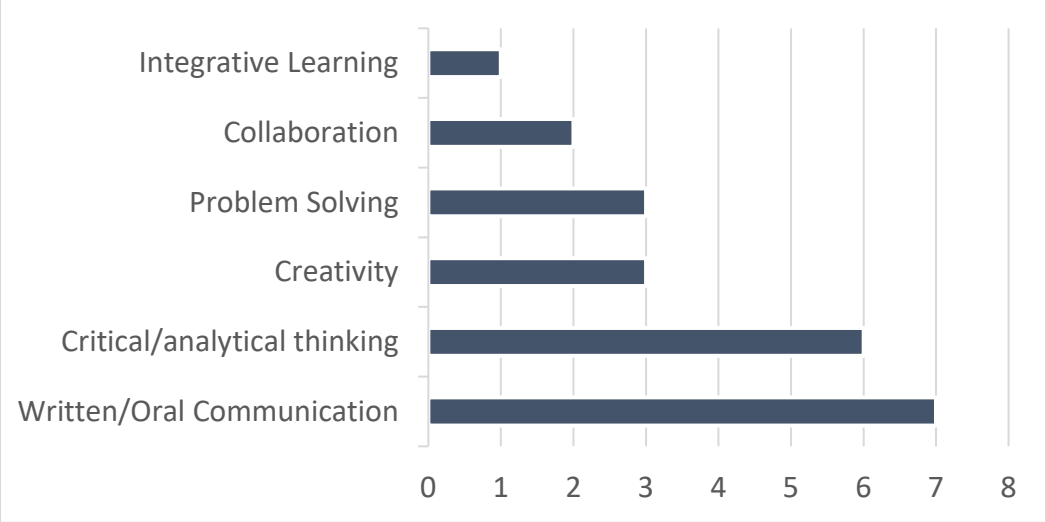

Figure 3. Student Learning Outcomes Emphasized by Faculty Members

It is obvious from Figure 3 that communication practices organically emerged from faculty interviews most often. The business professor explained the linkages between content knowledge and this larger SLO this way:

> So you've got this is minimum wage over time, this is unemployment over time to what it—at that level it is more, can you plot this? And then can you describe what you see in what you find? So if you are listening to NPR on the way to work this morning and, and the listener only knows what is told to them. So can you describe this data in a way that the reader driving in or the listener driving into work could understand the main points?

Of course, the type of communicative practices privileged varies widely across disciplines represented. While from a business standpoint data interpretation is key, a political science professor described communication as public speaking skills, a set of abilities that he recalled from working in government and political campaigns that many young people lacked. For one first year English professor, poetry took center stage in meaning-making:

> I hope to convince [students] to see poetry as an operating system. Just like when you, you go to the . . . Office Depot and get your new laptop . . . you have choices to make. And, and it's not like in some sort of absolute sense your Windows system is any worse than your, than your Apple system or vice versa . . . they help you different things. And so, the operating system that I would hope to instill to my students, or pass onto them, is one that sees these formed patterned slices of language as resonate for their life experiences outside our classroom.

Again and again, faculty, like the one quoted above, alluded to the application of their course material and experiences to a larger arena . . . life. Figure 4 represents the various ways that faculty viewed their work with students as larger than merely disciplinary content acquisition.

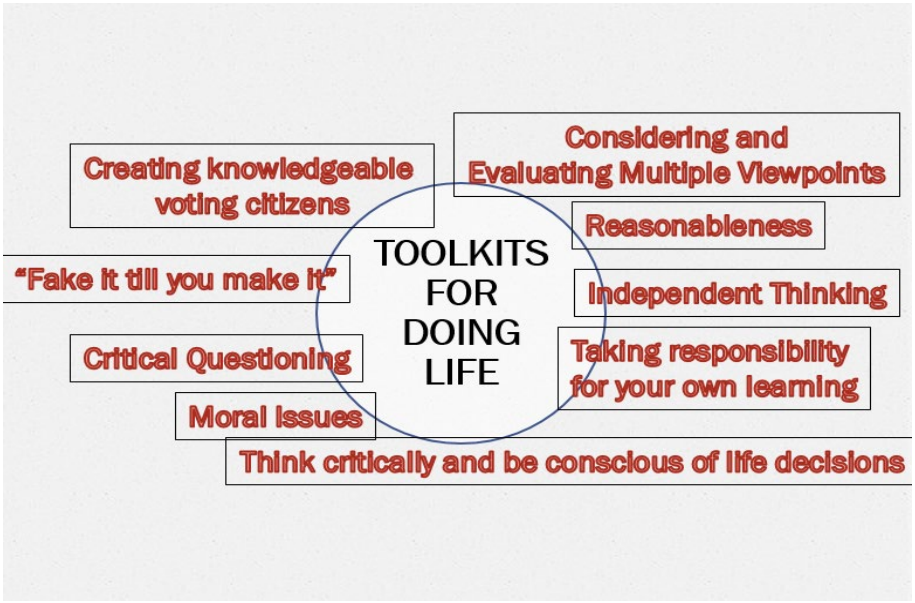

Figure 4. Toolkits for Doing Life

Twelve out of the sixteen interviewees spoke at extended length and explicitness about life application when asked about their objectives for their course. One psychology professor explained:

> My main goal for them to take away is the fact that psychology is a very useful tool for looking at the world and I try to explain to my students that I see psychology everywhere. . . When I'm interacting with my friends and they tell me problems, I see psychology. When I'm watching TV, when I'm reading books, when I'm seeing a movie, when I'm angry with people, when I'm whatever it is and I'm trying to plan out for my future I see psychology. And I can use psychology terms and theories to help explain my behavior and influence my behavior and then I can use it for other purposes and I think that's a really unique aspect of the discipline . . . Psychology is so fun because people don't know that they're doing it and people don't know that they're using the skills. So really I look at it as an awakening . . .

While the psychology professor saw her discipline as unique in its life-application-reach, her sentiment was far from unique. Faculty members from philosophy to physics spoke of the particular toolkits for richer lives that their discipline offered. One theater professor in his second year at the college described the central performance-linked disposition he sought to cultivate in his students: "fake it 'til you make it":

> For me, students write less because they're less comfortable with that aspect of performing because no matter what you say . . . it's a performance. And they don't start because they second guess themselves. 100% of the time second guessing is what stops you from writing a paper. Of any kind. Or a poem. Or a short story. Or a project proposal. You just feel on

> the spot and say 'I've got nothing' . . . For lack of a better word I really think it's fake it till you make it.

For this professor, "being able to produce your best work on the spot when it really matters when everybody's listening and everybody's turning to you" is not merely about acting on the stage. It is the spontaneous, ever-emergent improvisation that millions of small and large life situations demand.

Faculty members also honed in on the way that their work with students might empower critical questioning, independent thinking, and consideration/evaluation of multiple viewpoints. A philosophy professor in his thirtieth year at the college labeled this as an orientation of **reasonableness** that the entire college experience coalesced to create:

> When students are good examples of the *Smith College product (I really dislike the idea that I'm instilling virtues) but still, there's a type that you see . . . not just their skills but their whole orientation went through a paradigm shift of sorts. There's this thing that they get about how to be a thoughtful responsible human being and here's the rough part about it- it separates them from a lot of people around them. They'll come back to us and say "it's not *Smith College out there" in the business world or the government agency or the doctor's office . . . but the good news of course it that [our state] is peppered with people who went to *Smith College who have that different outlook . . . so reasonableness would be the one word.

Reasonableness, as a tool for life, comes in handy for a variety of situations, but one biology professor zoomed in on its import for citizens participating in a democracy. For her, the ability to vote responsibly goes beyond pure reasoning capability and ventures into the knowledge domain:

> We need a bioethics and biotechnologies course because these are the types of things as citizens that are going to be coming up in voting and there's a lack of scientific expertise in Washington that is troublesome . . . if people understood the issues they'd be more informed voters or law-makers.

Being informed, of course, isn't just useful in citizenry issues; knowledge illuminates personal decisions as well. One psychology professor emphasized:

> When I'm teaching my Adulthood and Aging class, one of my main goals is I want them not to be scared of aging. I want them to understand that aging is a normal and wonderful part of our development that you really want . . . the alternative is you die now and you don't age and then you don't go through it . . .But I also want them to be thinking about end of life choices really critically . . . I want us to be thinking about is it really that important that we are expanding our lifespan if that means a reduced quality of life? I mean, do we want to be able to have choices about what control do we have over our own medical care and when and where we die? . . . Those are the sorts of questions that are really uncomfortable but I think they're incredibly important . . . So I try to hopefully have them think more critically about things that they're going to be experiencing later on and begin to be conscious of their choices.

Although Mishra & Koehler's (2006) framework conceptualizes teaching decisions as originating from a complex negotiation of content knowledge, pedagogical knowledge, and technological knowledge, it is clear from my conversations with faculty that the phrase "content knowledge" fails to capture the breadth, depth, and width of the goals that instructors have for their

students at *Smith College. Backwards design asks us to "begin with the end in mind"; these conversations with faculty at *Smith College about pedagogical design requires a very broad net to make space for these larger, less discipline-specific non-negotiables. Faculty can name and claim these objectives, which contain an array of discipline specific content (e.g. "what is constructivist theory"), competency-centered skills (e.g. "students will exhibit creativity by reflectively adapting their lesson plans in-the-moment"), and life tools or dispositions (e.g. "students will learn resilience in the face of obstacles"). Once these focal goals and objectives have been named, faculty move into far more thorny territory: how to actually go about teaching in a way that moves students in these predetermined directions.

RQ 2: What pedagogical approaches mark our teaching decisions?

As a teaching institution, it is perhaps not surprising that *Smith College draws faculty that take quite seriously their roles as teachers. A studio art professor explained the reward that gaining trust with progressing students triggers and went on to say:

> The Internet is this amazing tool and it makes me think- do we need teachers anymore? We very clearly need teachers to funnel energy and to direct energy; we need teachers to be a personal [touchstone] for these students. The Internet works once you have some kind of a framework for using it.

Pedagogical knowledge reveals deep understanding of both our students and our role as teacher, an instinct about exactly <u>how</u> to funnel that learning energy within the affordances and constraints of classes and institutions and formal learning contexts. A comprehensive list of pedagogical moves that were described during interviews, along with the number of interviewed faculty that named them, can be viewed below, and I choose several key themes to discuss more in depth in this section.

- **Active, varied teaching and learning strategies (5)**
- **Student-Led, Student-Centered, Dialogic (5)**
- **Talking about technology as it emerges in discipline (4)**
- **Hands-on, experiential, applied learning (3)**
- **Use of Storytelling/Narrative (3)**
- **Empower student voice (Improvisation, Oral Presentations, Stand and Deliver, etc.) (3)**
- **Reflection on what does and doesn't work (3)**
- **Open-ended prompts**
- **Inclusion of under-represented voices**
- **Limiting materials and media**
- **Hone own teaching persona**
- **Push playful problem-solving**
- **Flipped Classroom**
- **Getting Interdisciplinary**
- **First master tool, then move to ideas**

Pedagogical design can be experienced as a deeply personal, anecdotal, choose-your-own-adventure. It can also be characterized as a generalizable set of research-based best practices. For our physics professor, it is clearly the latter:

> And so, you know, I think what I would like for us to see is a way that—I'm not interested in what I want to do, or what I think works; there's been tons of research on what works. Let's do that. I don't care, I don't care if it's comfortable for you or not, I don't care if you think it's this or that. If you've got 10,000, you know, data points that clearly show this works and what I'm doing doesn't. It's you know standing there, talking, chalk in my hands, making the students laugh, telling funny stories about Michael Faraday . . . they love it, they give me a 6.3's [out of a score of 7 on student evaluations], I get promoted to full professor, they don't learn a damn thing, right? They learn that, that Michael Faraday was weak at math; that's something a lot of them might could take away, is that one of the most important scientists ever was very, very weak at math . . . how often are you doing these things in your class that work? If you're doing those things, you're fine. Your students may hate it, your students may like it, but it works.

It was clear from the previous section that "determining what works" can be more complicated than giving students a test to see who has mastered the content; faculty objectives spanned much broader territory than simply content knowledge. For our studio art professor, good pedagogy calls for prompts that are open-ended and demand student interpretation:

> So in my prompts I do leave a huge amount of room for interpretation . . . I tell you how to use the tools and what they are for and the things I think are most important for making a good-looking image, but not "what should it consist of" because in art there is no definition like that. Art is about communication, expressions, it's not about rules. . . For my Photoshop conceptual project [I simply ask students to] show me a story, use Photoshop to tell your story. . . [Students in] my sculpture class [say] "if you could just TELL me what to make, I will make it." NO. I won't do that. There are some art professors who have a diff philosophy-make what I make, do what I do, they're working for me! And that's completely opposite my philosophy because I am so bored of myself . . . it would be so- unhelpful.

This open-endedness can be a challenge for students. A physics professor described it as playful problem solving:

> And one of the things I will do this with the students from time to time—is I give them, you know, to see how numbers connect to each other in the same way. . . At some point they will learn the light from the sun takes eight minutes to get here. Right? Eight and a quarter minutes. If you know one semester of physics and the speed of light (which essentially every physics student after one semester or two semesters should have that number petty close to memorized) you can now calculate the mass of the sun.

Just as in art, students might create a conceptual Photoshop project, and in physics students might be asked to connect significant numbers to calculate the mass of the sun, students in philosophy, political science, or anthropology might be asked to engage in open-ended meaning-making through the vehicle of dialogic discussion. One philosophy professor explained: "the wonderful class is when students are talking to each other and you don't have to be continually nudging or guiding." Several

professors, in fact, described making large changes in their class based on student push and ownership over the content. A political science faculty member explained:

> A student actually wrote his research paper on Obama's use of social media, looking at Tweets and Facebook primarily and made me realize next time, this is the ideal use of this . . . the governing end not the campaigning end. I would like to look at how politicians or elected officials who are of different generations look at this . . . but I have not done enough of this in class and I think I will in the future, especially with public administration, because that's the best place to look.

> This same push to carve out class experiences that ask students to create, to find their own voice, is echoed in the theater professor's interest in what he calls "stand and deliver pedagogy". I'm really interested in students finding their voice . . . I would like to see more stand and deliver pedagogy where someone's on their feet with no bullshit device or even a piece of paper to read off of but being on the spot. . . It's the fake it till you make it . . . We have the best time celebrating the fact that we know nothing. It's the very fact of honoring your own voice.

He went on to describe a common classroom practice of asking students to ad lib answers on-the-spot to questions of which they had no way of knowing the answers:

> Improvisation is my favorite . . . the main tenant is that idea you have in your idea that you think is stupid, you need to put it on paper or you need to speak that word right away. Number one: It's probably not as stupid as you thought. Number two: It's only the first thing you are saying or writing. It's not etched in steel and erected in the middle of campus.

Many of these improvisation exercises that the theater professor utilizes demand movement and spaces beyond the four walls of a classroom, which pedagogically afforded multiple benefits, not the least of which included attention-maintenance of students:

> That's what great about theater . . . I haven't had to tell anyone to turn off their phone because we move all the time . . . like they would literally run into the wall and it's fantastic. I think we have to change the conventions of our classrooms. I'm a big believer in changing the location a lot inside a class, changing where you sit, changing where the whole class is I mean there are things you can do, studies show, everyone's happier about it. But we get stuck in a rut.

For him, risk is a foundational component of learning, and when I asked him what the most "cutting-edge" theater folks are up to with their students, he didn't hesitate:

> What's cool is what we're doing! We can devise pieces with faculty, students, cafeteria staff- we call this "devised"- when you get a room full of people and say Let's make a play so everyone writes it, everyone directs it, everyone acts it out, so NO MORE FUCKING EXPERTS. Everyone thinks in theater they can be really risky . . . "bring this risky playwright from NY" you already blew it you're not taking a risk at all the risky thing you can do is put the students in charge that's it. That's your risk. But you don't want to do it because you're afraid you'll look bad. . . that's POWER. That's risk that pays off.

He wasn't the only faculty member who emphasized risk. Three different professors talked at length of the strength of integrating partnerships with community-engaged-learning opportunities which enabled students to link learning in the classroom with reality. An education professor who had been at the college for thirty-six years described risk as something that faculty must take in developing and engaging in these partnerships:

> I think I'm beginning to see faculty teaching differently . . . hands on learning is really important, student engagement is really important, we're seeing our faculty take students on field trips, things that are outside the gates of the college and really learning to use our community as a resource which is exciting . . . it's great for professors to take risks, because that's what we want our students to do.

While not all faculty members described such consistent and radical movement during the course of a class, the most common pedagogical theme that emerged revolved around active learning practices. A math professor explained: "I'll have them get up- flipping coins or counting Reese's Pieces, getting proportions, doing scatter plots or dot plots on the board . . . I do things like that to try to keep them engaged."

She went on to describe the importance of being responsive in terms of student needs throughout the lesson. In the case of noticing drooping or distracted students, she explained: "I'll stop [and] this might not seem pedagogically sound, [but I'll say] 'do you want to know a funny story about the kids?' just to get them back together." This tactic functioned well for students to take a break and refocus, but also afforded the side benefit of personally connecting with students.

In fact, four different faculty members mentioned the centrality of storytelling and narrative, often used in concert with the content of the course. One physics professor lamented that the only part he missed about lecturing when flipping the classroom was his insertion of historical antidotes about key physicists and engineers. A member of the art department faculty discussed the power of visual narrative, and an anthropology professor discussed the examination of games as narratives.

Situating content in the real world was also a strategic move described by the professors, one that sometimes resulted in shifting course topics and texts. A biology professor described the popular push (one she subscribed to) to begin re-naming and re-focusing generalized courses, such as "Cell Biology", into specific angles with specific contexts, such as "Marine Biology". She also described the importance of applying science content to big attention-getting questions. For instance, after discussing content in a traditional chapter in a biology textbook, students then might be asked to read articles such as "Growing meat in a test tube: Would you eat it?" She would then pose a key question to students: "Knowing what you now know, does it change your attitude on this question?" In other words, she is committed to teaching the "same basic concepts but putting them in the lens that is better for students that need to see why they need to know these things."

She is also keenly aware that each "non-major" in her science classes needs a different entry point into her content:

> For my business majors, I would try to give them hypotheticals about experiments they might do . . . so focus group testing if you want to know if college students will want a new cookie, because the concepts in setting up an experiment are universal whether you're talking about microbes or college students and cookies.

Perhaps because of this fact, several professors note a definitive interdisciplinary turn in their work with students in terms of content. A philosophy professor explained: "It's okay to be interdisciplinary . . . In all classes, application sends them to other fields." Of course, weaving in

theories and applications outside of your training and expertise has its own challenges. One physics professor explained:

> So I could definitely spend more time on the more current events stuff I could do- the theory of why that computer stuff is possible. The social- the whole hacking the cell phone, but that's really interesting but that's not the math, that's the ethical. I can talk about those things, but that's not really my discipline. I could talk about voting, how we count, we use plurality but we could rank the three people, etc. I would just be teaching them the techniques, not pursuing this open ended questions . . .just to have something else that's more current- what's the best fit? It has to be an application I think because when you're back in the theory you're in the theory- but is it cryptography? Is it statistics?

Finally, the most notable of themes in these discussions around pedagogy were the deeply reflective ways in which faculty members considered what worked, what didn't, and the various institutional constraints and affordances within which they were working. One professor spent several minutes considering various ways to improve the current version of a class, alluding to extensive notes he takes during the course of each semester: "I'm struggling so badly with that class. I don't feel like I lit any fires under anyone. But when you get down to the nuts and bolts, it gets super tedious. While the overarching ideas was interesting, what they were doing was rather boring, but starting out from scratch sounds awfully daunting." It was the indecisiveness, the inner wrestling that I found most compelling in the course of these interviews.

RQ 3: What affordances and limitations do our tools, platforms, and technologies for teaching present?

Faculty members had a broad understanding of "what counts" as technologies for learning, from chalk to Internet. A history professor explained:

> Well I define technologies of course broadly. I like to use technologies that I think are appropriate for the task at hand. So there are times when chalk and chalkboard are my technologies of choice; sometimes I like to have students write. I like to use PowerPoint in accordance with my lectures quite often, especially when visual imagery is especially important to the topic. When we do discussion work or in class research projects, I sometimes have my students use their own laptops and we do on the spot research questions. I require my students, beyond the 2000 level to do research at the archives and that can be done online, but then some of it is old fashioned going to the archives where they don't allow technology into the reading room. To sum that up, I try to use a range of technologies as they suit the task at hand.

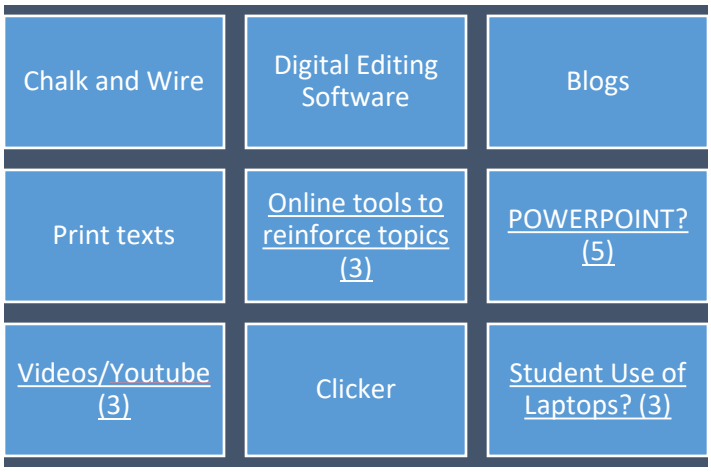

Figure 5. Tools mentioned by Faculty

Throughout the interviews, faculty members alluded to employing a range of tools to fit their purposes and goals (see Figure 5): a new campus-wide-adopted platform (Chalk and Wire) that facilitates portfolio building, digital editing software for art projects, traditional print texts (which several faculty insisted students prefer over e-texts), blog platforms for public sharing of ideas, or clickers for in-the-moment formative assessment feedback. Multiple faculty members discussed the ways that online sources of information can reinforce their course content, such as this business professor:

> I assign the text but I also, frankly, assign sort of an either/or: you can either read the text or you can go to Khan Academy. . Some of them do both but, but those but, some of them really like the reinforcement of having to plot the graphs, shift the curves, and you can see the steps rather than—just the textbook, it all sort of appears there in front of you and you don't know where, where those graphs come from.

While the faculty member above allowed student choice in the source of their meaning-making, an art professor detailed the student pushback she received when requiring the use of online tutorials: "I mean I do use online tutorials and I get some blow back for that and I think I've been working really hard to make them understand WHY I have those, because some of my early – and it's partly my fault for not introducing them as such, as a textbook . . . " Clearly in her experience, her undergraduates didn't view online tutorials as a legitimate source of knowledge.

Increasingly, YouTube content and other video clips emerged across all disciplines. A political science professor, for instance, commonly will show clips of political ads to engage in analysis with students. One history faculty member discussed so in less-than-sanguine terms, as more of a "giving in" to the demands of her students.

> I have shifted what I do. I show more videos. I present information in shorter pieces. I have them do shorter readings. I have students make use of technology that they've already gravitated towards, but I'm not always happy with that compromise. I have conceded some room away from books and to online video work.

A psychology professor, however, rather than viewing these video sources lens of deficit, saw them as burgeoning with possibility:

> So I do that, I do intersperse lots of clips from YouTube. I love doing that and I love being able to give examples, some classes are better or some lecture topics are more applicable with things like that . . . so it's really great like when I'm talking I have this wonderful video for enjoying attention in my child development class that I showed last week. So it shows a neurotypical child enjoying attention I think they're like 14 months, a child who has Down's Syndrome, and a child who has Autism. So you can see how are these things show that "enjoying attention" and why do we think it's an important milestone we should be considering.

She also describes the art of documentary as essential in opening up perspectives. Here she was discussing how she shows her students *How to Die in Oregon*, a documentary that explores a range of end-of-life decisions by following a few terminal patients through their decision-making processes to the very end.

> It's very upsetting to them and it's very upsetting to me. . . but I think it's really important to be able to see this other perspective because we are growing up in this super conservative part of the country and they probably have never thought of this and they probably haven't seen very human examples of this before . . . We have this whole conception that there is something noble in suffering, and I don't agree with that and I don't think psychology as a field agrees with that.

Interestingly, faculty found themselves quite divided in two main areas: the use of PowerPoint presentations in teaching and students' use of laptops in class. A political science professor describes his evolution here:

> I have been going to great lengths to phase out things like PowerPoint. I'm using it when I have charts, graphs, pictures. When I started teaching as an adjunct, I was quite reliant on that because you feel like you're told you have to be and I can tell you from my own experience, the more I use that kind of stuff, the less engaged students are in things like discussions. And I think they read less because they expect whatever appears on that screen is all they need to know and they don't do as much work outside of the classroom.

On the other hand, a psychology professor points out the problem is not on Power Point usage itself, but how overly-reliant users might be on it:

> I do use PowerPoints, and I know that's a little bit controversial at [*Smith College] because . . . [when] I was in my orientation. . . somebody in it said "You're going to get terrible evaluations if you use PowerPoint . . students don't like PowerPoints." Right- if you don't understand how to use them appropriately! . . . So I definitely use PowerPoints. My slides are purposefully sparse and my expectation is you write them down and then you listen to the examples I give or you listen to the discussion prompts. I use them mainly a guide for myself to keep me on track. Mostly it's just because I need some sort of guide, some sort of structure…

Note the allusion above to the incompatibility of a particular technology with the culture of the college. The same theme arose when discussing whether or not students should be encouraged or even allowed to use laptops while in class. A first year professor in the English department explained:

> Well for me it's really been about the culture of pedagogy on campus. I think that a lot of teachers that students respect have no-laptop policies, and it's been important for me to, you know, to try to cater to and play to the expectations of the student community here. And the culture of teaching here . . . There's a kind of very understandable, and in some ways a resistance that I appreciate and agree with, has shaded into the way that the students have—conceive of their education and the act of classroom instruction. No one complains when I say 'hey you can bring your laptops,' but you know, I think that there is kind of a sense that that is the way that, you know, [it isn't done?].

Interestingly, the faculty member prefaced this conversation with a discussion of his generative work in digital humanities. While teaching in graduate school, he would gladly invite students to bring laptops to class. Now situated in the context of a small liberal arts college like *Smith, he felt enculturated into a different set of pedagogical tool norms and affiliations. It is also important to note variations, however. For instance, a professor of education in her 36th year at the college explained quite clearly that she saw laptops in class as a distinct advantage for sharing and looking up information quickly as questions arose during class. She explained:

> Professors have told me that they walk around in class and look at the screens, but that feels like policing to me and I don't want to go there. . . But I have found that when [student in the room] uses his laptop, it's very helpful to me and to the rest of the class . . . a responsible use of technology.

Another faculty member described losing patience with those so reluctant to incorporate newer tools for teaching and learning:

> Those kinds of things are not cutting edge anymore, it's what our students should know how to access and should know how to do. I don't even know what is cutting edge. You know, I am not an early adopter, I'm sort of a midway adopter. I'm not going to be the first one to adopt some new technology, because I want to know that it works. But nor am I a dinosaur that doesn't ever do any of that stuff. It's sort of hard to teach students when they are. And students are using these tools, then I need to use them as well.

Barriers Integrating New Tools

The faculty interview excerpts above illustrate that many faculty are deliberately implementing a range of tools, both old and new, as they go about their pedagogical and content pursuits. However, faculty also articulated a range of challenges and limitations that digital tools surface in college classrooms. In this section, I unpack some of the most resounding themes that emerged (see Figure 6), including a lack of support in utilizing newer tools and the perception of technology as a distraction or detraction from learning.

Figure 6. Barriers to Integration of New Tools

Clear "technical difficulties" experienced in the past influences faculty's willingness to engage with newer tools in the present. Faculty described platforms not working in the moment, a lack of support from the technology support team at the university, poor Internet Connections, and inadequate learning management system that the school used, and lack of storage capacity. The difficulty of staying current was echoed multiple times, and one professor questioned if it was worth even trying to, since young people react poorly to school appropriation of their tools:

> I would say that I've noticed that ironically email is read less and less and I'm thinking Oh God do we have to assign stuff on Snapshot now? But you know as soon as we do that like bacteria they're going to become resistant to Snapchat. .. they are going to hate us . . as soon as we do, it's no longer cool.

Clearly, then, others placed the blame, not on the tools or support teams, but on the students themselves. A biology professor explained:

> It's difficult . . we weren't taught that way, students expect a certain thing when they come to a biology class . . . to sit down and be talked at and then maybe they'll pick up the book at some point and two days before the exam they will re-read their notes and they expect that to work for them and it won't.

Multiple faculty alluded to this issue, arguing that students prefer printed text over e-text, that students don't enjoy open ended inquiry and prefer more traditional school structures. A physics professor shared the story of his own experience flipping the classroom

> Professor: [Flipped classrooms] didn't work for introductory level course. . . Because they revolted, essentially. . . And, you know, and I went to the Dean, and said you know, I can't remember the exact words I used, I said you know I'm essentially stealing their money by going back to lecture. Because . . . you know, one of them was 'Dr. ____ clearly doesn't know how to teach. This is a teaching institution, not a research institution. He should leave and go find another [job]."
> Because I was like, you know, it's like this is the best offering of any class I've ever given at Millsaps, and— [I] essentially [got] negative credit, right?

Despite the fact that learning levels clearly improved using this tech-mediated approach, students felt differently. He bemoaned: "*Smith students don't like flipped classroom. They don't like it because they think their professors should be the one should hold all the knowledge- because that's the illusion of professor-dom . . . and I can just sit back and be funny."

These kinds of student attitudes weren't only experienced in the sciences. A professor in the history department noted: "Students don't know how to use [online] maps and have done nothing. I gave them an assignment for 8th graders and almost none of the students could do any of it and were very resistant to it as well." A studio arts professor remarked: "They don't like being told that they have to google things, but it's part of living in the 21st century. When a student emails me a google-able question, you know how aggravating that is, it's the worst."

Note that nearly all of the concerns discussed above by faculty were situated at various corners of TPACK rather than at the nexus points. Professors feared student attitudes towards new tools and their lack of knowledge in working with them. There was also an existential fear about "keeping current" and the fact that reappropriating newer tools for classroom purposes causes them to lose their allure. But concerns about student interest in shifting pedagogical approaches and tools were not the only reason that faculty took pause before bringing technology into the classroom. Others had more practical considerations around distraction that did begin to encompass thinking around technology, pedagogy, and content. One faculty member explained:

> Also, then they're going to have to get out their cell phones and that's going to be a bit harder to police like "you can have your cell phone now and then you're going to have to put it away" . . . and now you have to get it back out again. And now there's an element. . . nothing's going to stop them from typing in "PENIS."

Technology as distraction was a theme that emerged spontaneously during eight separate faculty interviews. When I asked one professor how they think about technology in their classroom space, she remarked:

> For the most part I find technology to be an enormous distraction. Phones, phone addiction, I had them do a technology fast for 24 hrs. and only if they had to do an assignment, then they could do that. I ask students to put technology away on a daily basis and by mid-semester they start to realize to put it away at class start.

While these same professors did acknowledge that tech tools could provide affordances (for instance, looking up information needed in the moment), they stood firm that the general result of newer tools had even larger pitfalls. One religious studies professor used the scenario of a student using a phone in "a totally exemplary way" to illustrate his point: "So this wonderful student who had excellent attitude about the class would disappear down the rabbit hole [looking down at his phone] the way you do because one thing leads to another." He used this very story of the exemplary student

to introduce the absolute ban of technology in his classes which enabled him to "assume the best" of his students and "stay positive".

A professor in the psychology department defended her reluctance on allowing students to have new media out, not merely on students getting distracted, but on her own tendency to lose focus:

> So I have a new rule this year where they are not allowed to have their phones out. They have to put them away and I got this from [a colleague] because I previously just had a rule like "oh no texting in class" but then we were always just looking at our phones casually or pushing the buttons or if you see you have a text it's really hard . . . you're thinking about it . . And really the reason I have it is not just because I need to be the center of attention because obviously that's part of it, but also because I'm also such a distractible person myself and so I joke about it but literally this is how my brain goes. If I see somebody else texting I think to myself "I wonder if I have a text- I wonder if I should check my phone. I wonder if they're trying to make plans for later today. Do I have plans for later today? What am I doing for dinner? Am I getting dinner?" My brain starts spiraling because I'm so tangential with everything I do and everybody in my class knows I get off on these crazy whatever things . . . I think it's part of my CHARM and this is what I continue to tell myself so I don't want them to have the technology in class . . .

While for many professors, barriers to using technology was a matter of practicality and managerial control, others felt conflicted by their perception of technology as inherently detrimental to learning and class relationships. One theater professor spoke passionately against the ways that new media might erode authenticity:

> More and more and more and, yes I'll talk about online dating and the rest of it- you try to package and plan and so once it comes to actually relating to another human being you've already edited and Photoshopped everything so that once you're in front of another human being you don't have to do anything. . . The danger is that when people lose their ability to trust themselves and their ideas without the digital.

A political science professor asserted: "Even though social media, Twitter, Facebook, all the other stuff that's out there, is supposed to make us feel more closely connected, I actually think it makes it less personal". Another professor remarked "And it is also part of what we sell as an institution, that you are here to have interaction with, with, with your professors, you are not here to, to have an online experience." Such a personalized face-to-face experience is perhaps epitomized in one particular room on campus which is known for not having any technology or Internet signal:

> All of my best classes have been in CC5 which is the one room in the building that doesn't have any tech at all . .. there could be some traction for the sanctuary from interconnectivity .. . because we definitely have the best discussions- kind of a dropped signal zone- there's just a mentality about being in that experience that we run with. It just feels like we are here to talk to each other and wrestle with ideas.

The fact that technology detracts from learning came up with four separate interviewees. One professor cited a recent study that had been widely touted around campus, explaining: "I also encourage them to handwrite their notes instead of typing them on their computers. There's a lot of research that says it's better for memory attention, for engagement, for mindfulness and so that is what I encourage." Others questioned the efficacy of flipped classrooms or online classes and the

ease of cheating, and one faculty member put it quite simply: "I'm skeptical of [technology's] effectiveness."

It is notable that around half of my interviewed professors who were reluctant to embrace newer tools into learning spaces made claims well-informed by a cluster of technological, pedagogical, and content knowledge. They fear, for instance, that technology will distract students from the content and from full engagement in the pedagogical activities planned. But there were also many other faculty members operating in the same nexus that came to alternate conclusions, the subject of the next section.

Affordances of New Tools

While it is clear from the previous section that many faculty members were reticent in their incorporation of newer tools, the interviews also revealed a large portion of enthusiasm. Notably, the most positive interview comments around teaching with newer tools also emerged at the intersection of technology, pedagogy, and content knowledge. (See Figure 7.)

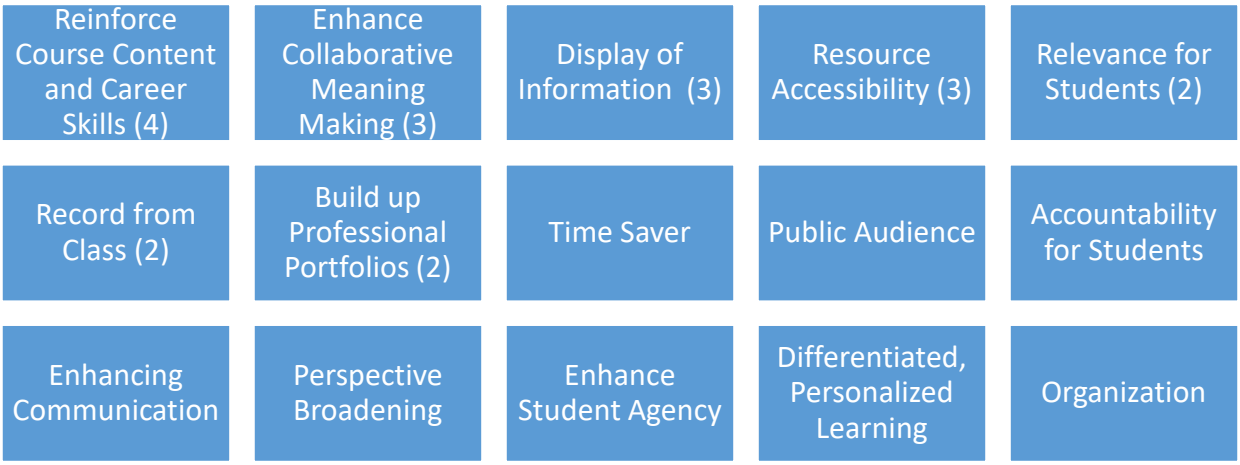

Figure 7. Affordances of New Tools

For instance, an art professor described one of her greatest successes the past semester . . . asking students to blog before class and then using these blogs as a springboard into leading class discussion:

> It's been really amazing . .. I realize I don't have enough time to prep . . . [there is] so much research of performance artists that you have to present- it's all about the lineage of performance artists- a safety net of students to understand you are not alone . . there are other artists, although it's a small population that are interested in their bodies, experimenting, this historic- it's so hugely important . . . you can only show, do exercises. Each of [my students] present every week a research [blog] post and present to the class and prompt the discussion- it's been really great for me as a teacher, I don't have to prep for that, and I'm familiar with all the artists they are showing . .

Note the dizzying array of TPACK negotations she makes. She begins with the practical-logistical issues of limited time, moves to the central purpose of **content** in that class (expose students to a wide range of performance artists to enhance their confidence in the art), describes the student-

centered **pedagogical move** (have them post blogs and then present) which is supported through the multimodal nature of a newer blog **tool**, one that importantly enables students to embed video of the performance art. Other faculty members made similar moves, as they discussed the ways that newer tools unlocked access to a wider range of texts and materials for thinking and learning, aided in accountability and transmission of information, and enabled people to take agency over their own learning, just to name a few. Each time faculty delved into this nexus of pedagogy, content, and technology, the hyper-focus on the newer tool (quite present in the previous pessimistic section) faded into the background. For instance, in discussing the affordances of flipping the classroom for differentiation, a physics professor explained:

> I mean, I think there's—and, and one reason I ended up doing the flipped and I know it's not, it doesn't have to be flipped, it's active learning in general, and flipped just works for me for a lot of different reasons. One is when I have really strong students, my goal long-term is to have a whole lot of courses flipped so that like when I have a student that's so strong he's able to finish this course two-thirds of the way through, just go ahead and give him the videos for the next semester. And, you know, I'll work out with the administration where to give him credit, right? But there's no reason to slow him down . .

On the other hand, three of the interviewed professors described usage of newer tools, not to promote one individual to jump ahead of the rest of the class, but to aid in collaborative meaning-making or archiving. A history professor described her future goal to do some archiving and mapping with a collaboration of students across institutions. An English professor described his class involved in "Book Traces" which archives images of books to a consortium housed online. He went on to wax eloquently about the way that digital projects indeed demand collaboration:

> the dissertation can seem like such a—in humanities—can seem like such a solitary activity. You know, you kind of go into your carol . . . you don't have research sites . . . there's no field work, you know and like. I mean there can be . . . and you conceivably, or presumably, you have these committee members . . . But so much of it is so solitary and that translates in a certain way to the pragmatic question of making a career in our field. I mean unlike in the sciences where you might be a co-author with fifteen other people on a paper, you know, our, our tenured decisions are made by, you know, in part by publications that we produce in a kind of you know self-sustained way. But the digital humanities doesn't work like that; because I can't both know all the coding that I need to know to produce the experience for the user that I want, and know all of the research that I need to have, too—demands collaboration.

Similarly, a professor in anthropology discussed one of his favorite newest innovations to support their traditional text readings of ethnographies: asking students to submit to a Wiki a 30-45 second video "shot from the perspective of an east African viewer as opposed to CNN or BBC or something like" then used as a springboard into an in-class conversation.

In other words, when teachers in higher education shared successes with technology, they often foregrounded its affordances to promote better pedagogy and clearer mastery of content. However, professors did highlight the tool itself when it directly related to future career usage, such as when the art professor described the necessity for students to be able to build their own portfolio websites:

> I got my degrees in sculpture, but as an artist you always had to manage your images and I had to build my own website, when you build applications you have to edit photos to be a

> certain dimension and that's just alone means you has to touch a computer so it's not this magical thing that an artist would live away from a computer if you want to advance your career, you have to do applications you know.

Another practical emphasis in tool implementation emerged when this professor in business talked at length about FRED (Federal Resource Economic Data):

> The other thing that has been incredibly helpful is that all of the macro data websites are really so good now, and when I said could you plot unemployment and the minimum wage, FRED at one point you had to download all that data into your Excel spreadsheet and then create, create your graph yourself. But within FRED, FRED has a graphing generator and if you just sort of want to know real quick what that relationship is you just tell it to plot and it has just a really nice tool within FRED that you see a lot of the PowerPoint presentation from the big guys they have, or the presentations that are online from the big guys, they have their basic data plots as a copy and paste from FRED. And so it's really cool to say 'look this is a tool that is so easy to use.' . . . Ten years ago the data was in there but it was clumsy to download it, sometimes you didn't download it correctly or it went to a different file or you could never tell where it went. And I'm still of the age that I use technology the way I use my car: I turn it on and I expect it to work and if it doesn't I call somebody else to help me with it. So FRED is pretty reliable in that I don't have to worry about whether FRED is going to work or not.

Note that her key concern resides around reliability and functionality for real world application, as opposed to trying out new media because it is shiny and new.

Discussion: Toward Critical Digital Pedagogy

In many ways, my findings illuminate the amazing consistency in beliefs around pedagogy, technology, and content across all disciplines at *Smith College. Whether one teaches engineering or education, we must all reckon with what to do with the powerful machines sitting at our students' fingertips. But the findings also reveal that our most thoughtful educational design surfaces at the nexus of our knowledge around technology, pedagogy, and content, particularly when these knowledge bases interact with positive beliefs about the potential of new tools. The question, however, remains: what happens when negative beliefs around newer tools inhibits faculty interest in reimagining their teaching practices?

First it is key to recognize the healthy source of digital skepticism for many liberal arts faculty. Professors that I interviewed at *Smith College had a preoccupation with the human side of teaching, necessarily so. Our existence as a college depends upon persuading the world that small faculty to student ratios substantively change the quality of the educational endeavor. But while some faculty were able to make peace with the hybrid nature of teaching and living and making meaning in the 21st century, faculty most concerned with new tools saw them as diametrically opposed toward their aims to connect with and empower young citizens. I argue that the call for *technology integration* should be replaced with an emphasis on *critical digital pedagogy* (Rorabaugh & Stommel, 2012; Morris, 2017). Armed with this critical lens, faculty are encouraged to think deeply about the decisions they make in their classrooms, to "look askance at the tools we use," (Rorabaugh & Stommel, 2012) whether they are digital or physical, and to have conversations with students about the affordances and limitations of every platform we use for making meaning.

Critical digital pedagogy takes the spotlight off of utilizing all things shiny and digital and new and helps us zoom out to the fuller picture, the one that takes into account the ebb and flow that

make up our learning and communicating as humans. Increasingly, scholars are losing patience with long-held dichotomies such as play/learning, digital/physical, informal learning/formal learning (Pittman et al., 2004; Jewitt, 2008; Husbye et al., 2012). Learning is being recognized as operating on a vast network of diverse nodes, including communities, materials, teachers, technologies, and much more (Ito et al., 2013). Pete Rorabaugh and Jesse Stommel (2012) write in defining *Hybrid Pedagogy* that "all learning is necessarily hybrid," since we continually shunt back and forth screens and faces to communicate, make meaning, gather knowledge, and network. Morris (2017) explains:

> The digital isn't magic. It isn't mysterious. It's regular human communication astride a new medium. Let me say that again: It's regular human communication astride a new medium. There's no need to make it more than it is. . . . What is needed, what has always been needed—since the early days of videotaped lectures to the primordial ooze of the invention of the LMS [learning management system]—is an effective digital pedagogy that lets us span the interface, cross the digital, and find one another where we are.

TPACK, then, is useful as a frame for decision-making, only so far as it enables us to get to the destination to which our deepest beliefs around teaching/learning direct us. Transformative faculty members take the time to confront their own deeply held teaching beliefs, determine if they hold up under scrutiny, and then reflectively utilize their knowledge bases (content, pedagogical, and technological) to make a pathway forward.

Appendix

Appendix 1. Interview Protocol Questions for Faculty

- BACKROUND: What field(s) do you associate with? What job(s) are you preparing students for? How long How long have you been at the college?
- What do you think "preparing students for the 21st century" means in your particular discipline/field?
- Follow up: (tie it to how they defined it)- Do you see yourself as preparing students for the 21st century in your discipline? Why or why not?
- What technologies do you use with students in your classes? Which are most effective and which are least effective?
- What technologies would you like to use with students in your classes? (But don't b/c of time, access, training, etc?) Why don't you use them?
- Have you had any training for teaching with technology? If you could have training, what would it be?
- What sensibilities/dispositions/ways of thinking do successful people in your field need in 2016?
- Has there ever been a time when a new technology substantively changed the way you taught?
- Do you think skills/content needed in your field have changed in the last 20 years?
- What "old" skills/content/teaching approaches are still relevant in the 21st century? Why?
- Do you allow students in class to use their own technology (laptop) for learning purposes? Why or why not and how?
- Do you find that technology is distracting for students in your classroom? How do you deal with that?
- What "digital citizenship" lessons do undergraduates need to learn to be successful?

- Do you use social media to professionally represent yourself or to connect with students? (Twitter- Instagram/FB) In what ways/why or why not?

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Impact of the Stringency of Attendance Policies on Class Attendance/Participation and Course Grades

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Abstract: The purpose of this preliminary study was to investigate the impact of three diverse attendance and participation policies in face-to-face and online courses and the effect on students' final grades in each course. We examined nine different undergraduate courses taught between Fall 2010 and Spring 2015. The results suggest that a more stringent attendance policy significantly impacts student attendance, absences were negatively correlated with course grades, and that course delivery methods were not predictive of either attendance/participation or course grades. Additional research is needed to determine what other factors might influence attendance and participation and correlation to course grades.

Keywords: attendance, participation, course grades, face-to-face courses, online courses, course policies

Introduction

Among the many decisions that a college instructor must make is whether to have a stringent class attendance policy. Some instructors may also have a separate participation policy. For example, in such a policy or policies, an instructor decides whether students earn points when attending class lose points when missing class or both. The focus of this study is to determine how the stringency of attendance and participation policies affect students' attendance and academic performance. The authors included both face-to-face and online courses in this study. Findings of the study will add to the current body of knowledge by examining attendance and participation policies in the context of technical courses with different course delivery methods.

Relationship Between Attendance Policy, Class Attendance and Student Performance

Numerous studies have shown that class attendance and participation are major factors that influence the outcome of students' learning (Gump, 2011; Kupszynski et. al, 2011; KunhiMohamed, 2012; Dalelio, 2013; Gbadamosi, 2015). Better attendance is often related to higher quiz scores (Clump, et. al, 2003) and better exam performance (Launius, 1997). Corbin et al. (2010) found that students who attended lectures more frequently achieved higher grades. Even though the strength of the relationship is disputable, the positive relationship between class attendance and student performance has been consistently found among several disciplines such as science, mathematics (Thomas & Higbee, 2000;

Meulenbroek & van den Bogaard, 2013), economics (Cohn & Johnson, 2006), chemistry (Lyubartseva & Mallik, 2012), and physiology (Hammen & Kelland, 1994). Similar results have also been found in different levels of students, with this study comparing attendance and performance for first-year and third-year students (Clark et al., 2011).

A few studies used observational methods to investigate the correlation between students' attendance and performance (Rogers, 2001; Golding, 2011). These studies have the limitation of not being able to discern the causal relationship between these two variables. Some experimental studies found that a clear attendance policy improves students' attendance and their performance (Baum & Youngblood, 1975; Hancock, 1994). Westerman and colleagues concluded that "[a]ttendance is positively related to exam performance. There are more pronounced negative effects of an absence for lower-performing students than for higher performers, and absences are negatively related to a student's cumulative grade point average" (Westerman, et al., 2011, p. 49).

Even though the positive relationship between attendance and performance has been well documented, some studies do not support or agree on these findings. Some studies have not shown a clear advantage of an attendance policy with regard to performance (Berenson, et. al, 1992, Butler, Phillman, & Smart, 2001; Golding, 2011).

Reasons Why Students Miss Class

Despite the well-documented negative correlation between class absences and grades, students do miss class for various reasons. Absenteeism is a significant problem at many institutions of higher education and a major concern for educators (Devadoss & Foltz 1996).

Research has indicted that absenteeism is a product of two types of factors: background factors, such as study mode, origin, employment, distance travelled to lectures, availability of lectures online, and behavioral factors such as attitude towards attendance (Sawon, Pembroke, & Wille, 2012). Van Blerkom (1992) determined that the reasons cited most frequently by students for missing class were boredom, illness and interference with other coursework or social life. Friedman and colleagues (Friedman, Rodriguez, & McComb, 2014) surveyed a total of 333 undergraduate students and identified 33 relatively distinct reasons for not attending class. The study results suggested that student characteristics, such as gender, class standing, age, employment, residence, funding of education, and number of credit hours did not affect attendance; however, students with higher grade point averages tended to attend class more regularly. The same study analyzed how class attendance may be affected by course characteristics, including type of course, motivation, enrollment size, time of class, and teacher status. The findings by Chenneville and Jordan (2008) suggest that many undergraduate students lack the experience to understand fully the impact that missing class has on their grades.

A common response from instructors is that students do not attend class because the lectures are available electronically. McKinlay (2007) notes that using recorded lectures may reduce attendance by 10-33%. However, a number of other studies disagree with this finding (Larkin, 2010; Biggs & Tang, 2007; McGarr, 2009). Sawon and colleagues (Sawon, Pembroke, & Wille, 2012) found that the students who do not regularly attend class generally find lectures easy—a fact suggesting the possibility that a low standards or lack of rigor means that the quality of a course is insufficient to keep many students motivated.

Increasing Class Attendance and Improving Student Engagement

Policies on class attendance vary from institution to institution and from instructor to instructor. Some faculty members do not require attendance and do not care whether students attend class as long as students learn the content and pass exams (Sawon, Pembroke, & Wille, 2012). Some faculty members

argue that college students are adults and that, since they pay for courses, they should be the ones who are responsible for deciding whether or not to attend class and should not be penalized for failing to show up (Chenneville & Jordan, 2008). A review of the literature demonstrates that the research in the area of attendance has primarily focused on the relation between attendance and grades. However, much less of research has focused on what educators need to do to increase attendance and improve student engagement.

Studies on students' absenteeism have determined that a graded attendance policy strongly encourages students to attend class. For instance, Launius (1997) found that 70 percent of the students participating in a survey thought that instructors should provide credit for class attendance; furthermore, 84 percent of the students surveyed claimed that their attendance would improve if they earned points for it. The findings by Chenneville and Jordan (2008) suggest that having a graded attendance policy may serve as a motivator for increasing and routine class attendance.

Methods

The data in this study were collected from nine different undergraduate courses taught at a large urban college in the Midwest between Fall 2010 and Spring 2015. Among the nine courses, one was taught online (ONL) and the other eight were taught face-to-face (FTF) (see Table 1).

Table 1: List of courses that are included in the study

Instructor	Course	Meetings per week	Student count	Delivery method	A/P Policy[1]
Instructor 1	Foundations of New Media	1	658	FTF	GAP[2]
Instructor 2	Computer and Information Ethics	N/A	209	ONL	MAP[3]
Instructor 3	Mathematical Foundation of Informatics	2	114	FTF	MAP
Instructor 3	Information Infrastructure I	2	122	FTF	MAP
Instructor 3	Information Infrastructure II	2	105	FTF	MAP
Instructor 3	Applications of Data Mining	2	55	FTF	MAP
Instructor 4	Online Document II	1	70	FTF	SAP[4]
Instructor 4	Online Video Delivery	1	40	FTF	SAP
Instructor 4	Advanced Digital Video	1	74	FTF	SAP

[1] Attendance/participation policy
[2] Gentle Attendance/Participation Policy
[3] Moderate Attendance/Participation Policy
[4] Stringent Attendance/Participation Policy

In this study, the face-to-face courses are lecture-based and meet one or two times per week. In terms of the online courses examined, one of the hallmarks is a highly interactive weekly discussion forum, in which students review the course materials and provide feedback to one another. The authors of this study, as instructors, have taught technology-related courses in two of the major programs under the same school for varied number of years. The students included in this study are a mixture of traditional-age and returning/adult students and are diverse in terms of gender, race and nationality. The students' relatively homogenous academic interests have provided an excellent opportunity for the authors to observe the motivational impact of attendance and participation policies on these students' academic performances.

Course delivery method (face-to-face vs. online) and attendance policy stringency have served as two main independent variables in this study to investigate how they affect students' absences and their course grades. The absence variable also serves as an independent variable to see how it affects students' course grades. Through this study, the authors expect to determine which, if any, of the three policies demonstrate effective use of intrinsic and extrinsic motivation, how attendance and participation policies might be improved in order to motivate and actively involve students in the learning process, and what a reasonable combination of attendance policy is.

The authors have applied three different types of stringency in these courses consistently across the years. They are labeled as:

- SAP (Stringent Attendance/Participation Policy),
- MAP (Moderate Attendance/Participation Policy), and
- GAP (Gentle Attendance/Participation Policy).

The authors considered factors regarding each policy, including policy statement, implementation strictness, extra credit, make-up, and so on, and came to the agreement as to which policy falls in which category of stringency. The instructors' attendance and participation policies can be lengthy. To save space, following are the segments of each policy that pertain to absences only.
Here is the SAP statement:

From Instructor 4:

> There are reasons for missing class: illness, accidents, or death/serious illness in the family, etc. For whatever reason, you are allowed to be absent for up to two times. If you are absent three or more times, you have the choices of either withdrawing from the class when withdrawing is still possible or getting an "F" for your course grade. Every undocumented absence will cost you 2 points of your course grade. An absence due to sickness or other excusable reasons will be excused in the sense that 2 points will not be marked off your course grade, but it is still counted as an absence.

Here are the two MAP statements:

From instructor 3:

> Learning is not a passive process. All learning requires active participation. Participation is required in this course and accounts for 10% of the total course grade.
> Missing class reduces your grade through the following grade reduction policy: You are allowed two unexcused absences. Each additional absence, unless excused, results in a 2-point (out of 100 points) reduction in your final course grade. More than six absences result in an F in the course. Missing class may also reduce your grade by eliminating

opportunities for class participation. For all absences, the student is responsible for all covered materials and assignments."

From instructor 2:

Please make an effort to participate in the Discussion Forums regularly—not only is this 20% of your grade, but it will also be a much more rewarding course if we all share our thoughts and expertise. Points will be taken off if all questions in a Discussion Forum are not responded to. This is a 3-credit hour course and we cover a great deal of material, so you can expect to be at least as busy as you would be in a course that meets face-to-face every week.

Here is the GAP statement:

From Instructor 1:

Missing class reduces your grade through the following grade reduction policy: You are allowed one excused or unexcused absences. Regardless of the reason, a second absence results in a 5% reduction in your final grade and a third absence results in a 10% reduction. Further absences result in an F in the course. Missing class may also reduce your grade by eliminating opportunities for class participation.

Table 2: Summary of course attendance and participation policies

Instructor	A/P policy	Number of penalty-free absences allowed	Is excused absence allowed?	% of final grade reduced by each unexcused absence	Number of absences allowed before an automatic F
Instructor 1	GAP	1	Yes	4	3
Instructor 2	MAP	None – no points are provided if responses to a Discussion Forum are more than one week late. Points also reduced for incomplete responses, missing questions, etc.	No, but allow an extension to the due date if requested ahead of time via email.	2.5 points per week	Missing all Discussion Forums reduces the final course grade to no higher than an 80%.
Instructor 3	MAP	2	Yes	2	6
Instructor 4	SAP	0	No	2	2

[1] Even though this policy has not stated very clearly how absences are handled since this online course does not have meeting time, the instructor has implemented relatively strict assignment grading. Therefore, this policy is labeled as MAP.

[2] This policy seems relatively strict, but the instructor provides abundant make-up opportunities and extra credit opportunities. Therefore, this policy is categorized as GAP.

Through this study, the authors tried to address the following research questions:

RQ1: How does attendance and participation policy stringency affect student's absences?
RQ2: How does attendance and participation policy stringency affect student's grades?
RQ3: Are students' absences negatively correlated with their course grades?
RQ4: How do course delivery methods influence students' course grades?

Since this study is based on a census of all courses governed by these three types of attendance/participation policies, both descriptive statistics and inferential statistics are applied to compare means and correlate variables.

Findings

RQ1: How Does Attendance and Participation Policy Stringency Affect Students' Absences?

Tables 3 and 4 show the results of comparing the mean absences based on three types of attendance and participation policies. A One-way ANOVA test shows significant difference among the policies ($F=19.84$, $df=2$, $p<0.001$). An LSD post-hoc test (see Table 4) shows that the differences between all pairs are significant. Overall, SAP has brought up the least absences while GAP has caused most absences.

Table 3: Students' average absences under each type of attendance/participation policies

	N	Mean	Std. Deviation	Std. Error
SAP	184	.96	.85	.06
MAP	607	1.29	1.50	.06
GAP	656	1.75	2.09	.08

Table 4: LSD post-hoc test regarding each type of attendance/participation policies

(I) Name	(J) Name	Mean Difference (I-J)	Std. Error	Sig.
SAP	MAP	-.326*	.146	.026
	GAP	-.791*	.145	.000
MAP	SAP	.326*	.146	.026
	GAP	-.465*	.098	.000
GAP	SAP	.791*	.145	.000
	MAP	.465*	.098	.000

*. The mean difference is significant at the 0.05 level.

RQ2: How Does Attendance and Participation Policy Stringency Affect Course Grades?

Although attendance/participation policies brought up salient differences among students' absences, they did significantly affected students' course grades ($F=0.8$, $df=2$, $p>0.05$) (see Table 5).

Table 5: Students' average course grades under each type of attendance/participation policies

	N	Mean	Std. Deviation	Std. Error
SAP	184	83.281	15.1287	.5907
MAP	607	82.264	13.0417	.5293
GAP	656	82.758	14.7303	1.0859

On the other hand, Table 6 shows the distribution of student grades under each type of attendance/participation policies. The results indicate that GAP policy is associated with higher percentage of A's and lower percentage of B's than SAP. The percentages of A's and B's associated with MAP are in the middle between the percentages associated with GAP and SAP. In addition, the percentages of D's and F's associated with GAP are higher than those associated with MAP and SAP.

Table 6: Grade distribution under each type of attendance/participation policies

	A (%)	B (%)	C (%)	D (%)	F (%)
GAP	41.0	31.1	14.0	6.9	7.2
MAP	32.8	35.8	20.9	3.6	6.9
SAP	28.8	48.9	15.3	2.1	4.9

RQ3: Are Students' Absences Negatively Correlated with Their Course Grades?

Figure 1 clearly shows the negative correlation. The more absences students have, the lower the scores they earn (Pearson $R=-.475$, $p<0.001$).

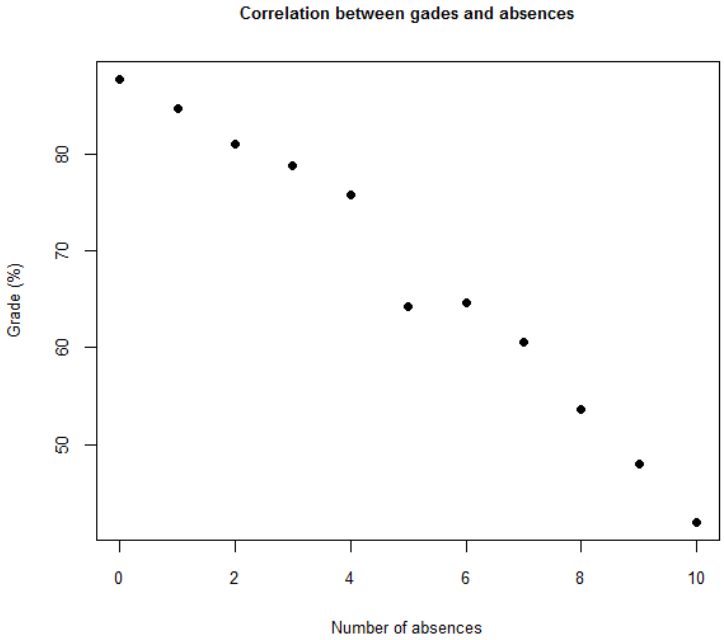

Figure 1: Correlation between students' grades and their absences

RQ4: How Do Course Delivery Methods Influence Students' Course Grades?

An independent-samples T-test shows that the face-to-face approach and the online approach brought no significant difference in terms of students' grades ($t(1445)=0.4$, $p=0.69$) (see Table 7), though the course contents and teaching approaches are both different. A close examination at the distribution of student grades under each type of course delivery methods indicates the two course delivery methods did not cause significant difference in students' grade distribution (see Table 8).

Table 7: Students' average grades under each type of course delivery methods

	N	Mean	Std. Deviation
FTF	1238	82.85	13.86
ONL	209	82.84	16.27

Table 8: Students' grade distribution under each type of course delivery method

	A (%)	B (%)	C (%)	D (%)	F (%)
FTF	35.5	36.0	17.3	4.7	6.6
Online	38.8	31.1	16.2	6.2	7.7

Discussion and Conclusions

This study was to evaluate the impact of stringency of course attendance/participation policies on student attendance and course grade. Findings from this study indicated that graded attendance policies increase the class attendance rate. These findings are line with the results reported by some of the previous studies (Gump, 2011; Kupszynski, et. al, 2011; KunhiMohamed, 2012; Dalelio, 2013; Gbadamosi, 2015). Furthermore, we found that the more stringent attendance policies were, the better class attendances and better course grades were.

The findings of this study indicate that a graded attendance policy with appropriate stringency on the course syllabus that explains the importance of attending class can encourage students to attend class and be responsible for their course outcome. This study concludes that having a graded attendance policy can serve as a motivator for increasing class attendance. If absence does not lead to any penalty on their grades, students may easily find excuses to miss class and thus earn undeserved grades.

This paper has studied the correlation between class attendances and student grades. However, this study has several limitations. First, in order to fully investigate the impact of attendance policy on class attendance, a study should be designed to include both experimental and control groups. In this study, we collected data from normally taught courses. Thus, a future study should include a control group.

Another limitation has to do with assessment of academic performance and student success. Final course grades were used to study the correlation between class attendance and academic performance. Even though course grade is a good indicator that shows how well students learn the course materials, there are other important factors that should be considered when assessing students' academic performance and success. Druger (2003) notes that it is the class experience gained from attending class that matters. Experiences in class, including the interaction with peers and the instructor, provide a motivational learning environment and are essential to meaningful, lifelong learning. In addition, class attendance might foster good work habits, teach responsibility, and improve social skills.

Due to the limitations of this study, the results must be interpreted with caution. Further studies would ideally be conducted with an appropriate experimental design. Studies should be repeated for different courses, instructors, and different course delivery methods. In addition to final course grades, other assessments should be included to evaluate students learning experience.

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The Effect of Small Group Tutors on Student Engagement in the Computer Laboratory Lecture

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Abstract: Student engagement is widely recognised as being influential on learning and achievement in higher education. What is less clear is how the knowledge transfers, i.e., the process of engagement by the student with any new forms of teaching demonstrated by the teacher. Aim: To investigate the effect of small group tutors on student engagement in the computer laboratory lecture. Methods: Participants were undergraduate, second year BSc Public Health students taking the Health Information Systems II module. Teaching consisted of 12 x 2-hour face-to-to face classes. Tutors were assigned to groups of 5/6 students from weeks 5-12. Quantitative data from the Irish Survey of Student Engagement was collected in week 12 and analysed using the Statistical Package for the Social Sciences. Qualitative data from a 1-minute pre-and post-module CAT, tutor post lesson appraisals and two focus groups (one student and one tutor group, respectively) were analysed thematically. Findings: This study provided evidence that student engagement and learning was indeed enhanced by the addition of small group tutors in the computer laboratory lecture. In addition, students' attitude to engaging with their programme of study improved and their positivity towards learning increased as the term progressed. Furthermore, there was evidence of an improved student experience and improved personal development that was highly valued by the students.
Keywords: student engagement, small group tutors, tutor assistant, computer laboratory lecture, teaching public health.

Introduction

There is widespread agreement that while there are many formulations for the scholarship of teaching and learning, it includes ongoing learning about teaching and the demonstration of teaching knowledge (Brew & Ginns, 2008; Hutchings, Huber, & Ciccone, 2011; Hutchings & Shulman, 1999). Historically, much of this focus has been on teachers and their pursuit of knowledge through the scholarship of teaching and learning and improvements in their practice of teaching (Brew & Ginns, 2008). However, there is a more fundamental aspect to be considered, and that is the gain to the student of all this scholarly knowledge, and if it actually translates into positivism, and increased learning, for the student. There is some research evidence that engaging in training in university teaching leads to increased student satisfaction and an increase in the use of student-focused approaches to teaching (Gibbs & Coffey, 2004; Lueddeke, 2003). What is less clear is how this knowledge transfers, i.e., the process of engagement by the student with any new forms of learning demonstrated by the teacher, or what Daniel Bernstein calls the 'transactional relation' between teaching practice and student performance (Bernstein, 1998).

One new form of learning in medical education and associated health degrees, including public health, is that of small-group teaching. While there is an abundance of literature on active learning in a variety of disciplines (Freeman et al., 2014; Roach, 2014; Ruest, Svoboda, & Opperman, 2017) and the effect of tutors in the problem-based learning setting, literature is scant on the effects of multiple

tutors in the traditional small group (classroom) setting, and negligible on the effects of multiple tutors in the computer laboratory setting. From the little evidence that is published, we know that tutors' expertise has important effects on the process of discussion in a problem-based tutorial (Silver & Wilkerson, 1991). We also know that tutors with expertise tend to take a more directive role in tutorials, speak more often and for longer periods, provide more direct answers to the students' questions, and suggest more of the topics for discussion (Silver & Wilkerson, 1991). Additionally, it is reported that students guided by subject experts achieve better results than those not guided by subject experts and spend more time on self-directed learning (Schmidt, van der Arend, Moust, Kokx, & Boon, 1993). Nevertheless, we also know that if tutor-to-student exchanges dominate, then there is less student-to-student discussion (Silver & Wilkerson, 1991). Evidence from an undergraduate health sciences curriculum in the U.S. found that the personal qualities of the tutor, his or her ability to communicate with students in an informal way, were determinants of learning. Furthermore, an empathetic attitude that enabled the tutor to encourage student learning, by creating an atmosphere in which open exchange of ideas was facilitated, and the tutor's subject-matter knowledge, were further determinants of learning ((Schmidt & Moust, 1995). Similarly, a qualitative study in an undergraduate medical curriculum, small group teaching setting, identified the tutor's characteristics and a non-threatening atmosphere as the two most important characteristics of effective small group teaching (Steinert, 2004).

The extensive research on third level student development shows that the time and energy students devote to educationally purposeful activities is the single best predictor of their learning and personal development (Astin, 1993; Carini, Kuh, & Klein, 2006; Kuh, 2001b; Terenzini & Pascarella, 1991). This has more recently been defined as student engagement and is widely recognised as being influential on learning and achievement in higher education (Bryson & Hand, 2007; Kahu, 2013; Krause & Coates, 2008; Kuh, 2009). Research on student engagement is underpinned by the constructivist view that education is fundamentally about students constructing their own knowledge and that learning is influenced by how an individual participates in educationally purposeful activities (Krause and Coates, 2008). Students have affirmed how active engagement positively impacts their learning (Lumpkin, Achen, & Dodd, 2015). Since the late 1980s, authors have considered student engagement as an important contributor to the student experience (Astin, 1985, 1993; Bryson & Hand, 2007; Hu & Kuh, 2001; Pace, 1995). Early definitions of student engagement focused on the student. This arose because students had the responsibility for their own success in third level institutions with the institution itself abdicating responsibility(Quaye & Harper, 2014). However, institutional policies, practices, and learning environments may also encourage and support, or discourage and impede students in achieving their educational objectives (Davis & Murrell, 1993; Quaye & Harper, 2014). In fact recent literature speaks of students and universities as partners in education though making the point that while all partnership is student engagement, not all student engagement is partnership (Healey, Flint, & harrington, 2014). A review of student engagement literature by Trowler (2010) captured the responsibility of both the student and the institution. She defined student engagement as, "…concerned with the interaction between the time, effort and other relevant resources invested by both students and their institutions intended to optimise the student experience and enhance the learning outcomes and development of students and the performance, and reputation of the institution" (Trowler, 2010:3). While this broad definition is inclusive, it gives no consideration to the value realised by the very act of engagement, which adds to the skills that are essential to live a productive life after higher education (Kuh, 2003). Shulman discusses this value in his 2002 article, outlining that students who are involved in educationally productive activities in higher education, are developing habits of the mind and heart that increase their capacity for continuous learning and personal development (Shulman, 2002). Boyer and others, influentially, have also considered the

scholarship of engagement to describe how scholars work with and for communities, participating in activities that cross disciplinary boundaries, teaching, research, and outreach (Boyer, 1996).

The phenomenon of student engagement has received recognition in the last decade as a cogent means of guiding higher education research policy and practice (Krause & Coates, 2008) most prolifically in North America (Kuh, 2001b), and Australia (Hamish Coates, 2010), and to a lesser extent the UK (Mann, 2001; Quaye & Harper, 2014). More recently Ireland has acknowledged this research (Drennan et al., 2014; Working Group on Student Engagement in Higher Education, 2016) and along with North America, Australia and the UK, has introduced a framework for capturing student engagement to capture the student's views on their experience, largely based on the seven principles for good practice in undergraduate education: student-faculty contact; cooperation among students; active learning; prompt feedback; time on task; high expectations; and respect for diverse talents and ways of learning (Kuh, 2001a). Originally the National Survey of Student Engagement in the USA (Kuh, 2001b), it became the Australasian Survey of Student Engagement (H Coates, 2009) and in 2013, the Irish Survey of Student Engagement (ISSE, 2015). The purpose of this study is to investigate the effect of small group tutors on student engagement in the computer laboratory lecture.

Methods

Module context and teaching methods

EH2007 Health Information Systems II (HIS II) is a 5-credit module offered to undergraduate BSc Public Health students in their second undergraduate year. Learning outcomes and module structure are summarised in Appendix 1. Teaching consists of 24 hours of face-to-face teaching (12 x 2 hour sessions on consecutive weeks). The teaching plan for the module is summarised in Appendix 2. The corresponding author, with a background in Epidemiology and Public Health, is the sole teacher on this module. Four tutors join the module in week 5 of term. Each tutor is assigned 5/6/ students per group, and they remain with the students until the final week of term, week 12. Teaching is delivered in a computer laboratory. During the period of the current study, twenty-three students took the module.

The module was designed using the Teaching for Understanding (TFU) framework (Wiske, 1998) as a guide (See Appendix 3 for a graphic of the module construction). The TFU is embedded in the constructivist tradition of education. The TFU framework has five interacting elements: generative topic, throughlines, understanding goals, ongoing assessment and performances of understanding. The fundamental aspect of the TFU framework is that the focus is on the student, and on the development of their understanding of the subject and discipline. The generative topic is the Epidemiology of Sexually Transmitted Infections (STIs). The final assessment is a 100% project on the generative topic, or on a sub-theme of the generative topic. Details of the final assessment can be found in Appendix 6. The first six weeks of the module involve interactive sessions in the computer laboratory where students are instructed how to: systematically search the literature; critique sources of literature; develop a focused research question; write a literature review; analyse their data using SPSS (statistical package for the social sciences); and reference their work appropriately using the reference manager EndNote. For the final six weeks of term the students spend the 2-hour class in their groups working on their research project, with assistance from their assigned tutor and the teacher.

The tutors were all subject specialists. Three were graduates of the BSc Public Health programme and either studying for an MPH or a PhD in the discipline. One tutor was a fourth year medical student who was taking a gap year and studying for the award of MPH. The tutors were selected by FS (lecturer on the module) given their subject specialist knowledge. In week 3, before

their introduction to the class, they were given a 1-hour training by FS on the learning outcomes for the module and their role in meeting those learning outcomes. They were also briefed on the fact a study was being conducted investigating the effect of small group tutors on student engagement and their consent to take part and complete the post lesson appraisal was attained. The tutors were monetarily compensated for their tutoring at the University student tutor/help rate.

Study Methodology

A mixed methods study was conducted to elicit different but complementary data on the same topic to aid the understanding of the research problem. This, referred to as triangulation, validates the research (Creswell & Plano Clark, 2011; Johnson, Onwuegbuzie, & Turner, 2007). The study design, most suitable to the research question was the convergent parallel design, where equal emphasis is placed on both the quantitative and qualitative phases of the research. Quantitative and qualitative data were collected concurrently, the quantitative and qualitative data were analysed separately, and then the two sets of results were merged to form an overall interpretation.

Quantitative Data

Irish Survey of Student Engagement. The Irish Survey of Student Engagement (ISSE), with a small addendum on tutor specific questions, was distributed to the students on the final day of term (week 12). A copy of the survey can be found at http://studentsurvey.ie/. There are six engagement indices: academic challenge; active learning; student-staff interactions; enriching educational experiences; supportive learning environment; and work integrated learning. There are five outcome indices: higher order thinking; general learning outcomes; general development outcomes; career readiness; and overall satisfaction. The sampling frame was the entire EH2007 HIS II class of 23 students. The students were given as much time as they required to complete the survey. Data from the ISSE were entered into SPSS for statistical analysis. Descriptive analysis was conducted for each index to obtain the proportions for each group.

Qualitative Data

1-minute Classroom Assessment Technique. Students were given a 1-minute CAT (classroom assessment technique) (Angelo & Cross, 1993), pre- and post-module, on their learning expectations and engagement with the module. A copy of the questions can be found in Appendix 4.

Tutor Post Lesson Appraisal. The tutors each tutored 5/6 students. They kept a post-lesson appraisal, from weeks 7 to 12 of term inclusive, to record the level of engagement of their group of students. They were provided with 14 specific engagement questions to guide them in that appraisal (see Appendix 5). The tutors submitted these reflections within 2 days of completion of the lesson.

Focus Groups. Six students from the class were randomly selected to participate in a focus group and permission was sought for their participation. It was emphasised that it was entirely voluntary. The 6 engagement indices and the 5 outcome indices from the ISSE formed the topic guide for the discussion. The discussion was recorded on a digital device for transcription purposes. On a separate day, the tutors participated in a focus group discussion on their experiences of being a tutor for EH2007 HIS II and also on their views of the students' engagement with the module. The topic guide for the tutor focus group was again guided by the engagement and outcome indices in the ISSE as well as their experience of tutoring. Permission was sought for their participation and the focus groups were recorded on a digital device. Both focus groups were facilitated by the primary author.

Thematic analysis (Creswell & Plano Clark, 2011; Norton, 2009; Nowell, Norris, White, & Moules, 2017) was undertaken, manually, to synthesise data from the 1-minute CATs, the tutor post-lesson appraisals, and the focus groups. This involved data immersion, generation of categories, deletion of categories, merging of categories, checking of themes, and linking of themes.

Ethical Approval

Ethical approval was granted by the Social Research Ethics Committee, University College Cork, Ireland.

Results

Pre- and post-module 1-minute CAT

There were 23 students in the class, and 18 responded to the pre-module CAT, a response rate of 78%. Twenty students responded to the post-module CAT, a response rate of 87%. The initial question, both pre-and post-, asked students about their expectations for the module. The responses were analysed thematically and three themes emerged: personal goals; knowledge goals; and external goals. Of note was the difference between the pre- and post-module analytical themes. While the pre-module CAT contained all three goal types, the post-module CAT focused only on knowledge goals. The personal goals were varied and very individual, e.g., "to improve my research capabilities, attend all classes, gain knowledge of myself and those around me". One of the major knowledge goals was that of work-integrated learning, e.g., "understand health systems so I can apply it to future work or Public Health". Eight students listed this as an important goal. A further nine students also listed "learning about different health systems as a goal". The list of knowledge goals was more extensive at the end of the semester and the range was very broad. While some were repeated from the pre-module CAT, others were variations on the pre-module goals or new goals, e.g., "putting statistics learning into practice and use technology to write a research report". The phraseology of the post-module goals was different to the pre-module goals, with an emphasis on application. The goals were also much more specific and precise and also more focused. For example, in the pre-CAT, the students had cited "knowledge of statistics and SPSS" as a goal, while in the post-CAT, the students wanted to "put[ting] statistics learning into practice". This shows a move from a naïve understanding to an apprentice level of understanding, along the TFU understanding framework. The external goals related primarily to information seeking for the assessment.

Ninety-four percent of the students said "yes", they achieved their learning expectations/goals. Markedly, five of the responses qualified their "yes" statements by saying they achieved their goals with the help of their tutor. Their responses also pointed to the visibility of the throughlines in the module as well as the BSc Public Health degree as a whole: "…it was good to use real data and observe how it could be used to design a study"; …it helped link all the various modules in the course together"; "…the assignment is challenging but very helpful and insightful in what is to come for the rest of the course or career".

The students were asked about their engagement with the module. Three analytical themes emerged from the data: engagement with tutors, teachers and peers; self/active learning; and time. It was clear that the students did not intend to work alone on this module or the project associated with it, but rather, intended to engage with others around them. All statements regarding engagement with the tutors in the post-module CAT were positive. Self/active learning was a significant analytical theme mentioned by more than half of the students. The students intended to self-engage with the module and become actively involved. The pre-module CAT showed students' intentions, but the post-

module CAT on the same issue highlighted some negative issues related to engagement. Some students felt they didn't put in enough effort: "may have left it too late". Other negative statements were on the difficulty of the module. External factors such as competing deadlines were mentioned as reasons for not being actively involved in the module. Time was a significant feature of engagement for the students and attendance at lectures featured often. The implication was that attendance at lectures was an indicator of future success in their degree.

The students were asked about their expected grade, both pre-module and post-module. This is reported in Table 1, alongside the actual grade achieved. Overall, students revised their expectations downwards, after completing the module. However, the proportion expecting to pass increased. When comparing the expected grades post module to the actual grades achieved, the proportion of first class honours decreased, but there was an increase in those achieving a 2.1 and 2.2, and no student received a pass grade.

Table 1: Proportion of students in each expected grade category pre and post module completion

	Pre-module Grade Expected (%)	Post-module Grade Expected (%)	Actual Grade Achieved (%)
First	28	20	13
2.1	61	45	52
2.2	0	30	35
Pass	11	5	0

The Irish Survey of Student Engagement (ISSE)

There are six engagement indices and five outcome indices. Each of these is analysed separately. Tables of results (Tables 2 -12) are too large to present in the body of the paper but can be found in Appendix 7. Results are compared to the ISSE National Data for 2014/2015 which sampled first year, fourth year, and postgraduate students from all third level institutions in Ireland. Twenty-three students responded to the survey in this study, a response rate of 100%.

Engagement Indices

Academic challenge (Table 2) reflects the extent to which expectations and assessments challenge students to learn. Evidence from the ISSE shows that 2nd year BSc Public Health students were academically challenged. Forty-eight percent 'often' worked harder than they thought they could, which was higher than the 33% found for the sample of 'All students' across Ireland. Sixty-two percent reported they had synthesised ideas into new more complex interpretations. More than 65% report that they spend significant amounts of time studying. However, when asked to quantify this only 19% spent more than 16 hours a week studying or preparing for class etc. The largest proportion, 43%, spent between 1 and 5 hours per week on these tasks. This is similar to the findings for the national ISSE data.

Active learning (Table 3) reflects students' efforts to actively construct knowledge. Questions focus on contribution to class, working with others inside and outside class, teaching others and discussing coursework. The contribution to class or tutorials is dichotomised in the response. While nearly a quarter said they contributed 'very often', only 10% felt they contributed 'often'. The largest proportion, 57%, contributed 'sometimes'. These figures are somewhat different to the national ISSE data, with a higher proportion of Public Health students 'sometimes/never' contributing (67%

compared to 49%) and a much lower proportion (33%) contributing 'often/very often' compared to the national data (51%). Working with other students outside of class is much more common than inside class.

Student-staff interactions (Table 4) reflect the level and nature of students' contact and interactions with teaching staff. Questions typically focused on timely feedback on assignments, discussion of results, and discussion of ideas for projects. The responses from the Public Health students suggest that the level of interaction was poor. Nearly 30% never discussed their grades or assignments with teaching staff, and only 14% did it 'often' or 'very often'. More than half never discussed ideas on coursework outside of class with teaching staff, which is comparable to the national figures. However, none did it 'often' or 'very often' in 2nd Year BSc Public Health, while nationally 14% did. Feedback on assignments, either written or oral, was not timely with 87% reporting they only 'sometimes' or 'never' received timely feedback. This is higher than the 64% reported nationally, but both figures are unacceptably high.

Enriching educational experiences (Table 5) reflects students' participation in broadening educational activities. The broad range of questions include: interacting with students from different cultures and religious backgrounds; participating in community groups; using technology; work placement; studying abroad; and participating in extracurricular activities. Students were quite accustomed to online learning systems. They also reported mixing with students from different cultures 75% of the time, a much higher figure than that reported nationally (58%). Twenty-four percent planned to, or had, participated in a study group. Thirty-five percent had either studied abroad or planned to study abroad. A very high proportion of students, 38%, spent no time participating in sports or clubs and societies. This is lower than the 46% reported at national level.

Supportive learning environment (Table 6) reflects students' feelings of support within the college community. Questions focus on relationships with peers and teaching staff, as well as the supports provided by the institution. In the current study, the students reported a high sense of belonging and rated highly the friendliness and support from their fellow students. The relationships with teaching staff were also rated well, with 80% reporting them as 5,6, or 7 on a 7-point Likert scale. UCC, the institution, also rated well on providing the support needed to succeed academically, with 55% of students reporting receiving 'quite a bit' or 'very much' support. This is comparable with the national ISSE figures. Only 5% said they got 'very little' support. The support achieved for coping with non-academic responsibilities is remarkably different. Forty percent reported receiving 'very little support', a figure similar to the 41.5% reported in the national ISSE figures.

Work integrated learning (Table 7) reflects the integration of employment-focused work experiences into study. Sixty-five percent of students reported that their institution had contributed to them acquiring job related skills 'quite a bit/very much'. Ninety-five percent of students planned to do a work placement. Blending academic learning with workplace experience did not occur often for this cohort in their second year, but this finding is most likely because their work placement takes place in the third year of their degree programme.

Outcome Indices

Higher order thinking (Table 8) reflects students' participation in higher order forms of thinking. The current students felt they are very engaged in higher order thinking. The majority of students, 81%, reported that their course work in year two of their degree had required them to organise and synthesise their ideas into new more complex interpretations and relationships, 'quite a bit' or 'very much'. This is significantly higher than the 59% reported in the national ISSE data. In terms of making judgements about the value of information, arguments or methods, again 81% felt they do this 'quite a bit' or 'very much' in the BSc Public Health degree. Sixty-two percent of students reported applying

theories or concepts to practical problems or in new situations 'quite a bit' or 'very much', a figure comparable with the national data. The final question in the table asked the students about applying basic concepts in an in-depth case or situation. Almost all students, 95%, felt they do this most of the time, a higher figure than the 72% reported at national level.

General learning outcomes (Table 9) reflect the development of general competencies. Question topics were quite broad, ranging from thinking critically, to speaking clearly, writing clearly, analysing quantitative problems and using computing and information technology. The Public Health students rated their acquisition of these competencies either 'quite a bit' or 'very much' at a minimum of 65% of the time. Some competencies were rated as such over 90% of the time. All of these figures are equal or higher than those reported at national level, e.g., in terms of thinking critically and analytically, students felt they were engaged in this competency 90% of the time, whereas this was just 77% in the national data.

General development outcomes (Table 10) reflect the development of general forms of individual and social development. In terms of personal development, more than half the students felt that the institution, UCC, had contributed to their knowledge and skills in understanding themselves 'quite a bit' or 'very much' and understanding people of other racial and ethnic backgrounds, 'some' (55%) and 'quite a bit' (35%). Solving complex real world problems was reported by the majority of students to some degree. Second year Public Health students also scored UCC quite well on developing their skills in developing a personal code of values and ethics. Fifty percent of students felt that UCC had done this 'quite a bit' or 'very much'. Developing skills on contributing to the welfare of their community was again scored high by UCC students. This was 18% higher than the national data for all third level institutions.

Career readiness (Table 11) reflects students' preparation for participation in the professional workforce. The questions focus mainly on job preparation, e.g., keeping CV up to date, how to present oneself to potential employers etc. Given the students are in second year, findings for the questions in this index are mainly 'never' or 'sometimes'. A question of relevance for the public health group is the time spent thinking about career development goals and plans. One third of the class had not spent any time doing that in the past academic year, however more than half had 'sometimes' spent time and a further 14% had 'often' or 'very often' spent time thinking about their career goals.

Overall satisfaction (Table 12) reflects students' overall satisfaction with their educational experience. Forty percent felt their educational experience at UCC was 'excellent' and a further 55% felt it was 'good'. This represents 95% of students and is higher than the 79% reported at national level. Seventy-five percent of students were happy with the quality of academic advice they had received in UCC. Only 15% of students would not go to the same institution if they had to start all over again with 0% of students saying they would definitely not. Ninety-five percent of students were 'very satisfied/satisfied' with their BSc Public Health degree programme and they felt that the best aspect of institutional support for student learning was that UCC encouraged students to think critically and think independently. When asked what the institution could do to improve how it engages with students the resounding response was "smaller classes and tutorials across all modules".

Tutor Post-Lesson Appraisals

Class preparation varied across the weeks. In the main, approximately 50% had done some preparation for the class or progressed their project from the prior week, or had pre-prepared questions. Mixed ability in the groups greatly influenced the effort put in outside of class: "Due to mixed abilities you find that some students have moved the project forward dramatically…while others are still trying to start". Equally significant to preparation for class as an indicator of engagement was the attendance of the students. Those that were absent from class fell behind and required a lot of input from the

tutors to bring them up to date. The average attendance for the term was 60%, but some students attended 100% of the time, and others attended as few as 5 classes of the 12. There was resounding agreement that all students were actively engaged during class. However, their focus and level of engagement increased as the term progressed. One tutor commented: "as the deadline for the assignment approaches, the students are becoming more engaged". Regarding the students' attitude to the module, the general finding was that some students were positive about the course, but others were not, because they found it challenging. There were two important findings related to this: their positivity increased during the term; and they were determined to engage and face the challenges. One tutor commented on week 9 of the 12-week term: "Seeming more positive. Asking good questions. Interested in the 'why' as much as the 'how'".

Concerning the students' engagement with the lecturer, the students were focused on meeting the lecturer's expectations. One tutor wrote "as the module progresses, students are trying harder to reach a higher grade than the beginning of the module". There was consensus amongst the tutors that the students were listening carefully and that they were open to receiving advice on their project. They also acted on the advice. There was agreement amongst the tutors that the students felt free to ask the lecturer questions. Regarding the students' engagement with the tutors, none of the tutors felt there was any anxiety amongst the students in this regard. As the weeks progressed, the students became more specific about their questions, asking "good" questions. Finally, in relation to the students' engagement with their peers, it varied amongst tutor groups. In one tutor group, four of her five students engaged with each other a lot in the early weeks, but this tapered off as the term progressed and they grew in confidence and gained a clearer understanding of their individual projects. However, at all times one student did not interact with any of the group for the entire term. Another tutor reported a different scenario whereby the students worked independently of each other for the entire term and rarely interacted with each other. However, the predominant finding was that students did not assist each other. The other relevant observation was that the student would ask the tutor, rather than their peers. The resounding consensus on working together outside of class was that there was no evidence of this. However, one relevant comment from one tutor, which possibly affects this was: "I think they view this as a very individual project and are afraid of plagiarism".

Focus Groups

There were two focus groups conducted, one with a random sample of six students, and one with all four of the class tutors. Both focus groups were approximately 25 minutes in duration. They were both thematically analysed, and findings were summarised under collective themes for both focus groups. Emerging themes were: academic challenge; active learning and student-student engagement; student-staff engagement; supportive learning environment; higher order thinking; general learning outcomes; and technology.

Academic challenge. Advance preparation for class was not a feature for BSc Public Health students in general. The reason was: "Some modules we wouldn't even know what's coming up the next week, because they wouldn't have put the things up on blackboard" (Student 1). However, because of the module set up for HIS II, the students did advance preparation for this. The tutors reported that advance preparation very much depended on the individual. Students did not seem knowledgeable on how best to use the tutor support to their advantage. Tutor 3 commented: "But then towards the end, when they realised that the submission deadline was kind of coming closer, they did seem to be more prepared and I think they might have understood more the purpose of having the tutor there was, to ask questions". Tutor 1 identified another possible reason why the students' engagement with them improved as the term progressed: "I think, as well, my tutoring style changed as well towards the end…". There was also a sense from the tutors that the students found the module

extremely difficult, but were satisfied with their achievement when they completed the challenge: "I think there was a sense of satisfaction that they actually…they reflected, in that they found it so difficult to start off with and they go…to see the project nearly finished. I think they did feel a sense of achievement" (Tutor 3).

Active learning and student-student engagement. The students were asked about working with other students from their class on their HIS II project outside of scheduled class time and they all said "no". They said they only work together if they have group presentations or group projects to do. Regarding working together inside class, the response was mixed from the students. The tutors felt that the students all worked, more or less, individually, with minimal interaction between them. It was perceived that the computer laboratory environment, with individual computers, didn't promote interaction. Tutors also reported that the perception amongst the students was that it was an individual project.

Student-staff engagement. In general, asking questions of their lecturers in UCC was dependent on the class size. Students tended to ask questions in smaller groups. Feedback from staff on, or conversations related to, assignments, was not common. When asked about their relationship with their lecturers, the relationship varied with class size (better relationship in a small class) and whether or not they had the same lecturer consistently for the 12 weeks. The students highlighted that the intimate setting in HIS II, with an individual tutor assigned to a small group of students, made it very comfortable to ask questions of their tutor. The tutors felt their relationship with the students was positive and two-way. In terms of the supportive learning environment, the students were clear that they did not want a different tutor each week, as this would decrease the quality of the relationship with the tutor: "I think one assigned is better because you develop a better relationship and you're a lot less hesitant to ask questions" (Student 3). However, they did indicate that occasionally it would be good to speak to a different tutor to gain a different perspective. The students were asked if having a tutor with subject expertise was important. All felt that the terminology in epidemiology was so specific, it was essential to have a subject expert. The students also felt that the subject expert helped them to begin thinking like public health professionals: "They kind of suggest ways of saying things better, like more of a public health way, like phrases etc." (Student 5).

Supportive learning environment. The students agreed that UCC provides support academically but it's not that easy to access: "I think it's there, but you do have to search for it like, it's not, you don't just fall across it, in like you have to feel like you really need it" (Student 5). The students felt that UCC doesn't accommodate people who commute long distances to the campus, or who work to support their studies. Support for sports and social activities was deemed excellent by the students. In terms of health, they did point out the early closures of some canteens, which forces students, studying late into the evening or taking night classes, into eating junk food.

Higher order thinking. The purpose of this module was to give students the skills to organise and synthesise ideas, analyse and interpret relationships, make judgements on information retrieved and to discuss these in the context of a chosen topic. Tutors were asked if the students understood this purpose. The consensus was that while some students understood, the majority were focused on the chosen topic: "I think they see it as the aim of their project, not as learning statistical methods, learning how to write a report, going through that process. They see it more as the topic that they have chosen" (Tutor 1). Critical analysis, organising and synthesising ideas, and making judgements about the value of information was found to be indigenous to the module and to the BSc Public Health degree as a whole. The tutors were asked if they felt the students could see the relevance of EH2007 HIS II for their Public Health degree. The opinion was divided with two tutors saying no, and two saying yes. However, the opinion was that the relevance was better understood at the end of the module: "[They] did actually by the end. At the start absolutely not. They were just trying to get through it…And then toward the end one of them said to me that, "…Oh you know I think I want to work in Health

Promotion more so than Public Health, but I can see that even like in Health promotion I'd probably end up having to write reports"…".

General learning outcomes. Attendance affected the general learning outcomes, i.e., acquiring job related skills, writing clearly and effectively, learning effectively on one's own etc. The tutors all agreed emphatically that they saw a considerable difference in the progress students made if they were good attenders or poor attenders. The students also felt attendance was important to their progress. One student said having the small group makes a difference as it encourages one to attend: "I think it's a lot better too with small groups, because if they were all big groups you're just a face in the crowd and you'd tend to probably not to go in as much" (Student 6). They also noted that the tutors in HIS II encouraged them to attend.

Technology. Regarding the use of technology, the students felt that they have enough of it: "we already have a lot of online stuff" (Student 1). When asked if they would like their degree to be online, the answer was a resounding "no". Student 1: "I think we need the face-to-face interaction".

Discussion

The ultimate goal of the scholarship of teaching and learning is to enhance student learning. Student engagement is widely recognised as being influential on student learning and achievement in higher education (Kahu, 2013, Krause and Coates, 2008, Bryson and Hand, 2007, Kuh, 2009). This study provides evidence that student engagement and learning is indeed enhanced by the addition of tutors in the computer laboratory lecture. In addition, students' attitude to engaging with their programme of study improved and their positivity towards learning increased as the term progressed. Evidence from the focus groups, the Irish survey of student engagement (ISSE) and the tutor post-lesson appraisals supports this assertion. Furthermore, there is evidence of an improved student experience and improved personal development that is highly valued by the students.

This study found that the students were unaccustomed to having a tutor present in their class and they were unsure how to use this new learning environment to their advantage. This has important implications for the future design of this module. In the current study the tutors were introduced after five weeks of the module, when the teaching focuses on data analysis and subsequently the completion of the project (see Appendix 6 for the project description). Introducing tutors earlier in the module may negate this finding, by giving the students the opportunity to develop a relationship with the tutor earlier.

The research findings show that students learned how to improve their interaction with, and utilise, the tutors as the term progressed. We know that with improved interaction comes improved engagement, and with improved engagement comes improved learning (Trowler, 2010). A key aspect of this was advance preparation for the class. The evidence shows that in general, students were not accustomed to preparing in advance for class, but for their HIS II module they found advance preparation necessary to make the most of their learning.

The students rated their tutors very highly with the majority, saying they understood the subject better after they interacted with their tutor. All of the students deemed subject expertise to be an important skill requisite for tutors. It is unclear if this finding would translate to all disciplines, but we know from the literature that the tutor's subject-matter knowledge is an important determinant of learning (Schmidt and Moust, 1995). We also know that tutors with expertise take a more directive role in class, speak more often and for longer periods, and provide more direct answers to students' questions (Silver and Wilkerson, 1991). This was the case in the current study, in which the students turned to their tutor for assistance rather than engaging with their peers. The students were very comfortable with their tutors and felt comfortable asking questions of them. They felt that the small group learning environment in HIS II was "intimate". We know from the literature that a non-threatening

atmosphere is an important characteristic of effective small group teaching (Steinert, 2004). This freedom to ask questions is not evident across the wider BSc Public Health degree programme. The students distinguished between the smaller and larger class groups. They reported that in large classes, which are a feature of their degree programme when they are taught alongside larger classes, e.g. in the Nutrition Module, they don't ask questions because the setting and the atmosphere doesn't permit it.

Tutor-to-student exchanges were more common than student-to-student. This was reported by both the tutors and the students. We know that if tutor-to-student exchanges dominate, then there is less student-to-student discussion, and this can jeopardise an important learning goal: the development of students' skills in active, self-directed learning (Silver and Wilkerson, 1991). This is borne out in the current study, with a low level of student-to-student interaction reported in the ISSE Active Learning index. Only half the students work with other students outside of class to prepare assignments, and less than half work with other students inside class. It was suggested by the tutors that the students may be afraid of breaching the plagiarism rules.

Analysis from the tutor focus group showed that the tutoring style changed as the term progressed. This implies that the tutors were perhaps inexperienced in tutoring. In this instance it was true, as just one of the tutors had tutored previously. Tutor training in advance of the term would thus be beneficial going forward with this module.

Tutors reported increased student learning, motivation, engagement, and expectations over the course of the module. Their positivity also increased. This change of attitude was attributed to a variety of causes. They became more aware of the purposes of the knowledge (categorised at an apprentice level in the purposes dimension of understanding in the TFU framework (Wiske, 1998)) whereby, with support they identified essential questions and used what they learned to solve practical problems. They were able to link the module and see the relevance of the content to their degree programme as well as to the broader public health discipline. The students were actively engaged in their own learning and devoted much time to the module. More than one third of students dedicated more time to this module than any other module. This finding emerged in both the post-module CAT and the focus group. The students also felt a sense of achievement as they progressed through the module, which motivated them to produce high quality work. The content and structure of the module, with the project as the culminating performance, lends itself to this. They initially found the module difficult, but the addition of the tutors to the class to assist them in the research process, guided them through this difficult stage. This finding emerged in their focus group upon completion of the module. In addition, in the module CATs while 11% of students had expected a pass grade at the beginning of the module, this decreased to 5% at the end of the module. There was a consensus amongst the tutors that the students who worked actively during all classes seemed more confident, but all students' confidence in their work improved as the term progressed.

Online learning for both undergraduate and postgraduate programmes is now a considerable part of education in many universities worldwide. UCC is no exception. Though this course is not online, all of the course notes are available online, which potentially encourages non-attendance. Despite this, according to the students in the study, attendance is of considerable importance and linked to one's success. Findings from the focus group with the tutors show that anxiety was related to attendance level, i.e., the more the student attended, the less anxious he/she felt, and the more positive about learning he/she became.

Student engagement is defined as, "the time and efforts students devote to activities that are empirically linked to desired outcomes of college, and what institutions do to induce students to participate in these activities" (Kuh, 2009). A key component of this definition is that it acknowledges that engagement is a concerted effort by both the student and the institution. In this respect, the students felt supported by their institution in their academic studies, some of the time. Several students

mentioned that critical thinking and independent thinking was encouraged. They identified very positive relationships with teaching staff, with 80% of students rating the staff highly for being available, helpful, and sympathetic. However, they did note that feedback on assignments and examinations was poor. The students mentioned a crisis with conflicting deadlines to such an extent that they were unable to devote the dedicated time needed to complete their HIS II work. This is a further lack of institutional support for the learning environment. This is significant given that we know that institutional policies, practices, and learning environments can encourage and support, or discourage and impede students in achieving their educational objectives (Davis and Murrell, 1993).

Findings from the CAT showed that the students' concept of engagement largely focused on time and their own effort, with significant numbers quantifying the length of time they spent on the module. Given that their grades reflected their expectations, the findings also suggest that their grades reflected their efforts.

In this study, the students report a high level of academic challenge, an important indicator of student engagement (Hamish Coates, 2007), in both their response to the questionnaire and in the focus groups. Nearly half of the class felt that they worked harder than they thought was possible. The students reported that their ability to succeed was related to having the tutors present in the computer laboratory. This finding was supported by the tutors when explored in the focus group. Findings from the post-module CAT and the focus group showed that the students found the module extremely challenging. One student reported "The assignment is challenging but very helpful and insightful in what is to come for the rest of the course or career". The sense, that they were satisfied with their achievement on completion of the module was also evident from the tutors.

Students were aspirational in the pre-module CAT and identified personal goals, knowledge goals and external goals. However, the focus in the post module CAT was on knowledge goals. Teaching at its best means not only transmitting knowledge, but transforming and extending it as well (Boyer, 1990:23-24). On exploration of this with the tutors in the focus group, they identified the pressure of the submission deadline for the project as a possible reason for this. They felt as the term progressed, the students become very focused on the deadline. They also suggested that the project weighting, 100% for the project, may be another contributing factor. There is scope for change in this aspect of the module in the future. Reducing the weighting and considering other assessment modalities are potential options.

This teaching takes place in a computer laboratory, a unique setting. There is no literature on the influence of this setting on student engagement, so this study is timely and worthwhile. As the lecturer on this course, I can give my personal account of the influence of the tutors on teaching and engagement. I have taught this course for 10 years and taken it through various morphisms - with no tutor, with one tutor and subsequently multiple tutors. With each iteration, student engagement improved. Without the tutors I had to try and problem solve the students' issues individually, as well as instruct the class. It was extremely inefficient and ineffective and progress on the course was slow. Tutors assigned to small groups allow me continue with the course, while the tutors assist the students with the various issues. Unfortunately, I had not embarked on the scholarship of teaching and learning in these early stages of the development of the course, so I did not evaluate the progressive impact the addition of tutors had.

This teaching methodology is potentially applicable to any discipline and any number of students. Further studies would need to be conducted to verify this. If we take the large class scenario, tutor support could only enhance the learning experience for both the teacher and the student. Implementing this in the traditional lecture style theatre would be challenging, as moving around in such spaces is extremely restrictive. If we consider the issue of institutional support to enhance student engagement, as discussed in this paper, then perhaps universal design for learning principles

need to be considered if we are to progress our teaching methodologies (Gordon, Meyer, & Rose, 2016).

The design of the EH2007 HIS II module, both in terms of structure and content was firmly based in real life, and appears to have been successful in meeting learning outcomes and facilitating student engagement. There is considerable evidence that the module changed students' attitudes and perceptions, and prompted them to increase their engagement, which in turn led to a more positive experience in university and increased their preparedness for working in the area of public health. Work integrated learning and career readiness, both inextricably linked, are both key indicators of student engagement (Kuh, 2009). The students were vocal in their acknowledgement that the module was relevant and applicable to their knowledge of public health and also to their future careers. They also mentioned the visible link between HIS II and their overall degree programme. The use of the Teaching for Understanding Framework (Wiske, 1998) to design the module, and the study of student engagement, both of which are underpinned by the constructivist tradition of education (Krause and Coates, 2008), allows for the students to make this connection to the real world setting. Evidence from the questionnaire, the CATs and the focus groups show that the students have been actively engaged in authentic work, as defined by (Blythe, 1998), and have been guided in the process of making connections between prior knowledge and new knowledge, to develop their understanding of public health.

Strengths and limitations

The convergent parallel study design, whereby the use of quantitative and qualitative approaches, in combination, provides a better understanding of the research problem than either approach alone, is a strength of this study. The study sample is small therefore we cannot generalise our results to the entire student population. However, by their definition, focus groups are small, therefore we feel that the information provided accurately represents the undergraduate experience with tutors in the computer laboratory lecture. Our students were all Public Health majors therefore caution should be applied when extrapolating the findings to other disciplines, though we have no reason for suggesting that the same findings would not be cross-disciplinary. It would be beneficial to elicit the opinions of students from other disciplines in future research. The outcomes measured through quantitative and qualitative methods are compared to national statistics, and not a prior HIS II offering without tutors. This was not possible and is a limitation of this study also. There are a number of sources of bias in cross-sectional surveys, including response bias and self-report bias. In terms of response bias, however all 23 students answered the ISSE so we do not feel that it is an issue in this study. Focus groups are also subject to a number of biases including selection bias. Students were randomly selected for their focus group however, and the tutor focus group included all tutors, thus negating selection bias.

Conclusions

In conclusion, the purpose of the study was to explore the effect of small group tutors on student engagement in the computer laboratory lecture. The evidence shows that student engagement and learning is indeed enhanced by the addition of tutors in the computer laboratory. We know that students' attitude to their learning, their motivation, and their engagement with the module increased as the term progressed. We also know that students' confidence in their ability and positivity improved over the term. Positivity and motivation, according to tutor reports, was related to attendance.

However, to capitalise on these findings and continue to improve student engagement, a greater number of tutors is required so the tutor-to-student ratio is decreased.

The constructivist tradition of education prevails, and students did learn through their own effort and active engagement with authentic challenges. However, the broader definition of engagement, where some of the responsibility for engagement resides with the institution has also been considered here, and while supportive in many aspects of the students' education, there is scope for further development in this area.

Acknowledgements

I would like to thank my two 'critical friends', Dr Fiona MacLeod and Dr Séamus Mc Monagle, who assisted me with feedback and friendship throughout this action research process.

Appendix

Appendix 1

EH2007 Health Information Systems II
Credit Weighting: 5
Semester(s): Semester 2.
No. of Students: Max 50.
Pre-requisite(s): None
Co-requisite(s): None
Teaching Method(s): 12 x 2hr(s) Lectures (and practicals).
Location: Computer laboratory
Module Co-ordinator: Omitted for blind review.
Lecturer(s): Omitted for blind review.
Module Objective: To provide an introduction to the use of information and communications technology in the management of health information and health knowledge, as a tool for self-directed and life-long learning in the context of Public Health practice and research
Module Content: Public health resources on the world wide web; Critically appraising the literature; Health information systems in practice; Electronic health records; Organisation of references using Endnote; Introduction to MS Excel; Introduction to SPSS
Learning Outcomes:
On successful completion of this module, students should be able to:

- Investigate the determinants of major diseases using Public Health resources on the world wide web
- Use appropriate Public Health websites to find aggregate level data on major diseases
- Manage their references using Endnote
- Analyse their data using SPSS
- Present their findings electronically using MS Excel and MS PowerPoint.

Assessment: Total Marks 100: Continuous Assessment 100 marks (Students must complete a Health Informatics Data Report 100 marks).
Compulsory Elements: Continuous Assessment.
Penalties (for late submission of Course/Project Work etc.): Where work is submitted up to and including 7 days late, 10% of the total marks available shall be deducted from the mark achieved. Where work is submitted up to and including 14 days late, 20% of the total marks available shall be

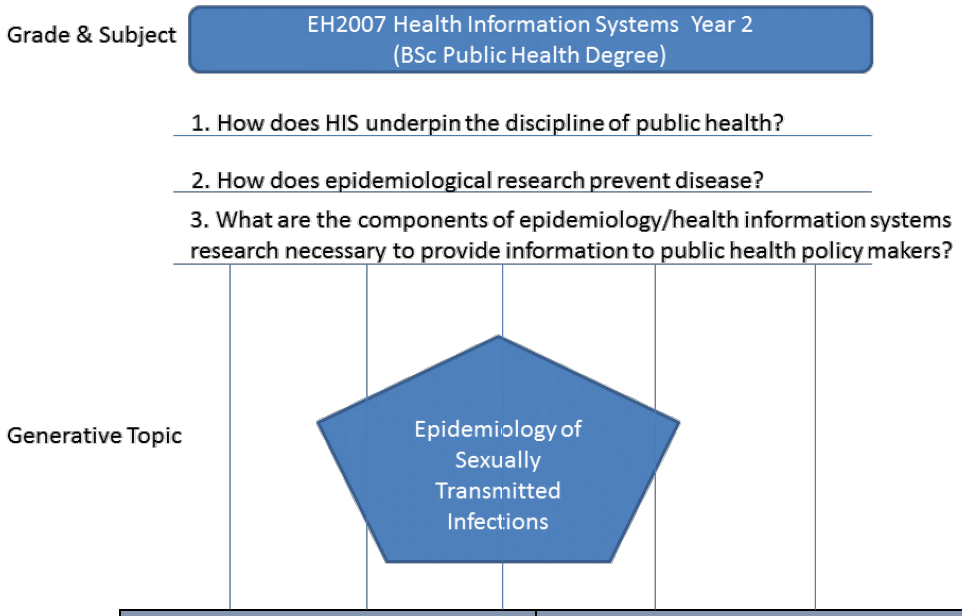
deducted from the mark achieved. Work submitted 15 days late or more shall be assigned a mark of zero.
Pass Standard and any Special Requirements for Passing Module: 40%. Formal Written Examination: No Formal Written Examination.
Requirements for Supplemental Examination: Marks in passed element(s) of Continuous Assessment are carried forward, Failed element(s) of Continuous Assessment must be repeated (as prescribed by the department).

Appendix 2. Teaching Plan for Semester 2 EH2007 Health Information Systems II

Semester 2	**Date**	Room	Topic
1	13 January	BHSC 101	Narrational Entry Point. DVD "And the Band Played On". Assign questions on DVD
2	20 January	WGB _G34	Searching the literature. Developing a focused research question. Assign end of term Public Health data report
3	27 January	WGB _G34	Searching the literature – electronic databases. Critiquing the literature
4	03 February	Boole Library Basement (Research Skills Training Rm)	EndNote Reference Manager Training – Compulsory.
5*	10 February	WGB _G34	Assign tutor groups. Introduction to Statistical Package for the Social Sciences (SPSS)
6	17 February	WGB _G34	SPSS continued.
7	24 February	WGB _G34	Referencing and supervised work on project
8	3 March	WGB _G34	Supervised work on project
9	10 March	WGB _G34	Supervised work on project
10	17 March	WGB _G34	No class on St. Patrick's Day
11	24 March	WGB _G34	Supervised work on project
12	31 March	WGB _G34	Supervised work on project

*Introduction of tutors to class

Appendix 3



	Understanding Goals	Understanding Performances	Ongoing Assessments
Introductory Performance(s)	1. Students will understand the relevance of systematic research in identifying the causes of disease 2. Students will understand the importance of critiquing sources of literature on the World Wide Web 3. Students will understand the importance of developing a focused research question	1. Through watching the DVD, "And the Band Played On", students will identify, discuss and debate the errors experienced in isolating the causes of HIV/AIDS 2. Focused questions provided to the students during the DVD will assist them in developing their understanding of the evolution and management of STIs, specifically, HIV/AIDS	1.Informal assessment through discussion in class 2. Informal assessment through guided discussion of the DVD question sheet provided
Guided Inquiry Performance(s)	Overarching goal for the mid-section of the course: Students will understand that their research question will guide their performance in designing, constructing, integrating, analysing, critiquing and concluding their research project.	Students will build toward achieving the understanding goal; 1. Students will plan/design their research project 2. Students will construct their research question – a subtheme of the generative topic 3. Students will review the relevant literature on their chosen topic and reference accordingly 4. Students will plan their analysis to answer their research question 5. Students will analyse the given STI dataset, with due consideration of their research question 6. Students will discuss their findings relative to their literature review and their research question 7. Students will evaluate if they have answered their research question	1. Cumulative informal teacher assessment through one-to-one feedback as they develop their project in class 2. Self-assessment relative to the project guidelines given 3. Self-assessment – have they answered their research question 3. Peer-assessment (feedback through working in pairs and/or groups as is permitted)

Culminating Performance(s)	**Learning Outcomes:** On successful completion of this module, students should be able to: 1. Investigate the determinants of major diseases using public Health resources on the world wide web 2. Use appropriate public Health websites to find aggregate level data on major diseases 3. Manage their references using Endnote 4. Analyse their data using SPSS 5. Synthesise their knowledge of HIS1, statistics, and HIS2 to construct a report on the Epidemiology of STIs in Ireland 6. Critique the relevant STI literature	Students will build toward achieving the understanding goals (learning outcomes) by: 1. Engaging with the project inside and outside class 2. Reviewing literature from peer reviewed sources as guided by the teacher 3. Analysing the dataset provided as guided by the teacher 4. Interpreting the results by integrating their knowledge of public health and epidemiology with their findings	Summative assessment. 100% research project on the Epidemiology of STIs in Ireland. The criteria for each performance will be: 1. Clearly defined research question 2. Relevant review of literature with peer-reviewed citations 3. Detailed statistical methodology with appropriate statistical techniques to answer the research question 4. Deductions from the analysis to produce relevant results 5. Appraisal of the findings, linked to the literature review. 6. References correctly cited using Harvard or Vancouver method.

Figure 1: Graphic of EH2007 Health Information Systems II module through TFU lens

Appendix 4

Pre-module CAT

1. What are your learning expectations for this module?
2. Having read the course outline and assessment for this module, how do you intend to engage with the module?
3. What grade do you hope to achieve?

Post-module CAT

1. What were your learning expectations/goals for this module?
1b. Did you achieve your learning expectations/goals for this module?
2. Have you engaged with this module, e.g., time research etc.?
3. In light of how you engaged with this module, what grade do you hope to achieve?

Appendix 5

Dear Tutors,
I am investigating the effect of tutors on the computer laboratory lecture. My research question is; has the use of tutors in the computer laboratory lecture effected student engagement in their learning
I wish to record your view on how the students in your group have engaged with their learning. Lectures have now finished, and we are focused on working on the project until the end of term. I will give you a sheet each week, and ask you to comment on the cues below, as well as any additional observations you would like to mention.

Can you comment on each of the following, during the class of [month, day]? Be specific as to the number of students that meet the criteria below.
1. There is evidence that the students spent time preparing for this class
2. The students are actively working on their project during class. Or the students are passive during class.
3. The students are positive when facing this course? Or perhaps the students are anxious and give up easily in the face of challenge.
4. The students are working hard to meet the lecturer's expectations for the module
5. The students interact with the lecturer during the class
6. The students ask questions of you, the tutor?
7. The students ask other students, questions?
8. The students contribute to group discussion/general discussion within the group?
9. The students are working to assist other students in the group?
10. There is evidence that the students are working with other students outside of class.
11. The students are motivated to learn and are actively working on the project during class
12. The students connect ideas from the course to prior experiences and knowledge
13. Compared to last week, have the students made progress in their work and (ii) in their attitude to their work? [Question asked after tutor's first week]
14. Please add any other comments you think may be relevant to the students' engagement in their learning for this module

Appendix 6

EH 2007 Assessment
Public Health Data Report
Theme: Epidemiology of STIs: analysis from a clinic sample
Title: Topic of your choice within this theme, using the STI dataset supplied to support your aim(s)

Part I – Introduction & Literature Review (30 marks)
Part II – Statistical Methods (15 marks)
Part III – Results (25 marks)
Part IV Discussion (15 marks)
Part V – Completion of Report (15 marks)

Pass Mark 40%

Your Data Report will be based on STI data from a STI clinic in Ireland. The data fields remain the same as those originally collected, but the data have been modified. The dataset will be supplied to you. The database contains data from 2005-2015. To view up to date STI data from Ireland, including HIV, go to the HPSC website. You will be asked to complete a data report which is similar to a peer-reviewed journal article. Your project should include the following sections:

- Introduction [200 words]
- Review of Literature [700 words]
    - Comprehensive review of international and local literature
- Statistical Methods [300 words]
    - Describe the SPSS and statistics you have chosen to conduct
- Results [500 words]
    - Describe and interpret the results from your SPSS. You may include up to **five** tables or figures.

- Discussion [800 words]
    - Discuss the results in the context of the background/literature review

The title for your report is, **"Epidemiology of STIs in Ireland 2005-2014"**. You are expected to provide a comprehensive review of the international literature in the area including the most up-to-date findings. You will find there is a lot of literature on this topic. In general, when we are presenting the Irish case, the review of literature will start with general/historical information, world scenario, European scenario, Irish scenario. Articles should be from trustworthy **peer-reviewed sources** and be referenced correctly. Articles should be no older than 10 years, unless giving historical context. Websites, e.g., WHO, are suitable for providing up to date incidence and prevalence but are not allowable for literature review, in general, because the material is not peer-reviewed.

The report should be typed in Font Size 12 Calabri and Line Spacing should be 1.5 Times. Referencing **MUST** be conducted in EndNote, and according to the Harvard or Vancouver system with a **minimum of 20 and a maximum of 40 references**. The project should **not exceed 2,500 words**. Please go to the website for the Journal of Epidemiology and Community Health for further details on referencing which can be located under the "instructions for authors" section.

Submit your assignment via Turnitin. Please also submit one stapled copy (do not put it in a plastic folder) of your assignment in the Assignment Drop Box outside the Dept. of Epidemiology and Public Health office by 4pm on Friday 17th April 2015. The penalty for the late submission of your final project has been outlined in your syllabus.

You are not allowed to collaborate with other students on this assignment and plagiarism will not be tolerated.

Appendix 7

Table 2: Findings for student engagement: academic challenge index

Questions		Response Options	2nd Year BSc PH (%)	*All Students (%)
In this academic year, how often have you	Worked harder than you thought you could to meet teacher/tutor's standard expectations	Never	14.3	13
		Sometimes	33.3	42.1
		Often	47.6	33.2
		Very often	4.8	11.7
In this academic year how much has your coursework emphasised the following intellectual activities	Analysing the basic elements of an idea, problem, experience, theory, such as examining a particular case or situation in depth and considering its components	Very little	0	4
		Some	4.8	23.6
		Quite a bit	81	42.9
		Very much	4.3	29.5
	Organising or synthesising ideas information or experiences into new, more complex interpretations and relationships	Very little	0	7.9
		Some	19	30.0
		Quite a bit	61.9	39.2
		Very much	19	22.9
	Making judgements about the value of information, arguments or methods, e.g., examining how others gather and interpret data and assessing the soundness of their conclusions	Very little	0	9
		Some	19	29.8
		Quite a bit	42.9	37.2
		Very much	38.1	24

	Applying theories or concepts to practical problems or in new situations	Very little	0	6.6
		Some	38.1	25.1
		Quite a bit	57.1	37.3
		Very much	4.8	31
To what extent does your institution encourage	Spending significant amounts of time studying and on academic work	Very little	0	3.3
		Some	35	21
		Quite a bit	50	46.9
		Very much	15	28.8
During the current academic year, approximately how many	Assigned textbooks, books, book length packs, or journal articles of subject readings have you read	None	9.5	10.2
		1-4	38.1	33.2
		5-10	33.3	20.8
		11-19	9.5	12
		>20	9.5	23.8
How many hours do you spend in a typical 7-day week doing each of the following	Preparing for class, e.g., studying, reading, writing, doing homework, lab work, analysing data, and other academic activities	None	0	3
		1-5	42.9	34.7
		6-10	23.8	23.4
		11-15	14.3	15.1
		16-20	9.5	10.2
		>20	9.5	13.6

**All students include Undergraduates Year 1, Undergraduates Year 4 and Postgraduate students.*

Table 3: Findings for student engagement: active learning index

Questions		Response options	2nd Year BSc PH (%)	*All Students (%)
In your experience at your institution, during the current academic year, how often have you done each of the following	Asked questions or contributed to discussions in class, tutorials, labs or online	Never	9.5	5.6
		Sometimes	57.1	43.6
		Often	9.5	30.1
		Very often	23.8	20.6
	Worked with other students inside class to prepare assignments	Never	9.5	12.2
		Sometimes	47.6	32.9
		Often	33.3	36.4
		Very often	9.5	18.5
	Worked with other students outside class to prepare assignments	Never	4.8	22.4
		Sometimes	42.9	33.5
		Often	47.6	28.8
		Very often	4.8	15.3
	Tutored or taught other college students	Never	90.5	67.4
		Sometimes	9.5	23.1
		Often	0	6.9
		Very often	0	2.7
	Discussed ideas from your coursework with others from outside class	Never	4.8	6.8
		Sometimes	28.6	35
		Often	57.1	36.7
		Very often	9.5	21.6

**All students include Undergraduates Year 1, Undergraduates Year 4 and Postgraduate students.*

Table 4: Findings for student engagement: student-staff interactions index

Questions		Response options	2nd Year BSc PH (%)	*All Students (%)
In your experience at your institution, during the current academic year, how often have you done each of the following	Discussed your grades or assignments with teaching staff/tutors	Never	28.6	32.3
		Sometimes	57.1	44.9
		Often	4.8	16.6
		Very Often	9.5	6.3
	Discussed ideas from your coursework or classes with teaching staff outside class	Never	52.4	49.8
		Sometimes	47.6	36.5
		Often	0	10.5
		Very Often	0	3.2
	Received timely written or oral feedback from teachers/tutors on your academic performance	Never	22	18.1
		Sometimes	65	46.3
		Often	5	27.1
		Very often	10	8.5
Which of the following have you done, or do you plan to do before you graduate	Worked on a research project with a staff member outside of coursework requirements	Do not know about	28.6	24.2
		Have not decided	38.1	22
		Do not plan to do	19	32.8
		Plan to do	14.3	15.3
		Done	0	5.7

All students include Undergraduates Year 1, Undergraduates Year 4 and Postgraduate students.

Table 5: Findings for student engagement: enriching educational experiences index

Questions		Response Options	2nd year BSc PH (%)	*All Students (%)
During your current academic year, how often have you done each of the following	Used an online learning system to discuss or complete an assignment	Never	9.5	14
		Sometimes	23.8	22.8
		Often	33.3	26.2
		Very often	33.3	37
	Had conversations with students of a difference ethnicity/nationality than your own	Never	0	10.4
		Sometimes	23.8	31.6
		Often	61.9	30.9
		Very often	14.3	27.1
	Had conversations with students who are very different to you in terms of their religious beliefs, political opinions or personal values	Never	9.5	13.3
		Sometimes	42.9	37.5
		Often	38.1	28.1
		Very often	9.5	21.1
Which of the following have you done, or do you plan to do before you graduate from your institution	Internship, fieldwork or clinical placement	Do not know about	14.3	15.5
		Have not decided	23.8	17.8
		Do not plan to do	4.8	22.3
		Plan to do	57.1	30.2
		Done	0	14.2
		Do not know about	9.5	15.1

	Participate in a study group or learning community	Have not decided	38.1	20.8
		Do not plan to do	28.6	26.3
		Plan to do	14.3	18.2
		Done	9.5	19.6
	Study a foreign language	Do not know about	19	10.1
		Have not decided	28.6	13.9
		Do not plan to do	28.6	41.6
		Plan to do	19	17.2
		Done	4.8	17.2
	Study abroad or student exchange	Do not know about	4.8	10.8
		Have not decided	38.1	17.6
		Do not plan to do	23.8	44.1
		Plan to do	23.8	20.3
		Done	9.5	7.2
	Independent study e.g. outside of your course	Do not know about	4.8	8.8
		Have not decided	28.6	20.3
		Do not plan to do	28.6	19.9
		Plan to do	33.3	33.5
		Done	4.8	17.5
About how many hours do you spend in a typical 7-day week doing the following	Participating in extracurricular activities, e.g., organisations, clubs and societies, sports etc.	None	38.1	46.2
		1-5	28.6	33.1
		6-10	19.0	12.6
		11-15	9.5	4.5
		>15	4.8	3.6

**All students include Undergraduates Year 1, Undergraduates Year 4 and Postgraduate students.*

Table 6: Findings for student engagement: supportive learning environment index

Questions		Response options	2nd Year PH BSc (%)	*All Students (%)
Which box represents the quality of relationships with people at your institution?	Relationships with other students	Unfriendly, unsupportive, sense of alienation	0	1
		2	0	2
		3	5	4.2
		4	0	10.3
		5	45	19.7
		6	30	24.0
		Friendly, supportive, sense of belonging	20	38.9
	Relationships with teaching staff	Unavailable, unhelpful, unsympathetic	0	1.4
		2	5	4
		3	10	8.8
		4	5	17.9
		5	45	26.1

		6	30	20.4
		Available, helpful, sympathetic	5	21.5
To what extent does your institution encourage each of the following	Providing the support you need to help you succeed academically	Very little	5	6.9
		Some	40	30.7
		Quite a bit	30	41.5
		Very much	25	21
	Helping you cope with your non-academic responsibilities e.g., work, family	Very little	40	41.5
		Some	35	33.6
		Quite a bit	10	17.8
		Very much	15	7.2
	Providing the support you need to socialise	Very little	35	33.1
		Some	35	35.4
		Quite a bit	25	22.7
		Very much	5	8.7

**All students include Undergraduates Year 1, Undergraduates Year 4 and Postgraduate students.*

Table 7: Findings for student engagement: work integrated learning index

Questions		Response options	2nd Year BSc PH (%)	*All Students (%)
In your experience at your institution, in the current academic year, about how often have you done each of the following	Blended academic learning with workplace experience	Never	57.	35.4
		Sometimes	33.3	29.1
		Often	4.8	21.4
		Very often	4.8	14.2
Which of the following have you done, or do you plan to do, before you graduate from your institution?	Industry placement or work experience	Do not know about	0	11.3
		Have not decided	4.8	11.9
		Do not plan to do	0	13.6
		Plan to do	95.2	36.1
		Done	0	27.1
	Improved knowledge and skills that will improve your employability	Never	4.8	6.4
		Sometimes	33.3	30.9
		Often	52.4	40.9
		Very often	9.5	21.8
Has your experience in your institution contributed to your knowledge, skills and personal development in the following area?	Acquiring job related or work related knowledge or skills	Very little	0	11.7
		Some	35	30.5
		Quite a bit	60	34.1
		Very much	5	23.7
	Explored how to apply your learning in the workplace	Never	19	15.7
		Sometimes	52.4	32.9
		Often	23.8	33.4
		Very often	4.8	18

**All students include Undergraduates Year 1, Undergraduates Year 4 and Postgraduate students.*

Table 8: Findings for student engagement: higher order thinking index

Questions		Response options	2nd Year PH BSc (%)	*All Students (%)
During the current academic year, how much has your coursework emphasised the following intellectual activities?	Organising and synthesising ideas, information or experiences into new more complex interpretations and relationships	Very little	0	7.9
		Some	19	30
		Quite a bit	61.9	39.2
		Very much	19	22.9
	Making judgements about the value of information, arguments or methods, e.g., examining how others gather and interpret data and assessing the soundness of their conclusions	Very little	0	9
		Some	19	29.8
		Quite a bit	42.9	37.2
		Very much	38.1	24
	Applying theories or concepts to practical problems or in new situations	Very little	0	6.6
		Some	38.1	25.1
		Quite a bit	57.1	37.3
		Very much	4.8	31
	Analysing the basic elements of an idea, problem, experience or theory, such as examining a particular case or situation in depth and considering its components	Very little	0	4
		Some	4.8	23.6
		Quite a bit	81	42.9
		Very much	14.3	29.5

**All students include Undergraduates Year 1, Undergraduates Year 4 and Postgraduate students.*

Table 9: Findings for student engagement: general learning outcomes index

Questions		Response Options	2nd Year PH BSc (%)	*All Students (%)
Has your experience in your institution contributed to your knowledge, skills and personal development in the following area?	Acquiring job related or work related knowledge and skills	Very little	0	11.7
		Some	35	30.5
		Quite a bit	60	34.1
		Very much	5	23.7
	Writing clearly and effectively	Very little	5	10.5
		Some	25	29.4
		Quite a bit	40	38.1
		Very much	30	22
	Speaking clearly and effectively	Very little	0	12.1
		Some	20	30.5
		Quite a bit	45	36.8
		Very much	35	20.6
	Thinking critically and analytically	Very little	0	3.7
		Some	10	19.7
		Quite a bit	35	41.9
		Very much	55	34.7
	Analysing quantitative problems	Very little	0	10.3
		Some	30	29.5

		Quite a bit	55	37.2
		Very much	15	23
	Using computing and information technology	Very little	0	10.6
		Some	15	24.5
		Quite a bit	50	32.8
		Very much	35	32.2
	Working effectively with others	Very little	0	6.5
		Some	25	24.7
		Quite a bit	60	39.7
		Very much	15	29.1
	Learning effectively on your own	Very little	0	6.2
		Some	35	23.7
		Quite a bit	60	40.3
		Very much	5	29.8

**All students include Undergraduates Year 1, Undergraduates Year 4 and Postgraduate students.*

Table 10: Findings for student engagement: general development outcomes index

Questions		Response options	2nd Year PH BSc (%)	*All Students (%)
Has your experience in your institution contributed to your knowledge, skills and personal development in the following area?	Understanding yourself, e.g. self-reflection	Very little	20	14.3
		Some	25	28.5
		Quite a bit	45	33
		Very much	10	24.3
	Understand people of other racial, ethnic or national backgrounds	Very little	10	20.5
		Some	55	31.6
		Quite a bit	35	28.3
		Very much	0	19.6
	Solving complex real world problems	Very little	5	15.3
		Some	40	32.8
		Quite a bit	45	32.8
		Very much	10	19.1
	Developing a personal code of values and ethics	Very little	5	19.6
		Some	45	31.5
		Quite a bit	40	30.1
		Very much	10	18.8
	Contributing to the welfare of your community	Very little	20	33.3
		Some	25	34.5
		Quite a bit	35	21.2
		Very much	20	11.1
	Voting in local, or national elections or referenda	Very little	40	53.8
		Some	40	24
		Quite a bit	15	13.7
		Very much	5	8.4

**All students include Undergraduates Year 1, Undergraduates Year 4 and Postgraduate students.*

Table 11: Findings for student engagement: career readiness index

Questions		Response Options	2nd Year BSc PH (%)	*All Students (%)
During the current academic year, about how often have you done the following?	Spent time keeping your CV up to date	Never	28.6	32.7
		Sometimes	42.9	37.7
		Often	23.8	19.8
		Very often	4.8	9.9
	Thought about how to present yourself to potential employers	Never	4.8	17
		Sometimes	61.9	35.9
		Often	19	31.8
		Very often	14.3	15.3
	Explored where to look for jobs relevant to your interests	Never	19	18.6
		Sometimes	38.1	35.7
		Often	28.6	29.4
		Very often	14.3	16.3
	Used networking to source information on job opportunities	Never	28.6	30.5
		Sometimes	38.1	34.1
		Often	23.8	23.3
		Very often	9.5	12.2
	Set career development goals and plans	Never	33.3	24.7
		Sometimes	52.4	35.9
		Often	9.5	25
		Very often	4.8	14.4

**All students include Undergraduates Year 1, Undergraduates Year 4 and Postgraduate students.*

Table 12: Findings for student engagement: overall satisfaction index

Questions	Response Options	2nd Year BSc PH (%)	*All Ireland (%)
Overall, how would you evaluate your entire educational experience at your institution?	Poor	0	4.1
	Fair	5	17.4
	Good	55	51
	Excellent	40	27.6
Overall, how would you evaluate the quality of academic advice that you have received?	Poor	5	6
	Fair	20	24.3
	Good	50	50.9
	Excellent	25	18.8
If you could start all over again, would you go to the same institution?	Definitely no	0	4.1
	Probably no	15	13.4
	Probably yes	45	41.4
	Definitely yes	40	41

**All students include Undergraduates Year 1, Undergraduates Year 4 and Postgraduate students.*

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The First Year Colloquium: Creating a Safe Space for Students to Flourish

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Abstract: College is one of the most formative times in an individual's life. Its intense living-learning environment can promote students' extreme self-confidence and positive development, or alternatively, can result in low levels of well-being. The first year in college is an opportunity for faculty and staff to engage with students to help them build learning skills, a sense of responsibility, and ownership of their college experiences. The aim of this study was to examine the impacts of a first year colloquium on student well-being. In the fall of 2015, 91 entering first year students at Georgetown University in Washington, DC, participated in a mixed method study using written reflection responses and in a pre/post survey using Keyes (2009) Mental Health Continuum-Short Form (MHC-SF). Gains were seen in psychological well-being with an increase in flourishing as compared to early semester moderate flourishing. Students reported that having one course that provided a safe space for them in their first semester, and that addressed well-being in college, was critical for them to succeed and thrive in their first year.
Key words: college students, flourishing, well-being, first-year experience

Introduction

For young American adults, their college years represent the most formative and formidable transition of their lives, and a time of great excitement, personal growth and learning. It is also a time when many young people experience anxiety, stress and a decreased sense of personal well-being (Eagan, et al., 2015; American College Health Association, 2015). An abundance of research has shown how important the first-year experience is for the development of not just academic and intellectual skills but for the formation of the students' emotional, social, physical and spiritual well-being (Upcraft and Gardner, 1989; Padgett, 2011; Bowman, 2010). Consequently, the first year presents an important opportunity for faculty and staff to engage with the students and help them build life-long cognitive and learning skills, a sense of responsibility and altruism, as well as critical life skills (Pascarella & Terenzini, 2011; Padgett 2011).

Over the past three decades, the vast majority of accredited US universities and four-year colleges have recognized this opportunity and have introduced first-year seminars as a tool to improve the transition and learning experience of new college students (Padgett & Keup, 2013). Research has shown that seminars taking a holistic approach, addressing academic and non-academic topics, have the largest impact on students' academic success and personal well-being (Swing, 2002; Barefoot, 2005). About 60% of first year seminars offered in the US take this whole-person, student-centered approach (Tobolowsky & Associates, 2008). Multiple studies have looked

at the impact of first-year seminars on student outcomes, including student retention and graduation rates, academic achievement, and life-long learning orientations, demonstrating the positive impact of these courses on key educational outcomes (Cuseo, 2009; Padgett, Keup & Pascarella, 2013).

One area that has not been studied in depth is the role that first-year seminars can play in fostering student psychological well-being, a more holistic measure of student success (Ryff & Singer, 2008; Bowman & Kitayama, 2009). Ryff identifies self-acceptance, positive relations with others, autonomy, environmental mastery, purpose in life, and personal growth as facets of well-being. According to the World Health Organization (WHO), 'mental health is defined as a state of well-being in which every individual realizes his or her own potential, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to her or his community' (WHO, 2014). First year seminars may be uniquely well positioned to address these key elements and to inform programs about students' needs and to assess the impacts of first year programming through pre-post-design (Seifert, 2005).

According to the 2015 NCHA survey (ACHA, 2015), undergraduate students reported that over the preceding 12 months, anxiety, sleep difficulties, depression and stress had a negative impact on their academic performance: 23.4% of students identified anxiety as affecting their academic work, 14.8 % depression, 22.0% reported negative impacts from sleep difficulties, and 32.5% of students perceived stress as a major factor negatively influencing their studies (ACHA-National College Health Assessment, 2015).

The Gallup-Healthways Well-Being Index (Rath & Harter, 2010; Sears et al., 2014) is an evidence-based instrument that provides a comprehensive description of what it means to be thriving. It identifies five elements that have been validated against community outcomes such as life expectancy, income, and mortality rates (Gallup-Healthways, 2009.) The five elements that describe the interplay among many aspects of life are: (1) having a sense of purpose (liking what you do each day); (2) social well-being (relationships and love in your life); (3) financial well-being; (4) community engagement; and, (5) physical well-being. The Gallup-Purdue Index measures these five well-being elements in college graduates with findings that only 11% of all U.S. college graduates are thriving in all five elements of well-being: (1) having a sense of purpose (liking what you do each day); (2) social well-being (relationships and love in your life); (3) financial well-being; (4) community engagement, and, (5) physical well-being. According to Gallup, more than one in six college graduates are not thriving in any of these elements. These measures of well-being are significant, since they influence vital outcomes such as worker productivity, absenteeism and healthcare costs (Gallup, 2015). Gallup has found that if college graduates felt emotionally supported during college, the odds that they are deeply engaged in their work doubled, and the odds that they are thriving in their overall well-being tripled. There appear to be very strong correlations between the experiences students have while in college and their success, fulfillment and overall well-being later in life. Having at least one professor who made them excited about learning, feeling that professors cared about them as a person, and having a mentor who encouraged their goals and dreams were the three most important elements in the graduates' college experience relating to their well-being and thriving later in life (Brandon Busteed, Executive Director of Education & Workforce Development for Gallup, Georgetown University, May 24, 2016).

Well-Being and Flourishing in College

Findings about well-being show the essential role that colleges and universities, and particularly faculty and staff, can play in supporting students' well-being during their college years and their capacity to thrive later in life. It is our hypothesis that holistic, student-centered first-year seminars can serve as an ideal entry point to create a nurturing and emotionally supportive environment for

new students, one that allows them to build meaningful relationships with fellow students, faculty, and academic advising staff.

The concept of human flourishing describes a multi-faceted state of well-being. The act of flourishing has been described as "liv[ing] within an optimal range of human functioning, one that connotes goodness, generativity, growth, and resilience" (Fredrickson and Losada, 2005). Keyes (2007) developed the Mental Health Continuum-Short Form (MHC-SF) to measure well-being or what he describes as "flourishing" or positive mental health. Flourishing, the optimal state of mental health and well-being, is at the positive end of this mental health continuum. Languishing is found at the opposite end. Languishing can be defined as the "absence of mental health" (Keyes, 2002), but not necessarily a state of mental illness.

The MHC-SF has been included in the toolkit of the Bringing Theory to Practice (BTtoP) national imitative that encourages and supports colleges and universities to address well-being as an essential component of student engagement, civic purpose and preparation for a meaningful life. It is a 14-item self-rating assessment tool that combines the three components of well-being: emotional, social, and psychological. The MHC-SF recognizes that mental health is critical to student success. The MHC-SF aligns with the WHO definition of mental health and provides an assessment of positive mental health as more than the absence of mental illness but, rather, as the presence of high levels of emotional, psychological, and social well-being (WHO, 2014).

Low (2011) examined first-year college students using Keyes (2007) MHC–SF. She found 69.1% of students flourishing, 29% moderately mentally healthy, and 1.9% languishing. These results demonstrate greater flourishing than in Keyes' 2006 study, which found 47.9% of high school students flourishing but only 20% of the general adult population (Keyes, 2005). Low also suggests that students entering highly-selective higher education institutions may be more likely to be flourishing.

First-year seminars can provide a safe space for young adults to practice how to reflect on and talk about their experiences, to explore their personal and academic strengths and weaknesses, to build personal relationships with faculty and staff, and to develop social and psychological well-being skills. In fact, self-reflection and mindfulness play crucial roles in the development of psychological well-being skills such as "having a sense of purpose in life," "accepting and thinking positively about oneself," and "seeking opportunities for personal growth" (Bowman, 2010). Reflection can also serve as an effective tool for emotional self-regulation (Herwig, 2010).

Recognizing its crucial role in students' flourishing, Georgetown University's School of Nursing & Health Studies developed a small, interdisciplinary First Year Colloquium (FYC), which explicitly focuses on student well-being. The different sections of the course address various health topics chosen by the course faculty, including college health issues, health disparities, bioethics, scientific theory, and end-of life care. The overall goal of the course is to ease the students' transition to college, and to equip them with the tools necessary for academic and personal success. The FYC is taught across all four majors (Global Health, Health Systems Administration, Human Science, and Nursing), allowing students to get to know each other across departments and to work in interdisciplinary teams. Each of the seven sections (16-18 students each) is co-taught by one faculty member and one member of the academic advising staff.

The goal of the FYC is to introduce new students to the programs, resources, and opportunities offered on campus, including the Career Center, Counseling and Psychiatric Services (CAPS), Academic Resource Center, and Campus Ministries. Students learn about time management and academic enrichment opportunities, health careers, internships, and study abroad programs. All sections include weekly discussions about students' common concerns, such as managing the transition to college, and student health issues. Several of the sections offered anonymous emotional intelligence testing (EQI) to the students, followed by a class discussion led by an expert from

CAPS. Each section also organizes co-curricular activities such as a walk through the school's historic neighborhood, a major league baseball game, or a community-service project. Specific goals include those experiences identified by Ryff (Seifert 2005), including promoting interaction and meaningful connections among students, professors, and academic advising staff, positive diversity interactions and moments of "challenge" between faculty and students, as well as developing reflective practices as a way to foster students' well-being and to promote student learning.

Methods

Design and Participants

This mixed-method design study, using qualitative and quantitative assessment, examined the impacts of the FYC on dimensions of students' flourishing and well-being in the Fall semester of 2015. The university's Institutional Review Board approved this study (IRB 2015-1016).
All students enrolled in the FYC were invited to participate. The FYC is a required course for first-year students and students do not self-select to enroll. The Fall 2015 cohort included 22% male and 78% female students. The cohort' cultural/ethnic background was 19% Asian, 10% Black or African American, 10% Hispanic, 7% two or more races and 54% White. In terms of their academic ability, the students accepted that fall had performed at 96.2 Percentile High School Rank, had a middle 50% SAT in CR of 640-750, and a middle 50% SAT in Math of 650-740, with a, 20% acceptance rank to the program.[1]

Students younger than 18-years-of-age and those not giving consent were excluded from the study. Of the 115 students enrolled, 91 completed pre and post surveys. The majority of the 115 students enrolled in the FYC completed four reflections and gave written consent to have their reflections included in the study (1st Reflection: N=92; 2nd Reflection: N=89; 3rd Reflection: N=63; Final Reflection: N=70). To analyze the qualitative data, the students' reflections were coded and analyzed thematically.

Instruments

Keyes Mental Health Continuum—Short Form (MHC-SF) (Keyes, 2006) was used to measure flourishing. A total flourishing score was calculated, as were individual sub-scores for emotional, social, and psychological well-being. Categorical criteria were followed to determine mental health diagnosis. MHC-SF data was collected using Qualtrics.

As part of the FYC curriculum, all students were asked to write three reflections throughout the semester (in September, October and November), as well as a final reflection at the end of the semester. All seven sections shared the same reflection topics and used similar pedagogical techniques. First, the students had the opportunity to answer the prompt anonymously in class, using an electronic polling mechanism (www.polleverywhere.com). The results appeared instantly as a word cloud for everyone to see, which triggered an in-class discussion of the question and the students' responses. After the discussion, students had the opportunity to either write their personal reflections in class or at home, and to share them on their section's e-portfolio site. The final reflection of the semester was completed individually and only shared with faculty and advising staff. The three common reflections were:

[1] Academic ability stats are regarding the accepted students that year

1. What are you most anxious or fearful about as you begin the semester? What are you most excited about or looking forward to as you begin the semester?
2. What are the obstacles preventing you from being your best self? Are there changes you need to make? What will you do differently?
3. What is your definition of success for yourself this semester? How are you doing in meeting this definition? What has been helpful?

The end of the semester reflection prompt asked the students to reflect on at least two of the following questions:

1. Connection: Describe an experience this semester when you made a meaningful connection between different things you are learning about well-being and your own life—a connection about which you had not previously seen the significance. Why was that particularly meaningful to you?
2. Relationships: Describe the person(s) and/or moment(s) this semester that has most contributed to your learning with regard to perspectives or persons about whom you previously knew little. Why and how has that person, group, or time been so important to your learning?
3. Challenge: Describe a time this semester when you encountered a significant challenge or obstacle to your own sense of your well- being. What happened, and what did you learn from that difficulty?
4. Self-Awareness: What about your experience in this course was meaningful for you personally or has mattered to you most? Tell us about that.

Findings

Using quantitative data from the pre- and post FYC survey of 91 students (out of the 115 freshmen who took the class) as well as qualitative data from the four written reflections, this study explores the question whether the FYC provided a safe space for new students to verbalize their thoughts, concerns, and questions. The data clearly shows that for the students, their weekly colloquium class was a place where they felt safe and comfortable sharing their positive as well as negative experiences as first semester college students with each other, their professors and academic deans.

In the pre-post survey, students were asked whether they agreed or disagreed with the statement: 'This class is a safe space to verbalize questions and concerns.' Scores ranged from 1 (Strongly Disagree) to 4 (Strongly Agree). The students took the survey at the beginning of the semester and then again at the end of the semester. In the beginning of the semester (3rd week of class), the mean score reported was 3.37 (SD 0.61). At the end of the semester (last week of class), the score reported was 3.59 (SD 0.52). Using a paired samples t-test, the difference of 0.22 had a p-value $< .001$, showing that students increasingly felt that their colloquium class was a safe and comfortable environment to talk about their experiences and to ask questions about life at Georgetown.

This survey result is also very much supported by the qualitative data. The thematic analysis of the students' reflections reveals a lot about the students' experiences throughout the course of their first semester. They write about their expectations, hopes, fears, doubts, struggles, successes, failures, and overall physical and psychological well-being. They reflect on who they are as a person and who they hope to become during the four years ahead. They challenge themselves to not only be better students academically but better people in the social and emotional care of themselves and others. Their experiences as first-year students are remarkably similar: most students struggle to balance their academic work and their extracurricular activities; they long to find their niche on

campus and to establish meaningful relationships; they try to come to terms with the reality that they are no longer at the top of their (high school) class; they learn how to navigate a new environment far away from parents and friends; and they begin to take full responsibility for their own physical and mental health. Many students identified getting enough sleep, missing home, feeling lonely, making new friends, and dealing with anxiety and stress about their academic performance as the key issues they struggled with while transitioning into college. The following reflection contains many of the key themes addressed by the students:

> "I know many people say the transition to college is difficult, but I did not realize just how difficult it would be until I arrived on campus. Being away from home and my family took a toll on me—it wasn't necessarily just the unfamiliarity but adjusting to college in general. I missed my friends back home terribly. Because I am a naturally introverted person, being outgoing and making new friends is not easy for me. As a result, I felt lonely and like an outsider at the beginning of the school year…. Furthermore, the academic system was new and stressful—unlike high school. I learned that there are only a few exams and/or papers a year in college. I realized that if I made a mistake one time, it would be almost impossible to recover my grade. This made me extremely fearful, even before my academic classes began. While a little stress can be good to motivate someone to work hard, I realize now that the stress I felt was so great that it actually made me *more* unproductive. That level of stress took a toll not only on my mental and emotional health, but also on my physical health, for I began to eat less, exercise less, and lose sleep." (Final student reflection #64, FYC, December 2015)

The FYC was specifically designed to help ease this transition, to reduce anxiety and stress, and to provide students with the tools to flourish in college – both academically and in their personal lives. In their reflections, many students write about the positive impact the FYC had on their adjustment to college. Overwhelmingly, they see the class as a safe space to verbalize their concerns, to ask questions, and to discuss their positive as well as negative experiences during their first semester in college. The positive assessment of the FYC reported in the quantitative survey results is compellingly echoed in the students' reflections. The following quote reflects the views expressed by many of the students:

> "This course has made me lose the feeling of intimidation from my classmates. I have struggled and so many of my classmates are on the same boat. The anonymous polls at the beginning of class made me realize that although everyone here works hard, college was not an easy transition for everyone in some aspect.… I really hope that other students can benefit off of this open and safe environment, where the instructors truly care about their students…. Overall I just developed a sense of comfort from this course." (Final student reflection #1, FYC, December 2015)

The main themes raised in this reflection are recurring in many others, including the realization that all students are experiencing similar challenges and anxieties, and the recognition that their university, and particularly the FYC, is a truly caring and supportive environment. As another student reflects:

> "I think the most outstanding fact of this course for me was learning how many people there are that are offering themselves and their services to me as a resource while I'm studying and living here on the [campus]... This course has shown me that on our campus especially, there is a sense of a caring community looking out for your best interests." (Final student reflection #4, FYC, December 2015)

Many students commented positively on the pedagogical tools used to engage the class in discussions about their feelings and experiences, particularly the use of anonymous electronic polls (www.polleverywhere.com) to kick off class discussions on student well-being:

> "I really liked the anonymous online polls we did during some classes. It allowed my peers and me to be honest and open because it was anonymous, so I felt like I was really getting privilege to see people's true responses to pretty hard-hitting questions about stress, anxiety, and adjusting to college life in general. That was really eye opening for me because I did not feel alone in my homesickness and other feelings of doubt (I'm not smart enough to be here, only I am having difficulty settling in and finding people I like, etc.) and I found that a lot of other people in my colloquium were facing similar challenges. So I think the online polls were a great vehicle for discussion and learning as far as my first semester of college and freshman experiences go." (Final student reflection #8, FYC, December 2015)

> "Hearing that it was okay to be overwhelmed, stressed, and even unhappy at times was very meaningful to me since I have always been under the impression that exhibiting any of these feelings was akin to showing weakness. It was as if something was wrong with you if you felt stressed out or unhappy because everyone else had it all figured out. Seeing the poll everywhere questions and understanding that many other people were facing similar challenges and having struggles of their own helped me realize that no one's life is truly perfect and that it never has to be." (Final student reflection #29, FYC, December 2015)

Similarly, the students appreciated the important role that reflection played in the course and how it allowed them to become more self-aware and mindful about their experiences. Learning how to reflect and doing it regularly in class helped them to cope with many of the stressors they experienced and provided them with a useful tool for the remainder of their college career and beyond:

> "My favorite aspect was the reflections. I never encountered a course before that asked so much deep thinking and soul searching. I learned more about myself, my goals, and my approach to life in this course than I ever have before. I am not usually one to self-reflect, and I certainly didn't think I would have the time to do so outside of classes, let alone during our weekly sessions. These discussions helped me open up to my friends and start those conversations outside of class too. It made my experience much better overall." (Final student reflection #11, FYC, December 2015)

> "In the beginning of our colloquium class, we have a time to reflect on the past week, and each of us are encouraged to talk about whatever highs or lows we have experienced within the past week. During this part of class, I have learned a lot about myself and others, whom I previously knew little about. Some people were very open to sharing whatever their stressors were or how they were doing for the week. Through this activity, I learned not only about their lives, but I also learned about myself. I learned that I too was very open and comfortable sharing whatever got me high or low throughout the week. I also learned that I found the support of a group helpful. Many people could relate to my lows, and it made me happy to share my highs." (Final student reflection #17, FYC, December 2015)

> "I think the focus on reflection was the most meaningful aspect of the class to me…. I feel like I've changed a lot as a person because of this course without realizing it. I'm much more in tune to how I am feeling and I can strategize ways to confront and deal with those

> emotions…. Reflecting on our experience transitioning to college and then discussing it with the class was extremely valuable to me too…. People shared many different ideas on what to do in certain situations and we all felt very comfortable to talk. I've seen this translate into my everyday life. The biggest change I've noticed about myself since coming to college is that I'm so much more open to expressing my feelings and thoughts to people." (Final student reflection #21, FYC, December 2015)

> "Before college, I never saw the significance of mental health. Back in high school, I worked all the time and never designated some time for myself to rewind and reflect. This semester in this class, I learned the concept of reflection and why it is important. Because of reflection, I am able to get a deeper understanding of "who I am" in the sense of my contribution to the rest of the world. Also, reflection aids my mental health by allowing me to realize the positive change that occurs in my life. (Final student reflection #62, FYC, December 2015)

Feeling comfortable and safe in a class with fellow students, professors, and academic advising staff helped the students to form meaningful relationships and to overcome many of the challenges they encountered during their first semester in college. As we know from the recent Gallup study, the correlations between experiences students have in college and their success, fulfillment, and overall well-being later in life are strong. In the Gallup study, forming positive mentoring relationships with professors and other adults on campus was the most important element in the graduates' college experience relating to their well-being and thriving later in life (Busteed, 2016). The FYC is designed so that students very early on in their college career get the opportunity to connect on a personal level with a faculty member and an academic advisor. The weekly discussions and co-curricular activities are opportunities for students, faculty and academic advising staff to get to know each other and to share their personal experiences in a low-stress, grade-free environment.

The qualitative data shows that the First Year Colloquium clearly supported the students in their search for overall physical, emotional, social, and psychological well-being during this time of transition:

> "This class was extremely applicable to my life this semester as the course material was directed toward the wellbeing of college freshmen. It gave me a safe outlet where I felt comfortable to share my true feelings and allowed be to shamelessly receive advice from my peers and professors. We learned about sleep, study habits, relationships, and more. These were all very helpful topics during my transition into college." (Final student reflection #27, FYC, December 2015)

> "I think the most meaningful aspect of this course for me was having an emotional outlet to others that are sharing my experience. As a lot of kids in my class are all pre-med and experiencing the stress and workload that I am, it is very comforting to hear how they go through life and cope with the same things I deal with… Because of this class, I have sparked some new friendships that I really do hope last. Also, I feel very comfortable knowing that my instructors are there for me if I ever need anything. This alone means a lot to me." (Final student reflection #31, FYC, December 2015)

> "The most meaningful part of this course for me was just the open discussion…. It helped me form bonds and meet other NHS students but more importantly it really helped in my transition… Also, our instructors were so kind and made us feel like a family. All of my

> friends in other schools were jealous when I tell them that we have a class like this. It was a really worthwhile experience for me, personally." (Final student reflection #30, FYC, December 2015)
>
> "My instructors put my fears about college and the future aside because they have made it a point in class to show that no one has it all together all of the time, even though it may look like it. We are all people going through our own journeys. They have provided a network of support and an environment in which I am safe to express myself, and it is one of the first times that I have ever felt like this in my life." (Final student reflection #35, FYC, December 2015)
>
> "The part of this course which was most meaningful for me personally was the fact that I felt like I left the class with a personal relationship with my professors and peers in the class…. Hearing the shared experiences that the other students in my class have had during their first semester humanized my class of 2019 and made me realize that there were other students who were all struggling with the same difficulties. Also, my professors were humanized in the same way because the class was small enough where they could all get to know each of us, at least by name. This made me feel more like an individual, and I felt validated as the person I am." (Final Student reflection #58, FYC, December 2015)

The students' overall positive assessment of the FYC demonstrates that the class's conscious emphasis on student well-being was a success. The different components and pedagogical tools used in the course – reflections, polls, discussions, group projects, visits from health professionals and academic resource persons, as well as joint co-curricular activities – all contributed to achieving the overall course goal: to ease the students' transition into college and to equip them with the tools necessary for academic and personal success.

The positive impact the class had on the students' overall adjustment and well-being is also reflected in the quantitative data. During the pre-post survey, students were asked to rate their mental well-being using the Mental Health Continuum Short Form (MHC-SF). The results show that the students' psychological well-being improved throughout the course of the semester and that overall, there was an increase in the number of students who were 'flourishing,' and a decrease in the number of students whose mental health was only 'moderate' (Table 1).

Table 1. MHC-SF Scores for All Students with both Pre and Post scores (N=91) (Revised)

	Pre		Post		
	Mean	SD	Mean	SD	Difference
MHC-SF Emotional Well-Being (max = 15)	12.20	2.34	12.10	2.50	-0.09
MHC-SF Social Well-Being (max = 25)	14.96	4.76	15.18	4.82	0.22
MHC-SF Psychological Well-Being (max = 30)	21.64	4.87	22.79	5.12	1.14**
MHC-SF Total (max = 70)	49.18	10.10	50.58	10.80	1.40†
% Flourishing	55.29		61.17		5.88***
% Moderate	42.35		36.47		-5.88***
% Languishing (n=2)	2.35		2.35		0.00

†$p < .10$. *$p < .05$. **$p < .01$. ***$p < .001$.

Note: Paired samples t-tests (confirmed results using Wilcoxon signed rank tests since not a random

sample – got same significance levels) for all statistical testing except for flourishing categories for which chi-square was used

The qualitative data supports the survey findings, with many students explicitly linking the FYC to their psychological well-being:

> "Particularly in an environment like [our university], where there is a big culture around pretending to always be put-together, the things which we discussed helped us to learn that it is okay to be challenged by your mental well-being, and that there are resources on the campus that you can reach out to. This course helped me to overcome that challenge of placing my mental well-being as a priority." (Final student reflection #58, FYC, December 2015)

> "This semester in our first-year colloquium class we talked a lot about the idea of balance. To be a successful college student you can't just focus on academics, you should also engage in extracurriculars, meet new people, take time for yourself, etc. And this idea of balance also ties into your well-being. In order to be healthy you need to consider not just your physical health, but also your social and mental health." (Final student reflection #70, FYC, December 2015)

> "Overall, I believe this course was very beneficial to my growth here [on campus]. This course provided me with life-long skills that I know will benefit my effectiveness as well as my mental health." (Final student reflection #62, FYC, December 2015)

Discussion

The percentage of students flourishing from pre- (early in the semester) to post- (end of semester) survey increased from 55% to 61%. Although not statistically significant, this finding does demonstrate a trend that students increased their wellbeing. The area of psychological well-being did show significant gain from the pre- to post-survey. These gains were reported in spite of the fact that the closing of the semester comes with increased workload and stress. The end of the first semester of college is generally thought of as a time of well-being challenges due to these academic pressures and the social challenges of first year college life. At a time when well-being would seem likely to decrease, having a place for students to belong and feel safe may be responsible for the reported increases in well-being among FYC students.

The flourishing prevalence among the FYC students was higher than that found in an adult (ages 25-74) population (Keyes, 2002) but is consistent with that found in a group of American adolescents (Keyes, 2006). It is lower, however, than the prevalence found by Low (2011) in students entering their first year of college. Low (2011) postulated that students just entering college might have higher levels of flourishing due to the unique position of this transitional time in life that is often consistent with feelings of excitement and high expectations. It should be noted though that Low studied the students during orientation week and not during the course of the semester as we did, which might account for the higher percentage of students flourishing, as orientation is typically an exciting time before the actual academic work has begun. Keyes' (2002) population, in contrast, was typically older, had less than sixteen years of education, and was/had been married (Keyes, 2002). These distinctly different demographic variables may account for such a prevalence difference. Further research will be needed to unfold the difference found in our levels of flourishing and those in the work of Low (2011). Improvement in flourishing over the course of the

first semester of college, and in particular the psychological subscale of flourishing has not been found in any previous reported research. This may be noteworthy as addressing well-being in first year college students during the time of transition may lead to a more engaged college student and a thriving adult later in life. Further research of these students over time should be conducted.

Current literature holds that social well-being is an essential component of mental wellness and that what is most important in social functioning is how social interactions and feelings impact the mindset of the individual (Keyes & Shapiro, 2004). However, it has been suggested that social wellness measures may be weaker predictors of overall wellbeing due to their partially "external" nature (Adams, Bezner & Steinhardt, 1997). Indeed, although social wellness encompasses a private or "internal" component of an individual's mental state, it also uniquely holds a public or "external" component that is distinct from other realms of wellness (Adams, Bezner & Steinhardt, 1997). Other studies have emphasized the importance of relationships and interpersonal interaction and acceptance in mental health outcomes, especially citing the importance of "belonging" (Chow, 2010; Karademas, 2005; Baumeister & Leary, 1995). Thus, further research should examine how college students in particular are affected by social versus emotional or psychological states of being. Furthermore, if sub-diagnoses can be generated for the subcategories of the MHC-S, this tool could be used to further determine whether there are certain components of flourishing or wellness that are more or less related to academic factors in the lives of college students.

Our findings that students found a safe space in the FYC confirms the research that safe spaces enhance academic skill development by increasing self-awareness, expanding perspectives, and facilitating communication skills (Holley & Steiner, 2005). Clearly, creating a space where first year students feel they belong is powerful for their academic and personal growth. A supportive college environment along with a sense of belonging has been identified as predictors of mental health in college (Fink, 2014) and beyond (Busteed, 2016).

Limitations

Limitations include our sample size and that all participants were from a single institution. Also, due to the fact that all freshmen in this cohort participated in the FYC it was not possible to compare our results with results from a control group. Further measures of student well-being should be employed in future research, since solely using the MHC-SF to measure well-being is likely limiting. Measures of belonging, self-knowledge, and other impacts of the first-year experience should be considered to assess well-being.

Conclusion

Our study results show that the FYC's emphasis on student health and well-being resulted in an overall positive experience for our first-year students, who felt safe and supported throughout their first semester in college. To them, the FYC was a place to unwind, to trust, to connect, and to reflect. It helped many of them to improve their social and mental well-being. The demonstrated increase in psychological well-being and flourishing validates that the FYC's explicit focus on these aspects of the first year experience can help foster overall student success, and contribute to their well-being later in life. As noted in the introduction, only 11% of all U.S. college graduates are thriving in all five elements of well-being and more than one in six college graduates are not thriving in any of these elements (Gallup 2016). Gallup's research shows a very strong association between the experiences students have while in college, and their success, fulfillment, and overall well-being later in life. If college graduates felt emotionally supported during college, the odds that they were thriving in their overall well-being tripled (Gallup 2016). By providing our students with a wellness

centered First-Year Colloquium experience, we are offering them the emotional support needed to help them achieve academic success as well as overall well-being throughout their college years and beyond. Based on our research results, we believe that our wellness-centered course design offers a model that can provide the emotional support so crucial for students to succeed and thrive in college and later in life.

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Cultivating a Process Approach to Writing: Student Experiences in a Developmental Course

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Abstract: Many developmental writing courses in colleges focus on teaching students isolated skills, with little emphasis on how such skills are applicable to the actual process of writing. This article focuses on capturing the perspectives of students enrolled in a developmental writing course designed around an explicit process-oriented pedagogy. The instructor assigned metacognitive tasks and aimed to be transparent with students about the purpose of all course activities and assignments. The findings point to the various ways students can learn to value and use a process approach when writing. The paper concludes with recommendations for helping both instructors and institutions foster a process-oriented writing culture in college classrooms. It also points to future research possibilities.

Keywords: developmental writing, metacognition, transparency, writing studies, college writing

One assumption many faculty members might make about the act of writing is that students view and treat it as a recursive process. As a review of research on college writing reveals, the habits, skills, and actions associated with the writing process, such as planning, considering audience and context, researching, drafting, and revising, are key aspects of successful writing in college classrooms (Beaufort, 2007; Council of Writing Program Administrators, National Council of Teachers of English, & National Writing Project, 2011; Cox, 2009; Rose, 2012). However, many students begin college not recognizing the need for a robust process-oriented approach to writing.

Researchers have found that very often college students do not approach writing systematically and instead rely on methods of writing that they have used in the past, neglecting to take ownership over their own learning (Ambrose, Bridges, DiPietro, Lovett, & Norman, 2010). Conley (2005) found that when students enter college, they often do not allot much time and effort to working on writing assignments. He argued that this was in part because students often have been taught by high school teachers who have little time to provide feedback on student writing and often must stress formulaic approaches to writing due to standardized writing rubrics. Unfortunately, if students do not recognize the need for a process-oriented mindset and approach to college writing, it seems unlikely that they will be equipped to navigate the complex writing demands of college classrooms.

Such limited views about writing seem likely to be prevalent in students who are deemed to be academically underprepared when they enter college (Rose, 2012). These students often participate in developmental or remedial education programs (Grubb & Gabriner, 2013). The programs often include coursework created to help students develop college level reading, writing, and math skills. According to the Community College Research Center (2014), "Federal data indicate that 68 percent of community college students and 40 percent of students at open-access four-year colleges take at least one remedial course" (p. 1). Unfortunately, Grubb and Gabriner (2013) found that many developmental reading, writing, ESL, and math classrooms emphasize a "remedial pedagogy" approach in which the emphasis is on teaching isolated skills, such as grammar and punctuation, with limited focus on how such skills are applicable to other contexts (p. 52). This kind of pedagogy is unlikely to help students adapt a flexible, process approach to writing. Developmental writing courses are an excellent place to set the stage for students to begin rethinking their beliefs about and approaches to writing. Students can then build upon this learning throughout the remainder of their education.

This article uses aspects of a larger qualitative research study I conducted (Pacello, 2015). It focuses on a developmental writing course I taught. The original study drew upon teacher-research, phenomenological, and case study research traditions (Cochran-Smith & Lytle, 1993; Creswell, 2007). It examined the ways students in a developmental writing course discussed developing their beliefs about and approaches to writing. It also explored how they articulated using what they learned when they wrote for other courses. Using portions of that study, this article addresses the following research question: In what ways (if any) does taking a developmental writing course designed around an explicit and transparent process-oriented pedagogy help students alter their beliefs about and approaches to writing? To address this question, I analyzed the ways students articulated how specific assignments, activities, and other elements of the course's overall design helped them develop as writers.

Theoretical Framework

Researchers from the fields of literacy, writing studies, and developmental education have argued that students can benefit from being taught to rethink some of their prior writing beliefs. For instance, Rose (2012) explained that a central goal he had when teaching developmental writing courses was to "change the model of writing my students carried in their heads" (p. 137). Students need to learn about the recursive qualities of effective writing. As Downs and Wardle (2007) have found, students often perceive writing largely in terms of drafting, neglecting to consider the "larger series of events" of the writing process such as exploring ideas and researching (p. 563). Students also do not always recognize how essential revision is to effective writing. Downs (2015) contended that students often associate it with poor writers. He asserted that they need to be taught that revising is "a sign and a function of skilled, mature, professional writing and craft" (Ch. 4.4). This understanding can help students recognize that writing takes a great deal of time and attention and that even experienced writers partake in a complex process that includes extensive revisions (Downs, 2015). Instructors can play a pivotal role in helping students "revise their writing process" (Rose, 2012, p. 137).

Developmental writing courses are often not designed in ways that foster a process-oriented mindset in students. Rose (2012) has asserted that there are "deep-rooted erroneous beliefs about learning that shape most remedial programs" (p. 12). He explained that very often such courses emphasize a "skills-and-drills" approach (p. 126). Alternative approaches are necessary. Grubb and Gabriner's (2013) work speaks to this need. They discussed a large-scale qualitative research study examining developmental education classrooms, including writing courses. Their findings suggested that a writing process pedagogy, as opposed to a "remedial pedagogy" approach, is more effective in helping students to develop the recursive, process-oriented mindset so crucial to mastering the skills and habits of college writing (Grubb & Gabriner, 2013, p. 52). The researchers have discussed this approach in detail, explaining that it often includes "first, brainstorming ideas, then writing freely without undue concern for correctness, and then a crucial process of revision and editing (sometimes by peers or peer groups, sometimes by instructors) and creating multiple drafts" (p. 96).

Although writing textbooks sometimes discuss writing in terms of process, the complex, recursive dimensions of composing still might not be evident to students unless a course is designed to have them directly experience this process and reflect upon it. The course under study was designed with the assumption that concrete guidance and practice can help students reexamine their prior beliefs and influence their writing approach.

Methodology

Instructional Approach

I explicitly designed the course to foster in students a process-oriented writing approach. This design was consistent with concepts about writing instruction that have been promoted by a variety of researchers and educational organizations (Council of Writing Program Administrators, et al., 2011; Grubb & Gabriner, 2013). I also consciously sought to be transparent with the students about my rationale for all assignments and activities. Winkelmas (2013) has found that transparency in classrooms can enhance learning by helping students better understand the purpose of assignments and how they are connected to the goals of a course. Each major assignment was sequenced over several weeks. To emphasize the writing process, this sequencing included explicit discussions of each stage of the writing process, generating ideas through freewriting, raising questions about assignments, conducting research, and discussing the various purposes of and contexts for different types of writing. When I incorporated instruction in grammar and/or punctuation into the course, I emphasized that this knowledge was an important tool of the writing process that could help students make their writing more audience centered and easy to read.

Various forms of formative feedback were built into the course design. For instance, students needed to provide feedback to each other in small groups. This aspect of the course was designed to help students develop the ability to consider whether their meaning is clear to a reader, emphasizing writing "as a form of communication among people and as the expression of ideas" (Grubb & Gabriner, 2013, p. 96). The rationale for this requirement was shared with students, emphasizing what role reader input can play in the writing process. Clear guidelines were given for how to provide helpful feedback, including beginning with a positive statement and giving concrete feedback.

Additionally, students submitted their final assignment to the college's online tutoring service, which was staffed by professional tutors. This requirement was enacted to help students become more conscious of a process approach to writing. After submission, students received emailed feedback on their work from the tutoring center. This approach was aligned with prior research showing that developmental courses can provide students with a valuable form of assistance when they integrate meaningful interactions between students and support services such as tutoring (Callahan & Chumney, 2009; Grubb & Gabriner, 2013).

After this stage, students had a short conference session with me to discuss their plans for integrating the feedback into their finished product. During that conference I also helped students prioritize what they should focus on during the revision stage of the writing process. Similar to the peer feedback sessions, students were given a clear rationale for why this task was included in the course and how it related to the writing process. I explained to them that I designed the tutoring and conference requirement with the intention of introducing them to a resource they could use as part of their writing process for all their coursework.

An integral strategy incorporated into the course was reflective tasks aimed at improving student metacognition and helping them become conscious of their evolving writing process. As Ambrose et al. (2010) have asserted, two crucial dimensions of metacognition are the ability to monitor one's learning and the ability to reflect on and evaluate one's learning. In the reflective blogs that students wrote for the course, they articulated the steps they took as they approached the assignments and what they believed they had learned about their own evolving approaches to writing. They also assessed what they believed they still needed to work on as writers. Students also created an electronic portfolio collection of their own work. On the welcome page of their portfolio, they introduced the written work they completed in the course and presented their thoughts about what they had learned about writing by producing these written artifacts.

Research Site and Participants

The study was conducted at a private urban college in the Northeast. The institution operated on a quarter system and offered Bachelor's and Associate's degrees. The focus of the study was on two non-credit developmental writing classes, which I will refer to as Developmental Writing. They met for four credit hours per week. The maximum number of students for all developmental courses was twenty. For at least half of those hours, the classes met in a computer lab. Students were required to take this course based on the results of the ACCUPLACER exam, which determined whether they needed developmental coursework in reading, writing, and/or math. Students needed to complete the course with the overall grade of C or above.

For this paper, I focused on the perspectives of six of the eight student participants who participated in the study. The participants that I included spoke most directly to the paper's research question. One participant was drawn from a course section I taught in the summer of 2013. The other participants were drawn from a section I taught in the fall of 2013. The limited number of students helped me to get an in-depth understanding of student experiences because I was able to closely examine multiple forms of data revolving around the participants. I asked students to volunteer to be in the study via email after they had completed the course and received a final grade. They were provided with detailed consent forms, and I explained to them the purpose of the study. The participants selected represented the range of ages of many developmental classrooms and their majors reflected several of the college's degree programs. All participant names are pseudonyms. Information was derived from student self-reporting. See table 1.

Table 1. Participants

Name	Age	Major
Adam	18	Information Technology
Amesha	22	Business Administration Management
Bruno	24	Business
Dana	38	Health Management
Gideon	33	Business
Heidi	21	Fashion Marketing and Management

Data Collection and Analysis

The study drew upon both phenomenological and case study traditions in qualitative research. Consistent with phenomenological traditions, interviews were the primary mode of data collection as I gathered student perceptions of taking the course. This method was guided by Patton's (1990) notion that "qualitative interviewing begins with the assumption that the perspective of others is meaningful, knowable, and able to be made explicit" (p. 278). Additionally, I drew from case study traditions by collecting extensive data in the form of field note reflections and observations of my own experiences in the classroom and written work students produced during the developmental course (Creswell, 2007). This process helped me triangulate the data because the various sources of information I collected enabled me to corroborate and enrich what I learned from participants during the interviews (Creswell, 2007).

My role as both the instructor and the researcher was aligned with Goswami and Stillman's assertions about teacher research, "Teachers know their classrooms and students in ways that outsiders can't" (as cited in Cochran-Smith & Lytle, 1993, p. 19). As their instructor, I developed a

rapport with participants that might not have been possible if I were a stranger. I explained to them that their honest responses to the interview questions would be helpful to me and other professors who were aiming to improve the design of writing courses. I was also able to document in a researcher journal important observations I made as the course unfolded.

Using three different data collection strategies, I asked participants at three different times what they believed were some of the writing habits and skills necessary for success in college. The first of these data sources was a writing inventory given to students in the class at the beginning of the quarter in which they took the course. Participants were also asked a question about their beliefs during the first interview, which was conducted shortly after they had completed the course. Finally, they were asked a variation of this same question during the second interview, which took place during the second half of the quarter after they had completed the developmental course. Participants were also asked questions about which assignments and activities from the developmental course they believed helped them become better college writers.

I also gathered short reflective blog posts students wrote throughout the course about their own writing process. In discussing documents as a form of data, Merriam (1998) has explained that "because they exist independent of a research agenda, they are nonreactive, that is, unaffected by the research process" (p. 126). When participants produced the documents I analyzed, they were still enrolled in my class, and thus not yet specific participants in the study, so their comments on these sources were not affected at all by the participants' knowledge that they were part of a study.

Finally, the welcome page of the electronic portfolio was a data source that helped me to understand what participants felt they had learned through taking the course. This short written assignment happened at the end of the quarter, so it was helpful to give me insight into their experiences with the course as it came to a close. I used the data that emerged in the electronic portfolios and reflective blogs as forms of comparison and contrast to the ways students discussed their writing process during the interviews.

During data analysis, I engaged in a process of coding and "discovering themes and subthemes" (Ryan & Bernard, 2003, p. 85). To arrive at these themes, I used a combination of the views and language of the participants ("emic") and my own interpretive perspective ("etic") on the phenomenon under study (Creswell, 2007, p. 72). As part of the coding process, I engaged in a process of peer debriefing to help me refine my thinking about what was emerging in the data (Creswell, 2007). Using various forms of data helped me to interpret the nuances of the phenomenon of students' rethinking their prior writing beliefs and evolution of their writing processes through course participation. All in all, multiple methods were used to maximize the validity of the findings. These methods included triangulation of data, a researcher journal, and peer debriefing (Creswell, 2007; Miles and Huberman, 1984).

Findings

An important element of this study was to examine the ways participants discussed a range of assignments, tools, and structural aspects of the course in relationship to their emerging or evolving understanding of writing. The findings pointed to the multiple ways students might be taught to acquire process-oriented beliefs and approaches to writing. This section is arranged around several prominent themes that emerged during data analysis about the course design and how it helped foster a process-oriented mindset in participants.

Writing As a Means of Thinking Through Ideas

Adam, Amesha, Dana, and Gideon discussed the ways elements of the course design helped them perceive writing as a process of thinking about and exploring ideas. For instance, during his first interview, Adam described the blog tasks as giving him "the freedom to bring your idea to life." Likewise, Amesha described working on her ePortolio welcome page as giving her the opportunity to "explore" and "expand" her ideas. Also connected to the idea of writing as a means of thinking, Dana explained during her first interview, "I think [freewriting is] a good writing tool" because "eventually you find you get a[n] idea that you could really develop" when you do it. She also stated that freewriting can help generate thoughts which can then "evolve."

Gideon most vividly discussed the course in relationship to the notion of writing as a process of thinking. He explained during the first interview:

> One of the things I enjoyed about the class first of all was the fact that you had time to think and write stuff through. My impression was always, of writing was…write this now…I came into the class with those expectations…I always thought writing was you kind of have an assignment pushed in front of you and you write it there and you are timed.

Based on his account about his prior experiences with writing compared to his experiences in the class, it can be inferred that the way the writing assignments were designed in the course, moving sequentially and over several weeks, seemed to challenge Gideon's prior writing experiences and the beliefs about writing which they engendered. Like some of the other participants, on the writing inventory he completed at the beginning of the quarter, there was no evidence that he believed writing is a recursive process. His responses on that document indicated his belief that "proper grammar and punctuation are key elements to being a successful college student." In contrast, his interview response suggested a significant shift in perception in which he was linking writing to thinking.

Writing in Stages

Bruno and Dana provided strong evidence of how the course activities emphasizing the stages of the process helped influence their beliefs about writing. For example, Bruno reported that it was helpful to require students to submit first drafts due prior to the deadline for submitting the final product because "You can improve, so it's not just one grade and you're out. So, you can always improve." He appeared to value the role of drafting and then revising in the writing process.

Like Bruno, Dana discussed the way the overall design of the course helped her learn to value the stages and habits of process-oriented writing. For instance, on her first reflective blog post after having taken her first major writing assignment for the class through all the stages of the writing process, she discussed what she had learned about herself as a writer, explaining, "I realized in writing it is beneficial to write in steps or sections, it is a process." Later in the quarter on her portfolio welcome page when she was asked to write a reflection on her learning in the course, Dana wrote that she had learned to apply the writing process to various written tasks. She explained:

> I have employed the techniques [of the writing process] when writing the works enclosed in my e- portfolio… As the weeks elapsed this quarter, the process became easier to engage, and I observed my writing got more grammatically accurate and the flow of my content seems more logical. In writing my last essay, I found that I kept going back to the process, and realized that revising is critical in writing.

Dana's comments focused not only on the grammatical components of her writing, but also on the flow and logic of her writing. Her comments also suggested a growing awareness of the importance of revision. Because she discussed these ideas in relationship to what she believed the course had helped her attain, it was evident that she viewed her development as being connected to the course's writing process emphasis.

Peer Feedback and the Writing Process

Several participants connected the peer feedback workshops to their evolving approaches to revising and proofreading their work because they were able to look at their writing from the perspective of a reader. For instance, Heidi felt that the process was helpful because "other people could see…if something could be added or something could be taken away." Elsewhere in the data, on a reflective blog post Adam stated that having peers review his writing helped him "perfect my writing even more." Additionally, on his second blog post, Gideon wrote, "The fear I used to have for my writing not being clear and concise has been replaced by enthusiasm to see what people think of my ability to write." His comment suggests that the feedback sessions helped him to value receiving reader input on his work.

Dana's commentary provided an interesting contrast with the perspectives of several other participants because she focused on the role of the feedback provider. She discussed some of the benefits of reviewing her classmates' work and providing them feedback. She explained that the activity was helpful because she had the chance to "see how others write." She also indicated that through providing feedback, a writer can become more "mindful" of her own mistakes. Building on this idea in the first interview, she explained:

> So now I'm conscious [of] the leaving of time so that I could proofread the essay because you know from reading [the work of others], you know there's words in there or the sentence's structure…That's not the way the person speaks, so you know it had to be an error. Had they read it prior to submitting it, they would have caught it.

Dana's comments suggest that she perceived providing feedback to others helped her become more aware of the need to engage her own work attentively. It seemed obvious to her when work had not been carefully reviewed, thus reinforcing the value of having a process-oriented mindset about writing.

Online Tutoring and the Writing Process

Several participants explained that the online tutoring service helped raise their awareness of writing issues they had not known about or had overlooked. For instance, Bruno, a non-native English speaker, explained that he liked having his mistakes pointed out to him that he had not been able to detect on his own, especially because "the punctuation in English and Portuguese is different." Heidi reported that the tutor helped her find "many mistakes I didn't even realize." Elaborating, she explained that the tutor helped her understand when her final assignment was "using too much information" from the research and not enough of her own ideas. Dana articulated on her third blog post that using available resources is an important part of becoming a better writer. She explained, "Getting into the habit of having a critical eye review and comment on the paper will only streamline and crystalize your view point." In these instances, participants appeared to believe that the service played a valuable role in assisting them with editing and revising, important aspects of a process approach to writing.

Discussion

Multiple participants were able to articulate how specific assignments, tasks, and other elements of the course design helped them develop a process approach to writing. The explicit and transparent way the course activities were designed and the emphasis on metacognition and reflection likely played a role in helping students develop an awareness of the evolution of their writing skills. The concrete emphasis on the process of writing also seemed to help participants recognize the connections between writing and exploring ideas. These findings are important because research has suggested that students sometimes misperceive why their professors assign certain kinds of activities and assignments (Cox, 2009). As Ambrose et al. (2010) have asserted and this study further affirms, effective instruction should include transparently emphasizing what is valued in the classroom and why. Transparency can aid in both short and long-term learning (Winkelmes, 2013).

The explicit discussions in the class about why each stage of the writing process is valuable for effective written communications across contexts, the short metacognitive reflective writing tasks, and the frequent use of the language of writing process likely helped participants perceive the importance of the approach. This awareness could be beneficial to students because it can help them begin to become conscious of using a systematic and strategic approach to writing. As Beaufort (2007) has contended, students encounter a variety of genres, practices, and tasks across disciplines and classes. If they do not begin developing a process-oriented mindset and approach early in their education, they are unlikely to be able to effectively navigate the diverse writing expectations of college courses.

The peer feedback sessions appeared to play a pivotal role in helping students develop a process-oriented approach to writing. It was beyond the scope of this study to analyze the quality and usefulness of feedback students receive from their classmates versus the quality of feedback they receive from other feedback resources such as their professors or tutors. However, regardless of the quality of feedback provided, there is a value to students participating in peer feedback workshops because doing so helps them consider their writing from the perspective of a reader. It also helps instill in them the idea that writing goes through multiple stages of development that includes receiving formative feedback.

It was also evident in the data that the online tutor feedback requirement helped multiple participants experience writing as a recursive process as opposed to something that happens quickly and without stages of development. These findings are important because, as Conley (2005) has found, many students begin college with limited knowledge of the time and effort it takes to complete writing assignments. The tutor feedback element of the course underscored Downs's (2015) assertions about the centrality of revision to effective writing. It also equipped students with a feedback tool they could continue to use beyond the developmental course.

Recommendations

Recommendations for Instruction

Although this study focused on a stand-alone developmental writing course, many of the following recommendations are applicable to a variety of writing course formats, including supplemental support programs that link developmental work to credit-bearing first-year composition courses. Instructors teaching first-year students how to write for college should repeatedly emphasize the idea that writing is a process regardless of the context. They should also engage students in discussions and activities focusing on how writing tasks, practices, and genres will often vary significantly across disciplines and classes. When faculty members acknowledge such variations in college classes, they can help students recognize that the recursive dimensions of the writing process can be flexibly applied

to the composition process across courses. Students might otherwise perceive the writing process as being applicable only to their writing class.

In order to emphasize and make the writing process concrete and to give students practice applying it, written assignments should be transparently built around recursive writing stages. The process should include time for students to receive feedback from a variety of sources (peer, tutor, and instructor). Faculty should share their rationale for including such activities in a class. It is important for faculty members to articulate what each stage of the writing process often entails even when they might believe they are stating what is obvious. Instructors should also give students regular opportunities to reflect on their own writing so that they become mindful of their evolving approaches to writing.

Although it is critical that faculty teaching developmental and first-year writing courses begin to help students develop a process-oriented approach to writing, this approach needs to be cultivated well beyond a student's first semester. Colleges need to do more to create contexts in which faculty in different disciplines are engaged in a dialogue with faculty who teach writing. Such collaborations can create opportunities for faculty across the curriculum to learn ways of incorporating the writing process explicitly into their writing assignments. For instance, they might design assignments that carefully scaffold the writing process, which can include time for planning, discussing an assignment's purpose, peer feedback, reflections on process, and/or a tutoring requirement to aid in revision. Doing so can help create a process-oriented writing culture that is college wide.

Limitations and Recommendations for Future Research

This paper relied on qualitative research methods using a limited number of participants. There is a need for longitudinal research using mixed methods approaches to help researchers examine whether students transfer what they learn about the writing process in developmental courses when they write for courses across the curriculum and to what extent they do so. Such examinations can also help determine which elements of writing are the most essential to cover in developmental courses and which elements might be best covered in more advanced writing courses.

It is also important for researchers to examine what types of revisions students make to their work after they have completed a draft. Although the findings of this study suggested that students were using a process approach to their writing, it did not address the quality and nature of the revisions students were making to their assignments after receiving feedback. Future research should systematically analyze the ways students revise their written work during and after completion of developmental writing courses.

Additional research also needs to be conducted to find out more about how to help students obtain the tools, skills, and habits necessary for success in navigating the variety of writing demands they encounter. This kind of inquiry can also help faculty and policymakers in colleges understand how demands change and increase and how writing development can continue to be supported beyond first-year course work. Colleges cannot rely on individual writing courses alone to improve the writing abilities of students. This process needs to be a college-wide effort.

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