Blended Courses Across the Curriculum: What Works and What Does Not

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Abstract

Recent hype around online and blended courses touts the benefits of immediate student feedback, flexible pace, adaptive learning, and better utility of classroom space. Here we aim to summarize the results of a 3-year pilot study using blended courses across the quantitative science curriculum (Mathematics, Statistics and Computer Science), in both upper and lower division, major and GE courses. We present findings on student attitudes towards this format, most helpful course components, student perceived benefits, and how different types of students use the flexibility. This summary can be used to inform best practices in blended (also called hybrid) design, implementation and faculty expectations in the quantitative sciences.

1 Introduction

The use of online learning is increasing and becoming more common in higher education. With concerns about utilizing resources and the need to provide greater access to a variety of learners, the number of universities offering online courses, blended (also called hybrid) courses or fully online degrees is rapidly growing [10]. The 2013 Babson report [1] states that as of 2011, 32% of students has taken at least one online course compared to 9.6% in 2002. Blended courses are a popular alternative to fully online or face-to-face courses. In a recent report by Babson, it was reported that academic leaders still

have concerns about the quality of online learning but are far more favorable about courses that combine elements of online instruction with those of traditional face-to-face teaching [2]. The report continues by stating that academic leaders rate the promise of blended course as superior to that of fully online [2]. While a blended course can have significant online content, this format does not eliminate face-to-face meetings. The amount of content delivered online varies from course to course but it typically ranges from 30-79%. [2]. The perceived benefits of blended courses compared to face-to-face courses are things such as flexibility for students and faculty, better use of classroom space, and increased student learning independence.

The literature on student learning gains and satisfaction with blended courses is mixed and varied. Several studies have found that, when comparing the student results on learning outcomes, blended courses are at least as good as face-to-face courses. [3, 7, 8, 14]. Another area of research in blended course design is on student satisfaction with the blended format. There are a number of studies that give mixed results on students satisfaction with blended format versus face-to-face courses [4, 6, 12]. Several of these studies report that the data supports the assumption of student preference for blended courses over face-to-face course, however there often are confounding variables. Recent research has begun to refine these results by looking at whether all types of students benefit and are satisfied with blended learning [11, 13].

However, the implementation of blended courses is not without its costs. There is substantial investment in building the online content. Technologies and the blending of different technologies sometimes require patience and often some type of learning curve. For the faculty teaching blended courses, keeping up the daily correspondence with large classes of remote students can be burdensome. There's a cost to our students- they may need to acquire technical skills to access the online content and have more accountability for their own learning.

In this study we aim to understand better which components of our blended courses the students found value in and in which type of course the bended format is perceived as most beneficial. The primary objectives of this study are: to examine the characteristics of students most satisfied with the blended format, the components in blended courses students find most helpful and how students use the flexibility provided by the blended format. To accomplish this, five blended courses in the quantitative sciences were surveyed: Problem Solving (MTH 303), Introduction to Statistics (MTH 203), Fundamentals of Elementary Mathematics I and II (MTH 213/223) and Introduction to Computer Science (CSC 143). The rest of this paper presents the implementation and results of research that was conducted over a three-year period at PLNU designed to attempt to answer the following four questions:

1. What type of student has the most favorable opinion (the most satisfied with the blended format)?
2. What particular components of the course do students find the most helpful?
3. Which students perceive the most benefit from the flexibility and self-paced nature of blended courses?
4. How do different type of students use the flexibility of the blended format?

2 Methods

2.1 Course descriptions

Point Loma Nazarene University (PLNU) is a private, Christian Liberal Arts university located in San Diego, California. There are approximately 2,500 undergraduate students, most of whom are residential. In 2013 the faculty of the department of Mathematical, Information, and Computer Sciences (MICS) of PLNU decided to test the blended format with some of their courses. We started by offering blended format of our mathematics general education course MTH 303, then the next year offered four other courses in the blended format; MTH 203, CSC 143 and a two course sequence, MTH 213/223. The mathematics general education requirement at PLNU is currently met with either Calculus or MTH 303. MTH 303 is a quantitative literacy course. The prerequisites for this course are elementary algebra and junior or senior standing by units completed. MTH 303 is a three credit course. We offer 10 to 12 sections per year with enrollment between 30 to 40 students in each section. Most students in MTH 303 are non-science majors and many of them are not comfortable with mathematics.

MTH 203 course at PLNU is a statistics course for non-mathematics majors. It is a first course in statistics for the general student and is usually taken mostly by sophomores and juniors. MTH 203 is a three unit course with a pre-requisite of elementary algebra. Majority of the students who enroll in this course are business, nursing, or psychology majors. We typically offer 8 to 9 sections per year with between 30 to 35 students in each section.

CSC 143 is the first computer science course at PLNU. It is designed to introduce students to programming and its uses in other disciplines.It is a three unit course with a pre-requisite of intermediate algebra. Every computational science minor, mathematics, computer science, information systems and software engineer majors take this course at PLNU. These students typically are more familiar with, and frequently use, technology. Because this is the first computer class for the majors of MICS most of those students are freshmen, however, because the computational science minors also take this class, they tend to be sophomores or juniors. We offer one section per year with between 30 to 50 students.

The MTH 213/223 are our mathematics courses for primary education majors. These courses cover the material necessary for the California multiple subject teaching credential (K-8). Each of these courses is three units. The prerequisite for these courses is intermediate algebra and only education majors take these courses. Most students who take these courses are sophomores or juniors. We offer one section of each course per year with between 20 to 35 students in each section.

In the PLNU MICS department, there are two different but similar models of blended courses. The first model (of blended) replaces the seat time by fifty percent, or 1.25 hours of lecture, with online content. This is the model for MTH 303, MTH 203, MTH 213 and MTH 223. All four of these courses have a weekly optional lab and a required face-to-face session. The optional lab is designed to be a resource for students who want additional help on the pre-class activities or on any other course material. Typically students who attend these sessions will independently work on the pre-class activities or homework, asking questions as they go. The single weekly class meeting for these courses typically begin with a short lecture followed by group work. The goal of the lectures is to review and clarify the online material. All four of these courses have both online and written assignments. For MTH 303, MTH 213 and MTH 223, we used the online material found in Pearson's MyMathLab [5]. It consists of videos from the publisher, online practice problems and a e-textbook. Additionally, MTH 303 also had

included online timed quizzes. For MTH 203, we used the e-textbook and software called Acrobatiq [9]. It consists of textbook, interactive applets and practice problems.

The second model of blending we use for CSC 143. For this class, we replaced a third of the face-to-face time with online content and offered an additional optional lab. Since this is a programming class, there is a required weekly face-to-face class meeting and a face-to-face lab. The optional lab time is to give additional help to the students and is staffed by both the professor and a lab assistant. The online content is designed by the professor and includes readings followed by online quizzes.

2.2 Instrumentation

In order to measure student satisfaction with blended courses and its components, and with student time allocation, we considered data that falls into two main categories: time on task and student attitudinal data. This data was collected by using an in-class survey administered during class time to all students from all sections during the last two weeks of the semesters. This was done for fall and spring semesters for the years 2014-2016 for a total of 1,301 surveys (73 for CSC 143, 498 for MTH 203, 84 for MTH 213, 44 for MTH223 and 602 for MTH 303). The in-class survey contained between 25 and 28 questions depending on the semester. Eighteen of the questions required a response based on a Likert scale: 6 regarding the students attitudes towards problem solving (these questions were for MTH 303 student only), 5 regarding which aspects of the course they found helpful, 2 regarding their pre-course and post-course desire to take courses in the blended format, 2 regarding their attitude towards the blended format, 2 regarding the benefits of the blended format, and 1 regarding the technology used for the blended portion. The first 6 questions on attitudes towards problem solving (for MTH 303 students only) were on a 5 point Likert scale (not analyzed here), while questions 11-15, 17-19, 22, 23, 26 and 27 were on a 4 point Likert scale. The changes in scale were due to merging an ongoing course evaluation containing items 1-6 with the new blended course assessment.

The remaining 10 questions had varied formats. Students were asked to estimate the number of hours they had spent each week outside of class on each of the four main components of the course: online reading, online practice problems, online quizzes, and written homework. Students were also asked about their anticipated grades (before the course and currently) and their study habits. Self-reported student grades were grouped into the categories: A, B, C, and Other. The authors used the self-reported expected course grade as an estimate of student performance in the course. The self-reported expected grade prior to the course was not used as most students had unreasonably high expectations, and hence there was little variability in this measure. Additionally, the students were asked to list the classes previously taken in the blended format, which, for the purposes of this study, were simply counted.

As mentioned, the number of questions varied by semester. Items 26, 27, and 28 were added beginning in Fall of 2015, hence there are only 226 surveys containing these items. The complete text of the survey is included in Appendix B.

2.3 Analytical methods

All statistical analyses were run in R (http://www.R-project.org). In order to assess the practical significance of each finding, effect sizes were computed for each statistical test. In an effort to avoid

assumptions on the distribution of Likert scale items, the authors opted to analyze them using nonparametric methods. In order to compare differences in Likert responses between groups, e.g. course or expected course grade, a Kruskal-Wallis H test was used instead of the parametric ANOVA. Additionally the epsilon-squared effect size was computed using the formula $E_R^2 = \frac{H}{(n^2-1)/(n+1)}$. A Wilcoxon signed-rank test, using the V statistic, and Cohen's d for effect size, was used for paired questions in the survey instead of the parametric paired t-test. Chi-squared tests and the effect size $\phi = \sqrt{\frac{\chi^2}{n}}$ were used to assess differences in work patterns between the groups of students. All effect sizes were interpreted using Cohen's suggested cutoffs of 0.2, 0.5 and 0.8 for small, medium and large effects respectively.

3 Results

Between the spring semester of 2014 and the fall semesters of 2016 the survey was completed by 1,301 students: 73 from CSC 143, 498 from MTH203, 84 MTH 123, 44 from MTH 223 and 602 from our GE course MTH303. Summaries of the student responses are given in Table 1. Below we analyze the results as they pertain to each of the research questions.

3.1 Opinion of the blended format

First, we aimed to understand student attitudes towards the blended format and what benefits they perceived. Four items, numbers 18,19, 22 and 23, assessed student opinions of the blended format in general and specifically for the course they were enrolled in. Prior to the blended course, only 40% of the students reported desiring to take a blended course, whereas after their experience 59% desired to take a course in the blended format, see Table 1. A Wilcoxon test comparing the pre- and post desire to take a course in the blended found a significant difference with a small effect size (V=19,333, $p < 0.001$, d = 0.45) showing that overall, after taking these blended courses they were more likely to want to take another blended course.

Students in the different courses varied much in their attitudes towards taking courses in this format. In Figure 1 (n.b., all figures appear in Section 5 at the end of this paper), we see that prior to the blended course, 58% of students in CSC 143 desired to take a course in the blended format, while only 23% of students in MTH 203 desired to take courses in the blended format. Students had a stronger desire to take more blended courses after their experience, with 85% of students in the CSC 143 wanting to take another course in the blended format and 42% of the students in MTH 203 reporting the same. However, it is interesting to note that 88% of students in CSC 143 say the blended format is preferable for this course, while only 29% of students in MTH 203 say the format is preferable. For MTH 203 students, at least, they still do not believe this format is particularly effective in this setting. Kruskal-Wallis tests were run comparing responses between courses on each of the four individual items regarding attitudes towards the blended course format and summarized in Table 2. In each of the four cases there was a significant difference between attitudes in students from the different courses, but the effect size was small ($H > 40.6$, $p < 0.001$, and $E_R^2 < 0.104$).

Additionally, attitudes towards the blended format varied between students at different performance levels. Figure 2 shows the opinions about the blended format broken down by expected course grade. Here we see that students earning higher grades were more likely to say that they wanted to take a course in the blended format, although still a minority of students in general, at 48%. However, after

Table 1: A summary of student responses to survey items.

Item	N	Mean	SD	Disagree(%)	Agree(%)
I found the reading helpful in learning course material	1247	2.55	1.10	38	62
I found the online quizzes helpful in learning course material	1256	2.84	1.03	26	74
I found the online practice problems helpful in learning course material	1207	3.1	0.93	17	83
I found the written homework problems or labs helpful in learning course material	1274	2.93	1.03	24	76
I found the in class activities and lectures helpful in learning course material	1276	3.26	0.93	17	83
Prior to taking this course I wanted to take a hybrid blended course	1199	2.15	1.19	60	40
After taking this course I would like to take another hybrid blended course	1219	2.67	1.10	41	59
The blended hybrid format contributed to my ability to learn	1227	2.53	1.13	45	55
For this course the blended hybrid format is preferable to traditional lecture	1223	2.56	1.2	50	50
I appreciated being able to learn at my own pace	1214	3.07	0.88	15	85
I appreciated the increased flexibility in my schedule as compared to meeting for the traditional hours	1212	3.22	0.93	15	85

Table 2: A summary of Kruskal-Wallis tests for significant differences in attitudes towards the blended format between students in different courses, and in difference in attitudes between students by grade expectation.

Item	Course Comparison			Grade Comparison		
	H	p	E^2_R	H	p	E^2_R
Prior to taking this course I wanted to take a hybrid blended course	40.6	< 0.001	0.03	80.6	< 0.001	0.07
After taking this course I would like to take another hybrid blended course	126	< 0.001	0.104	125	< 0.001	0.10
The blended hybrid format contributed to my ability to learn	122	< 0.001	0.1	124	< 0.001	0.10
For this course the blended hybrid format is preferable to traditional lecture	121	< 0.001	0.1	182	< 0.001	0.15

their experience with a blended quantitative course, a majority of high achieving students reported that they wanted to take another course in the blended format, 69% for A students and 51% for B students. Meanwhile, low achieving students did not desire to take more courses in this format. Interestingly the only group of students where a majority of students reported that the blended format is preferred in their quantitative course, are the A students with 64%. Meanwhile only 28% of the C students say this format is preferable. Lower achieving students are less likely to prefer courses in the blended format. Kruskal-Wallis tests were run comparing differences between students expecting to earn different grades and each of the four individual items regarding attitudes towards the blended course format and summarized in Table 2. Again, in each of the four cases there was a significant difference between attitudes in students at different performance levels, but the effect size was small ($H > 80.6$, $p < 0.001$, and $E_R^2 < 0.15$).

3.2 Most helpful course components

We aimed to better understand which components of a blended course students find the most helpful, and which types of students are more likely to find these components helpful. The majority of students reported that all of the course components were helpful, with the fewest reporting that the reading was helpful (62%) (See Table 1). The results of what the students found to be most helpful broken down by course are presented in Figure 3. We note that the CSC 143 students find all of the course components to be helpful ($> 89\%$ in all categories). While the MTH 203 students are more varied in what they found helpful, with the lowest finding the online quizzes and reading to be helpful (64% and 65% respectively). In nearly every course component, the MTH 223 students, reported lower helpfulness levels in each of the course components, with the lowest (38%) reporting that they found the reading helpful. It is interesting to note that, except for the in-class activities, students in MTH 223 find the course components to be less helpful than the students in MTH 213. Five Kruskal-Wallis tests were run to determine whether the perceived differences in the helpfulness of the each of the five course components were different between courses. In each of the five course components, there was a significant difference, with a small effect size, between courses ($H > 15.25$, $p < 0.002$, $E_R^2 < 0.05$) (See Table 3).

Additionally, we looked to determine whether students at different abilities found any differences in the helpfulness of the different course components, these are reported in Figure 4. The trend here is clear that students reporting a lower course grade are less likely to report any component of the course as being helpful, with the fewest (51%) reporting the reading as helpful. It is notable that all self-reported grade levels find the reading to be the least helpful course component. Again, Kruskal-Wallis tests were run to identify significant differences between how helpful each of the course components were to students at different achievement levels. Students at different achievement levels showed significant differences in how helpful they found the course components, however the effect sizes were small ($H > 46.1$, $p < 0.001$, $E_R^2 < 0.105$) (See Table 3).

3.3 Perceived strengths of the blended format

So then, what are the perceived benefits to the blended course and who holds these perceptions? For this we considered responses to the two questions regarding their appreciation of working at their own pace and the increased flexibility. Students highly appreciated learning at their own pace (85%) and the flexibility in their own schedule (85%) (Table 1).

Table 3: A summary of Kruskal-Wallis tests for significant differences in responses on the individual items between students in different courses, and between students by grade expectation.

Item	Course Comparison			Grade Comparison		
	H	p	E_R^2	H	p	E_R^2
I found the reading helpful in learning course material	15.3	0.002	0.01	67.9	< 0.001	0.06
I found the online quizzes helpful in learning course material	57.0	< 0.001	0.05	60.0	< 0.001	0.05
I found the online practice problems helpful in learning course material	66.1	< 0.001	0.06	127	< 0.001	0.105
I found the written homework problems or labs helpful in learning course material	25.7	< 0.001	0.02	96.8	< 0.001	0.08
I found the in class activities and lectures helpful in learning course material	51.8	< 0.001	0.04	46.1	< 0.001	0.04

Table 4: A summary of Kruskal-Wallis tests for significant differences in responses on the individual items between students in different courses, and between students by grade expectation.

Item	Course Comparison			Grade Comparison		
	H	p	E_R^2	H	p	E_R^2
I appreciated being able to learn at my own pace	78.8	< 0.001	0.065	93.3	< 0.001	0.08
I appreciated the increased flexibility in my schedule as compared to meeting for the traditional hours	85.0	< 0.001	0.07	93.2	< 0.001	0.07

Overwhelmingly, all courses and all levels of achievement appreciate the learning at their own pace and the course flexibility. MTH 203 appreciated these benefits the least with 74% and CSC 143 students appreciating the flexibility the most with 94%. Two Kruskal-Wallis tests were run to compare the differences between courses on their appreciation of (1) self-pacing, and (2) the flexibility of the course; both were significant, with small effect sizes ($H > 78.8$, $p < 0.001$, and $E_R^2 < 0.07$) (See Table 4). Similarly, C and D students were least likely to appreciate the self-paced learning (71% and 76% respectively) and the flexibility (74% and 70% respectively), while A and B students highly appreciating the self-pacing (94% and 82% respectively) and the flexibility (93% and 83% respectively). Kruskal-Wallis tests were run comparing the differences between grade expectation and their appreciation of (1) self-pacing and (2) the flexibility of the course and in both cases there were signifiant differences between grade levels, with small effect sizes ($H > 93.2$, $p < 0.001$, and $E_R^2 < 0.07$) (See Table 4).

Table 5: Summary of how students reported spending their time working by course.

Course	Long Sessions (%)	Short Sessions (%)
MTH 303	0.81	0.19
MTH 213	0.77	0.23
MTH 223	0.70	0.30
MTH 203	0.80	0.20
CSC 143	0.89	0.11

Table 6: Summary of how students reported spending their time working by course by self-reported expected course grade. .

Grade	Long Sessions (%)	Short Sessions (%)
A	0.86	0.14
B	0.76	0.24
C	0.78	0.22
Other	0.74	0.26

3.4 Utilization of the flexible course format

Finally, the instrument shows us that the majority of students tend to work in one long session, while lower performing students worked in shorter sessions. The majority of all students reported working in one long session (80%), versus several short sessions (20%). Table 5 shows how students from the different courses reported working on their course material outside of class. A Chi-squared test was used to assess whether there was a relationship between the work patterns and the course. This revealed that there was not a significant difference in the ways that students spent their time working on the course material in the different courses ($\chi^2(4)$ = 6.65, p = 0.16, ϕ = 0.07).

Additionally, we desired to know if the students at different performance levels studied for the course in different manners, and these results are summarized in Table 6. A Chi-squared test revealed there to be a significant difference between work patterns of students and their expected course grade ($\chi^2(3)$ = 17.5, p = 0.0005, ϕ = 0.12). We see that the highest performing (A) students most frequently reported working in long-sessions (86%), as opposed to the other categories ($< 78\%$).

The survey included questions on the number of hours students spent working on each of the course activities. As the activities across courses differed, the results are not presented here, but are summarized in Appendix A.

4 Conclusion

Online and blended learning have been very popular in recent years, with many perceived benefits to educators and students. Some of the claimed benefits include increased scheduling flexibility, more

personalized instruction, self-paced learning, and more efficient use of resources [10, 13]. Despite the hype, we find that many students do not actually share the enthusiasm, although they do appreciate the benefits in flexibility and self-paced learning. Additionally, this study aimed to identify course components which students found particularly helpful, in order to aid instructors in course design. However, few patterns emerge from these results.

When initially developing these courses faculty believed many students would enthusiastically support the blended approach due to the increased scheduling flexibility and self-paced learning. However, we found that although students appreciated these features, they did not desire to take blended courses before, and although their desire to take blended courses increased after their experience, the majority of students still did not desire to take courses in the blended format. Here we find that although students perceive many benefits to the blended course format, they still tend to favor other more traditional pedagogies in quantitative courses. The only groups of students where a majority prefer the blended format for these courses are students in the upper division MTH 303, majors in the CSC 143, and students expecting to earn an A. It would appear that high-performing students and more mature students, perhaps who have busier schedules, tend to favor the blended format, whereas students who did not perform as well, or who have less higher education background prefer to spend more time in class. This finding is consistent with the results found in [6, 11], suggesting that the blended format may be less desirable for lower performing and less experienced students.

Another purpose of this study was to identify course components which students found most helpful in order to aid instructors in designing blended courses. Overall the students found all of the course components to be very helpful, although reading was the least helpful of all. Low performing students and students in MTH 223 were least likely to find the reading helpful. Reading mathematics and computer science is certainly not an easy task, and the authors have noted that even in traditional formatted courses, students frequently complain about reading mathematics. This result may be more indicative of student attitudes towards reading in general.

Finally, we find it interesting that despite instructor suggestions to work on the course material in small blocks of time, students typically used the flexibility to work in very long sessions. This behavior was fairly consistent across the curriculum, but more pronounced among high performing students. As our study provides limited understanding of this behavior, in the future it would be interesting to try to further understand why they work this way when given the opportunity.

As educators we would make several recommendations for consideration when considering implementing courses in the blended format:

1. Faculty need to spend more time discussing the reasons for the blended courses and helping students understand how the blended format can aid in their learning.
2. Faculty need to help raise student awareness of different studying strategies.
3. Faculty need to be more deliberate in teaching reading skills and emphasizing the importance of reading.

In future work, we would expand on these results to gain a better understanding of the impact of the blended format on learning gains. This would allow educators to better understand the benefits of blended format on learning and potential tradeoffs to some of the positive aspects of the blended courses.

Additionally, with the busy schedules of our students and their widespread use of technology in their daily lives, we would like to better understand why they do not have more favorable opinions towards blended pedagogies.

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5 Figures

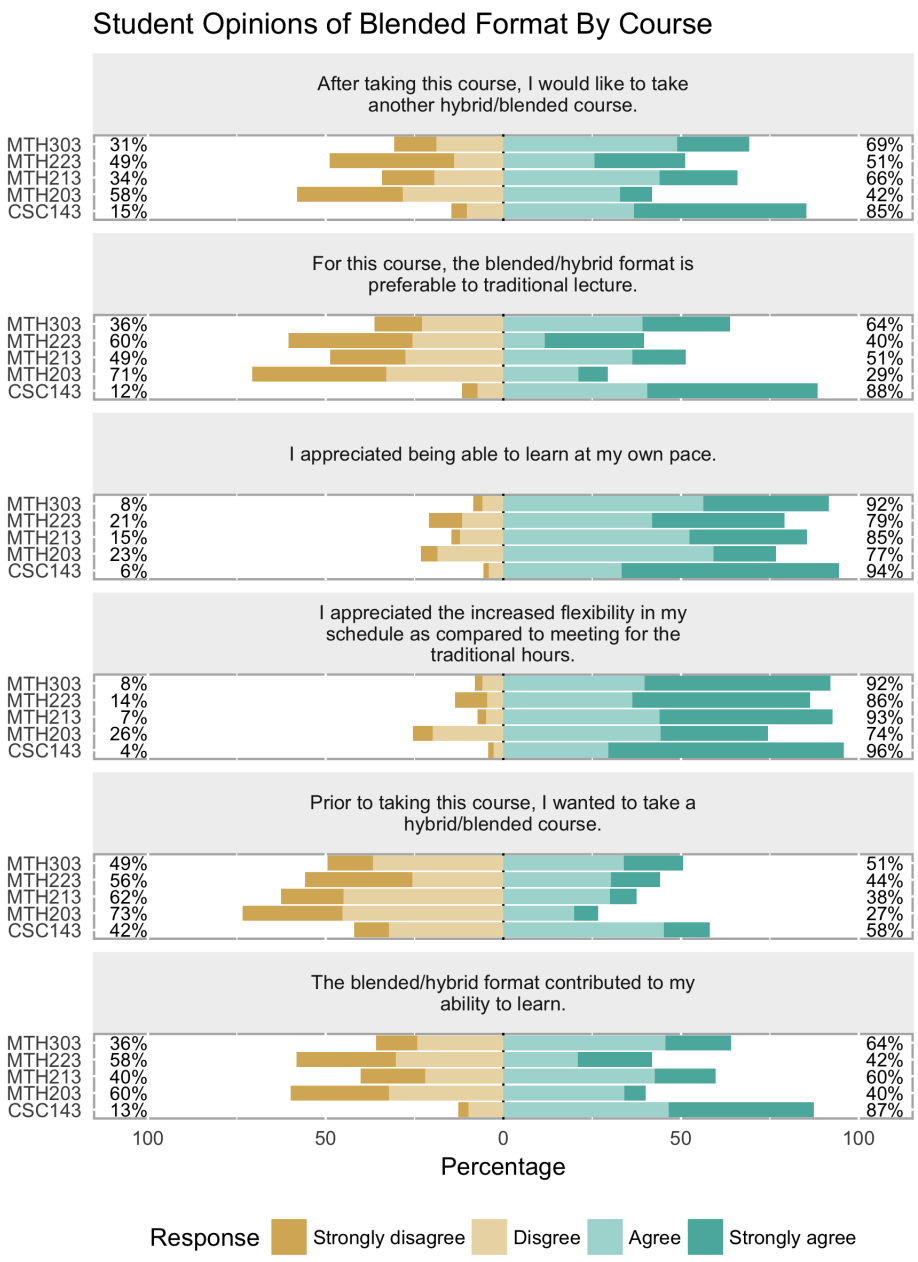

Figure 1: Summary of student attitudes towards blended learning by course. MTH303 is problem solving. MTH 213 and MTH 223 are elementary mathematics I and II, respectively. MTH203 is introduction to statistics. CSC143 is introduction to computer science.

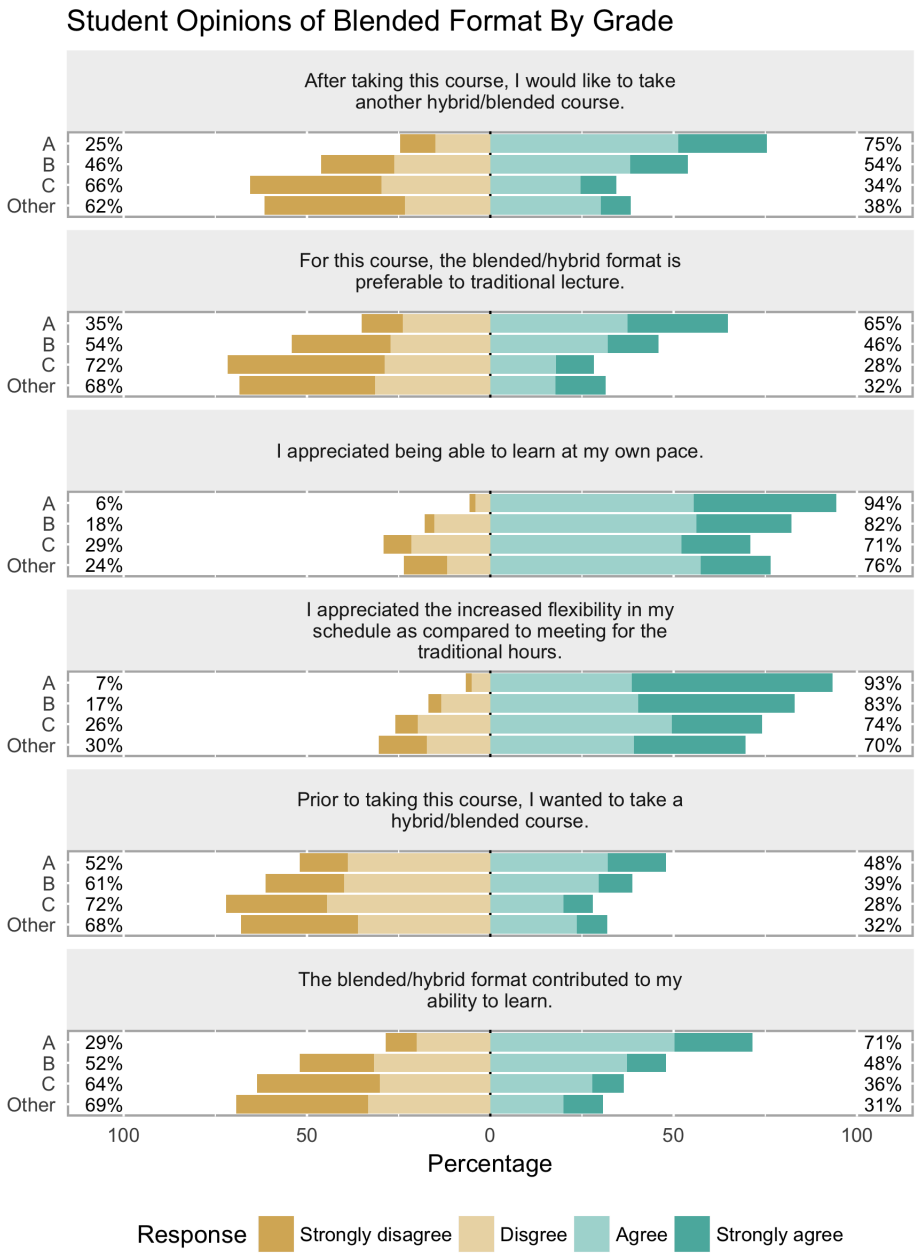

Figure 2: Attitudes towards the blended format by self-reported expected course grade. The Other category represents D, F and Unknown grades.

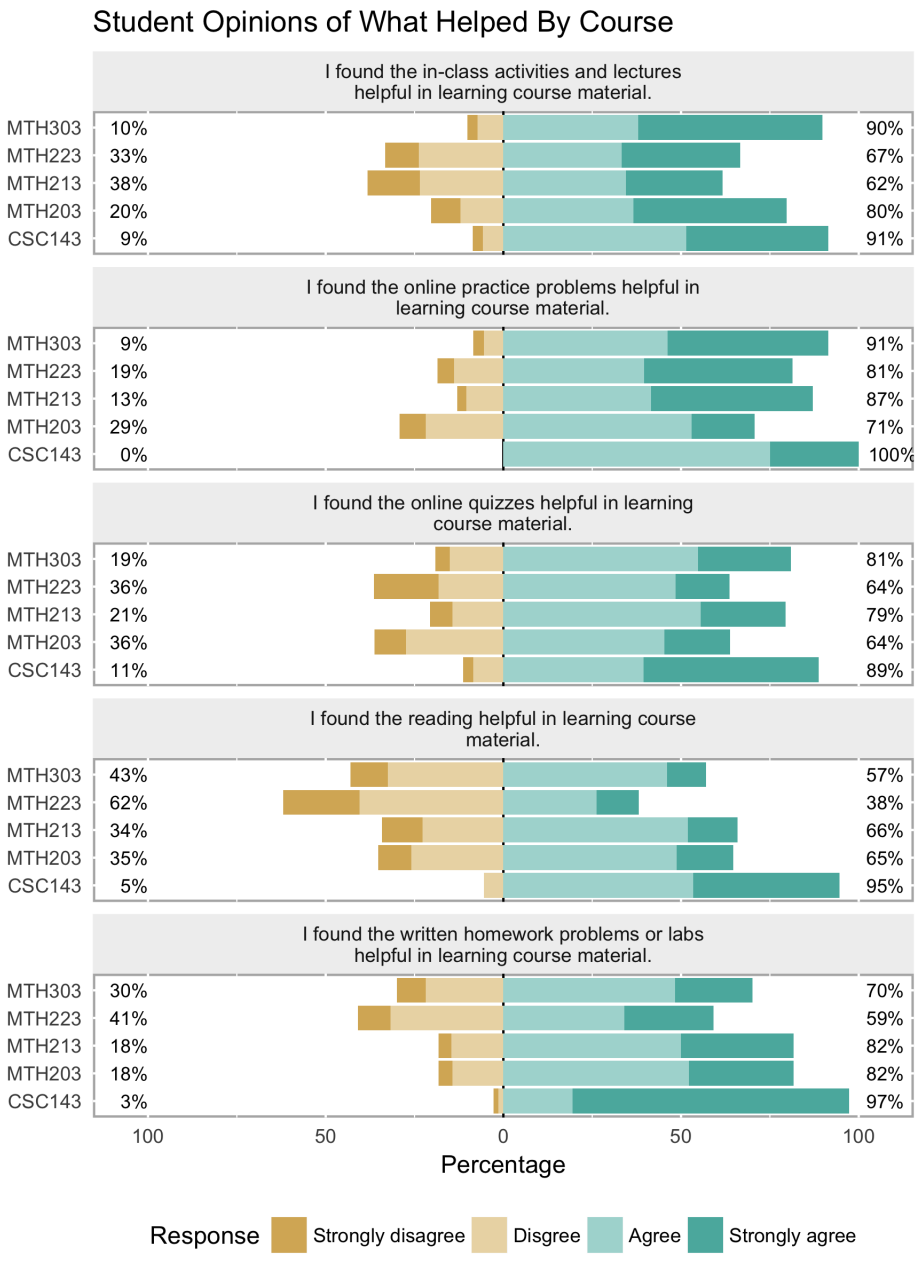

Figure 3: Summary of student responses as to what course components were most helpful in their learning by course. MTH303 is problem solving. MTH 213 and MTH 223 are elementary mathematics I and II, respectively. MTH203 is introduction to statistics. CSC143 is introduction to computer science.

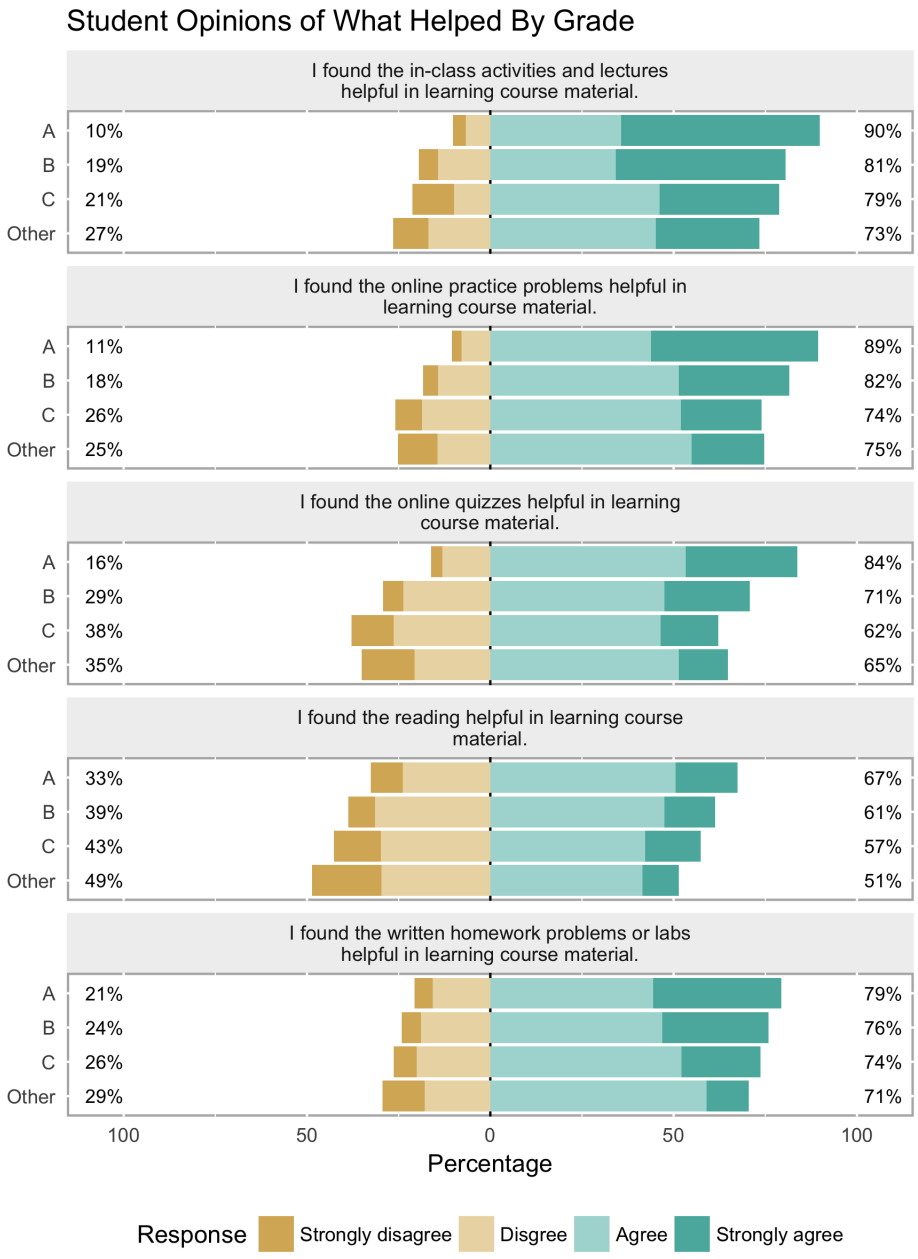

Figure 4: A summary of which course components were most helpful by self-reported expected course grade. The Other category represents D, F and Unknown grades.

Appendices

1 Summary of hours spent working on the course components

Question	N	Mean	SD
Approximately how many hours per week did you spend outside of class doing the reading (online or textbook)?	1243	2.21	3.05
Approximately how many hours per week did you spend outside of class doing the online quizzes?	1232	1.54	1.69
Approximately how many hours per week did you spend working on the online practice problems?	1228	1.63	1.87
Approximately how many hours per week did you spend on the written homework or labs?	1251	2.16	1.96

2 Blended Course Survey

		Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Does Not Apply
1	In this class, we have been directly involved in problem solving activities.	SA	A	N	D	SD	NA
2	This class has contributed to my ability to solve different types of problems.	SA	A	N	D	SD	NA
3	This class has expanded my methods of exploration in problem solving.	SA	A	N	D	SD	NA
4	This class has contributed to my ability to make educated guesses and check their correctness by analyzing their implications.	SA	A	N	D	SD	NA
5	This class has helped me to understand major concepts, methods and applications of critical thinking.	SA	A	N	D	SD	NA
6	This class has helped me to see the importance of problem solving in our modern society.	SA	A	N	D	SD	NA
7	Approximately how many hours per week did you spend outside of class doing the **reading (online or textbook)**?						NA
8	Approximately how many hours per week did you spend outside of class doing the **online quizzes**?						NA
9	Approximately how many hours per week did you spend working on the **online practice problems**?						NA
10	Approximately how many hours per week did you spend on the **written homework** or **labs**?						NA
11	I found the **reading** helpful in learning course material.	SA	A		D	SD	NA
12	I found the online **quizzes** helpful in learning course material.	SA	A		D	SD	NA
13	I found the **online practice problems** helpful in learning course material.	SA	A		D	SD	NA
14	I found the **written homework problems** or **labs** helpful in learning course material.	SA	A		D	SD	NA
15	I found the **in-class activities** and **lectures** helpful in learning course material.	SA	A		D	SD	NA
16	How did you typically work on course material?	A few long sessions			Several short sessions		
17	The course technology was easy to use.	SA	A		D	SD	
18	Prior to taking this course, I wanted to take a hybrid/blended course.	SA	A		D	SD	
19	After taking this course, I would like to take another hybrid/blended course.	SA	A		D	SD	
20	At the start of the course, what letter grade did you expect to earn?						
21	What letter grade do you currently expect to earn in this course?						
22	The blended/hybrid format contributed to my ability to learn.	SA	A		D	SD	
23	For this course, the blended/hybrid format is preferable to traditional lecture.	SA	A		D	SD	
24	List any other blended/hybrid courses that you have taken.						
25	Assuming that the class is taught in blended/hybrid format, what are some ways that we could improve this course? (If needed, use the other side of the paper for your answer to this question).						
26	I appreciated being able to learn at my own pace.	SA	A		D	SD	
27	I appreciated the increased flexibility in my schedule as compared to meeting for the traditional hours.	SA	A		D	SD	
28	Regarding the optional class (open lab sessions) check all that apply:						
	I come almost every week, but do not find it helpful.	☐					
	I come almost every week and find it very helpful.	☐					
	I do not come often because it is my only day to sleep in.	☐					
	I do not come often because I understand the material from reading alone.	☐					
	I do not come often because I have scheduled something else at that time.	☐					
	Other:	☐					