Large Classes: Better Results with Blended Learning

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ABSTRACT

This study shows that adding blended learning elements in a large classroom course has a positive impact on students' perception of the course, which leads to better course evaluations as well as better learning results. A study of 3rd year bachelor students in a strategy course at a Norwegian business school in 2015 and 2016 showed that introducing new elements of blended learning had positive effects on perceived quality and student satisfaction. The additions were more videos and more direct communication online. The number of classroom lectures was reduced. Based on an electronic survey of the students (N=125 in 2015 and N=124 in 2016) we compared the students' ratings on 10 specific elements of the course evaluation, and there was a significant improvement on seven of them and a significant reduction on one. In total, the course evaluations showed a significant improvement from 2015 to 2016 in students' perception of learning quality. A separate measurement of a class comprehension test on strategy concepts showed a significant improvement in learning from 2015 to 2016.

Key Words: Blended learning, classroom, webinar, student satisfaction, video

1. Introduction

Blended learning is referred to as some sort of a "buzzword" (Graham, 2006). A definition of blended learning is an integration of different models to teaching, where traditional lecturing is supported by video training, webinars, and online tutoring (Norberg, 2017). In this paper, we also include in the definition of blended learning other delivery methods like quizzes and electronic question-and-answer tutoring. The use of the blended learning approach has grown in parallel with the development of easy-to-use technologies. Students today are of a generation who have a daily use and familiarity with the new technologies (Proserpio & Gioia, 2007; Tucker & Jones, 2010b). Social networking sites, such as Facebook, have been widely adopted by students. These technologies have the potential for becoming a valuable resource to support learning and collaborations with faculty. However, students are more willing to use social media than teachers, who rely more on traditional means like e-mail (Roblyer, McDaniel, Webb, Herman, & Witty, 2010). Even though the use of blended learning is becoming increasingly relevant, there is still a need for practical research and a coherent theory on the process of blended learning (Arbaugh, 2008). Can blended learning in a classroom enhance the learning experience and give higher student satisfaction? Is there any evidence that the results improve? We wanted to explore this question by introducing new blended learning elements to a sample of business school students.

Students today have had internet access all their lives and the use of internet tools are closely integrated into their daily activities. From a separate study at the school we know that 60% of the students have checked updates on the mobile within a time-span of 30 minutes (Wilberg, 2017). We therefore hypothesized that by adding blended learning elements in a planned way it would have a positive effect on the students' level of satisfaction.

2. Literature Overview

2.1 The Process of Blended Learning

Research on the process of blended learning shows many advantages of integrating technology enhanced learning methods to teaching. Blended learning is a method where traditional classroom lecturing is supplemented with online activities like webinars, videos and

online tutorials. Researchers have found that blended learning has the potential to enhance both the effectiveness and efficiency of meaningful learning experience (Garrison & Kanuka, 2004). Firstly, it is possible to reduce time in the classroom if the course content is posted online outside of the classroom (Baepler, Walker, & Driessen, 2014). Furthermore, there is evidence that the use of multiple channels for content delivery enhances learning (Dixson, 2012). There is little randomized controlled research that compares learning outcomes (Bishop & Verleger, 2013). A large meta-study by Bernard et al. (2014) indicates however, that using blended learning instead of classroom learning results in better achievement outcomes, and that one or more interaction treatments (student-teacher-content) seems to enhance student achievement (Bernard, Borokhovski, Schmid, Tamim, & Abrami, 2014). In addition, a long-term study from the University of Central Florida found that blended learning resulted in positive institutional transformation, but that it requires proper support and planning (Moskal, Dziuban, & Hartman, 2013). A blended learning study of science education showed that in-class problem solving improved exam performance, and that video assignments increased attendance and satisfaction (Stockwell, Stockwell, Cennamo, & Jiang, 2015). Video as a learning tool also predicts higher student satisfaction, and there is evidence that students prefer a teaching method where video is a part of the course (Johansson, 2014). One aspect that stands out in the use of video in teaching is that students can watch the study content whenever they want, and how many times they want (Mok, 2014). A Swedish study showed that modern learning technologies have freed students and educators from being "locked into the classroom". Thus, the authors argue that learning rather than teaching is emphasized (Norberg, 2017).

2.2 Faculty Implications

In spite of the growing body of evidence that blended learning has the potential to enhance the effectiveness and efficiency of learning (Garrison & Kanuka, 2004), research on education faculty shows a reluctance to teach more online (Porter & Graham, 2015). This might be due to the lack of research on how to prepare and support effective online instruction (Crawford-Ferre & Wiest, 2012). Furthermore, a study on faculty showed that technology infrastructure and organizational support were the key determinants of acceptance of blended learning tools (Ahmed, 2010). On the other hand, a study of psychology students in Australia showed a more mixed picture. The study showed no significant quantitative differences between

face-to-face and online activities. These classes were however quite small (N=67 and N=37) (Kemp & Grieve, 2014). Qualitative data from the students showed on the other hand a strong preference for classroom discussions to be face-to-face. The conclusion from this study was that course developers should structure classes so that the students could benefit from the flexibility of online learning as well as the engagement in classroom discussions. A study also shows that designed learning management systems are easily accepted among students and regarded as useful, provided that faculty also can utilize them properly (Martins & Kellermanns, 2004). For a classroom course what is happening in the classroom environment has a great influence on learning – positively or negatively. On the one hand, you can have a brilliant and entertaining lecture that is soon forgotten, or you can have a more challenging lecture where the learning experience is greater. You can have a greater concern for the subject, or greater concern for the student – or a mix of both (Raaheim, 2016).

2.3 Blended Learning Outcomes: Student Satisfaction and Learning Outcome

As an example of blended learning, the use of inductive, case-based learning with small exercises during lectures was successful in a civil engineering program (Gørtz, 2011). An earlier study suggests that simply motivating students to participate in class does not alter overall learning styles. The research points to the fact that "unlearning" previous learning styles may pose a problem both for instructors and students, and that it requires more than just a single course intervention. But there is at the same time evidence that student-centered and self-regulated learning results in a more positive learning experience for both students and teachers (Herington & Weaven, 2008).

On the one hand, studies show that blending new teaching technologies with interactive classroom activities can result in improved learning but not necessarily improved student satisfaction (Missildine, Fountain, Summers, & Gosselin, 2013). On the other hand, research supports that using new online technologies in teaching improves the quality of teaching and thus the student satisfaction, but not cognitive learning outcomes (Rosenbaum, 2012). Yet another study showed that among 120 business school students, the empirical results confirmed that blended learning tools did enhance students' learning experiences and learning outcomes (Wai & Seng, 2014). Likewise, a study from the Manchester Metropolitan University Business School showed that a blended learning approach to teaching information and communication technology

was successful. Both the cost effectiveness, and the impact on student learning, was improved (Tucker & Jones, 2010a).

There is also evidence that students will be more enthusiastic learning through technology rather than the traditional classroom method (Steed, 2012b). A study of two undergraduate nutrition courses showed that the majority of the 142 students that were studied preferred the flipped approach (Gilboy, Heinerichs, & Pazzaglia, 2015). It should come as no surprise that there is a strong positive relationship between students' efforts in a course and their performance. When students are actively involved in learning and show mastery of a subject, then performance will increase. (Spivey & McMillan, 2014).

A large meta-study of the literature of online and blended learning showed that students performed modestly better on average in online learning than those receiving face-to-face instruction. An important conclusion was that the advantage over face-to-face instruction was significant in those studies that contrasted blended learning with traditional face-to-face instruction, but not in those contrasting purely online with classroom instruction (Means, Toyama, Murphy, & Baki, 2013).

A large meta-study of science teaching methods in the US, showed that active learning methods lead to better educational outcomes (Wieman, 2014). In this case, active learning methods are blended learning, using different and varied methods in the pedagogical approach. Another study supports theory claiming that increasing the number of students receiving STEM degrees (science, technology, engineering and mathematics) could be answered, to some extent, by moving away from traditional lecturing in favor of active learning. (Freeman et al., 2014). The literature review has showed us so far, that the research field on blended learning is a mixed one. Most studies show that variation in delivery methods where classroom lecturing is supplemented by other means of delivery and student-professor interaction are generally positive, but there is also evidence that careful planning of the delivery is important, and that clear improvements sometimes are difficult to recognize. In addition, the interest of faculty to use these newer methods helps to determine the success of blended learning.

With this as a background our research question is:

Will the inclusion of more blended learning elements in a classroom lead to greater student satisfaction and better results?

3. Method

The sample of this research consisted of 932 students attending the basic strategy course at BI Norwegian Business School (hereafter BI) in 2015 and 1230 students attending the course in 2016. The course is a third-year compulsory Bachelor´s program consisting of 45-hours of lecturing and tutoring, which gives seven, 5 hours of ECTS credit. The exam for this course came in two-parts – a Multiple Choice exam counting 40% of the overall grade, and a project paper on a self-nominated business case counting 60% of the grade. From 2015 to 2016, the course has been developed even more in the direction of blended learning, which means supplementing the traditional classroom lecturing with other activities like in-classroom exercises, offline and online tutoring, webinars and quizzes. The differences in the delivery methods from 2015 to 2016 are framed in the following table:

Table 1

Delivery structure of the course

Delivery method	Classroom 2015	Classroom 2016
Number of lectures	11	6
Number of workshops	0	4
Number of faculty	4	4 (3 of 4 lecturers were the same as in 2015)
Number of online tutoring sessions	1	4 large (3 hours) and 19 small (1 hour) where students could log on when they needed.
Main delivery method	Traditional lectures – of which one lecture was given online.	Classroom lectures and online webinars.

Delivery method	Classroom 2015	Classroom 2016
Q and A	Personal and Padlet.com[1] as well as Facebook group	Online webinars and Slack[2]
Facebook group in use for students	Yes	No
Course videos available for students	Yes	Yes – and more videos were added in 2016 – 26 videos at the student's disposal.

The above table shows that more blended learning elements were added to the 2016 course. The added elements in 2016, apart from videos, consisted of more webinars, online tutoring and online contact via the Slack program.

3.1 Research Variables

3.2.1 A measure of student satisfaction: We constructed an explorative survey instrument with an intention to measure student satisfaction in the strategy course. Rather than conceptualizing in general terms, our intention was to specify our questions on student satisfaction with concrete and identifiable elements like the textbook, videos, lecture content and learning management system. In addition, we wanted to know how they perceived the total quality of the course. We found no survey instrument that would cover our interest with the kind of details we wanted. The elements of the survey are shown in the following table:

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[1] Padlet.com is an online noticeboard where students could post questions that were answered by the faculty. Also used as an in-classroom tool.
[2] Slack (slack.com) is a collaboration tool providing easy contact and follow up between students and faculty. This was used instead of a standard Learning Management System (It's Learning).

Table 2

Elements of the student satisfaction survey*

Question	What is your opinion on…..	Survey element explanation
1	Textbook	A new Norwegian language strategy textbook used for the course in 2015 and 2016.
2	Videos by professor	Small topical videos made by the professor – one per strategy concept or item – and a summary video of the curriculum for exam preparation. For the 2016 course some videos from a second professor was added. All videos were produced by faculty.
3	External videos	Other videos – interviews with business managers highlighting strategic decisions – airline, banking, hotel etc. Produced by faculty.
4	Content of lectures	The perception of the content of lectures
5	Quality of lecturer(s)	The perception of the quality of the lecturer(s) on the course
6	Learning Management System.	In the 2015 course, we used a learning management system called It's Learning, which is the standard LMS for all courses at the school. For the 2016 course, we used Slack, which is a collaboration or project management tool that was used as a replacement for Its Learning. It was used both for upload of material (like ppt-slides) and for interpersonal written communication and Q and A with lecturer(s).
7	Tutoring online	Tutoring online via Adobe Connect[3]. The tutor is shown in a video window and students ask questions via a chat window. Tutor answers the questions one by one and interact with students on questions there and then. The tutoring session is recorded and can be viewed as a video at the discretion of the student.
8	Kahoot[4] quiz	Classroom quizzes via Kahoot. Always performed in class and in a webinar situation. This was used to check comprehension on subjects taught in the course.
9	Lecturing Online	Lecturing online via Adobe Connect. An ordinary lecture delivered with a video window, slides on screen, and a chat window for student interaction.
10	Total quality of course	Student evaluation of the overall satisfaction with the course.

*All the elements were rated on a Likert scale 1-5 where 1=Very bad and 5=Excellent.

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[3] Adobe Connect is an online web-conferencing tool.
[4] Kahoot (getkahoot.com) is a game based quiz tool widely used in classrooms for summing up after lectures.

The survey was conducted a few weeks after the end of the semester, which is a few weeks after each course exam in 2015 and 2016. It was distributed through the school's internal e-mailing system providing a link to the Survey Monkey questionnaire. In addition to the above questions, there was an open-ended question box for comments on the course in general. Here students could write comments on details of the course to clarify their responses on different items.

One week before the exam, we provided a special version of Kahoot that was more exam orientated. Named the MegaKahoot, it was used as a measure of the comprehension of strategy subjects from textbook and articles. 30 questions were given while students were logged on in the auditorium and they had 20 seconds to answer each question. 310 students participated in the MegaKahoot in 2015 and 371 students participated in 2016.

3.1 The Research Sample

Table 3

Sample description

Delivery	Number of students	Survey respondents	Response rate
2015	932	125	13,4%
2016	1230	124	10,1%

We have no breakdown, for reasons of privacy, on gender and age for the survey respondents, but we know from the student register at the school that the average age for 3rd year students are 22 years. The survey response rate for this study is below the level found in surveys performed in organizations, namely 35% (Baruch & Holtom, 2008). Therefore, the results in this study will have to be interpreted carefully. However, the level of response corresponds well with other studies performed at the school, which normally have very low participation rates, and this study might have been regarded by the students as "just another study". We cannot really tell if these results are representative, but we do find that the results are interesting. One might expect that the most dissatisfied students would be the ones answering the survey. Inspection of the

results on the open-ended question suggests that this is not the case for our course, because we have both positive and negative comments from students.

> *"I learned incredibly more of the tutoring that was presented online than I did in the lectures. Slack made the threshold for asking the teacher for help much lower. I feel that I have a very good learning from this course. The textbook is OK, but the subject register at the back is hopeless" (Student 2016)*

4. Results

The results of the survey are shown in the following tables.

Table 4

Descriptive Statistics 2015

	N	Mean	Std. Deviation
Textbook	123	3,64	1,110
Videos	123	3,97	1,152
External videos	120	3,60	1,056
Lecture content	123	3,20	1,109
Lecture quality	123	3,38	1,142
Learning Mgmt system	124	3,71	1,034
Tutorial online	114	3,05	1,432
Kahoots	119	3,79	1,199
Lecture online	118	2,95	1,467
Total quality	125	3,36	1,081
Valid N (listwise)	98		

Table 5

Descriptive Statistics 2016

	N	Mean	Std. Deviation
Textbook	120	3,57	1,018
Videos	122	4,32	,763
External videos	96	3,60	,827
Lecture content	120	3,80	,894
Lecture quality	122	4,08	,829
Learning Mgmt system	124	2,92	1,341
Tutorial online	107	3,45	1,319
Kahoots	121	4,50	,697
Lecture online	111	3,66	1,378
Total quality	124	3,65	,846
Valid N (listwise)	85		

The results with a t-test comparison of the two delivery methods is shown below:

Table 6

Statistical significance analysis

	Mean	
	2015	2016
Textbook	3,64	3,58
Videos	3,97	4,32 A
External videos	3,60	3,60
Lecture content	3,20	3,80 A
Lecture quality	3,38	4,08 A
Learning Mgmt System	3,71 B	2,92
Tutorials online	3,05	3,45 A
Kahoots	3,79	4,50 A
Lectures online	2,95	3,66 A
Total quality	3,36	3,65 A

Results are based on two-sided tests assuming equal variances. For each significant pair, the key of the smaller category appears in the category with the larger mean. Significance level for upper case letters (A, B, C): ,05[1]
1. Tests are adjusted for all pairwise comparisons within a row of each innermost suitable using the Bonferroni correction.

This two-sided t-test analysis shows that there is a significant difference (p<,05) for 9 out of 10 of the elements in the comparison. For 7 of them there is an improvement positively from 2015 to 2016, but for the Learning Management System (LMS) the situation is the opposite. The 2016 class had a less favourable rating of the LMS. The result on this item is easy to explain: The Slack system used in 2016 was unfamiliar in comparison with the LMS used in 2015 and 2016 on all other subjects than strategy for the students. The students regarded the Slack system as more inconvenient than the LMS used in other subjects. But the perceptions here were more divided. The standard deviation on the LMS in 2015 was 1,034 versus 1,341 in 2016, suggesting a more diverse view. Some students loved it because of the flexibility of learning material and Q and A with lecturers, both open for all students to see, or private as a messaging system between professor and student. Other students thought this was a bad idea.

4.1 Comments on the results

4.1.1 Satisfaction of the blended learning elements: The textbook is a Norwegian textbook written by the school's faculty. It is in its first edition and has been used for these two years. Generally, the book has been quite well received, but it has a flaw in a very weak thematic glossary. The results are no different between the years.

The videos by the professors have been expanded. Some videos have been revised, others have been added. For the 2016 class we provided videos on how to write a report, how to formulate a problem for the assignment and newer videos on value creation and resources.

External videos were expanded with two more videos from industry leader interviews.

Lecture content was revised. We provided fewer and more compact classroom lectures covering more material than earlier, where we had approximately one lecture per chapter. The change in lecturing meant leaving more of the study to the students rather than having the professor simply read bullet-points off Powerpoints.

Lecture quality was improved. We think that the revision of lecturing made the lectures more interesting, because they provided more overview. Also, we had one more experienced lecturer on board.

The learning management system (LMS) is interesting since it came out with a significantly lower rating from 2015 to 2016. We believe this is partly because our LMS in 2016 was a project management tool, with an emphasis on collaboration, rather than an LMS. Students are forced to use the school's LMS in all other subjects except strategy, and therefore the use of the LMS replacement (Slack) by some students were regarded as more of a nuisance than help, because the way they could find teaching material was through search, and not sifting through a folder of files.

Tutorials online were run on a platform called Adobe Connect. This enabled the professor to have a question and answer session on strategy subjects with students writing their questions in the chat window, and the professor answering orally and directly. Later in the semester, the tutorials were expanded to two professors simultaneously sharing the webinar. The professors were in in two different cities in Norway and logged on to the same webinar. The tutorials were recorded and made available to students after the tutorial for repetition purposes.

Kahoots have become immensely popular among students. We know that this tool is used worldwide in schools at all levels. We have used Kahoots as a repetition and revision tool. The quizzes have been run at the end of the lecture as a summing up, and has been both a learning and a competitive tool for the students: Through the quiz the student will see his/hers standing among other students. An analysis of the results after completion of the quiz gives the professor an opportunity to look at results and provide feedback on unclear or low-score questions.

Lectures online were performed as an integrated part of the course in 2016. In 2015, it was performed more ad-hoc. Students want things to be planned and if it seems logical they will accept the changes from the classroom to online. Another advantage was that the lecture was recorded, and the student could use it for repetition.

The students gave a significantly higher score on the total quality of the course. This is an indication that the "learning package" for 2016 with additional elements were more successful in 2016.

4.2 Learning Outcome

Table 7

Test of significance on Kahoot results, 2015 and 2016

	Year	N	Mean	Std. Deviation	Std. Error Mean	Sig. (2 tailed)
Correct answer	2015	310	16,19	5,847	,332	
	2016	371	17,74	6,617	,344	,001
Score	2015	310	14009,14	5295,285	300,752	
	2016	371	18391,79	8886,214	461,349	,000

An independent sample t-test was performed on the results, and both criteria were significant (p<,001) showing that the results were significantly better in 2016 than in 2015. For the 2016 course this meant that the students on average scored correctly on 59% of the questions (17,74/30).

5. Discussion

With the growing influence of social media and the requirements of out-of-campus activities (like part time jobs) the attention span and prioritizing of the students has changed. This has implications for structuring of the courses and further strengthens what is found in literature on blended learning – more flexibility and new learning opportunities are all for the best. (Grepperud, 2004; Gørtz, 2011; Missildine et al., 2013; Rosenbaum, 2012).

From theory, we know that acceptance for online learning and blended learning in classrooms have its advantages (Steed, 2012a; Wai & Seng, 2014) However, this study seems to reveal that some of the differences between the two semesters in our study lie in the design of the "blending" itself. In 2016 the online activities was more integrated in an overall plan, while in 2015 some of the online activities happened more as a surprise. One example was that one of the professors had a travel ban for medical reasons that forced him to lecture online instead of in

classroom. While accepted by the students it was not regarded as a "full lecture" because the delivery was changed almost overnight. Also, when testing tutoring in 2015, we conducted a three hour learning session as two hours in the classroom and then one hour online tutoring. This was regarded by some students as a "waste of time" and "not what we travelled to school for". Moreover, as a student in the classroom setting, the impulses you have in the classroom come from the social interaction in the auditorium, number of students present, lighting, sound, and other external impulses and/or disturbances.

In a blended learning situation, the students have more flexibility and variation. One example: All the online tutorials in 2016 were recorded and made available to the students for view whenever they wanted. This would give the students more control over their own learning, and was used for repetition purposes. This is also found in other research (Mok, 2014).

One conclusion we have made is that forcing a class in an auditorium into an online situation, contributes to a perception of studying in an unfamiliar situation, especially when it is not planned properly. When online activities is an integrated part of a course rather than a sudden change or unfamiliar study situation, the acceptance level is higher. This resonates well with the results shown in other research (Missildine et al., 2013; Moskal et al., 2013).

One of the interpretations that can be made from this explorative study is that there is a connection between the students' expectations and the final satisfaction with the course. Elements that are within the framework of expectations and part of the psychological contract between student and teacher score higher. Videos are examples of this. The students like the videos for being short, topical introductions, and we know from comments that students in classrooms also enjoyed and appreciated the online tutoring when it was planned into the lecture preparations. This is also supported by the research literature (Johansson, 2014; Moskal et al., 2013; Stockwell et al., 2015).

The teaching platform (Slack), which is not a learning system – but a collaboration system, was extensively criticized. Not so much about the platform itself, but because it had to be operated separately from the standard Learning Management System used at the school. It was therefore regarded as cumbersome by some, but loved by others. From a teacher's standpoint, the app lowered the threshold for students to ask questions and made it possible to communicate

with students in a much easier way. This is because you could click on the app and you entered the program. There was no log-on procedure to repeat each time, and it could be operated from the smartphone, the tablet and the computer seamlessly.

6. Conclusion

The results of this exploratory study show that carefully planned blended courses can lead to higher student satisfaction in a course (assessment of the total quality of the course). In an environment of classroom experiences, the introduction of online elements, like online tutoring, must be integrated well into the overall course planning. If not, it will create confusion and dissatisfaction. When looking at our results –we have indications that students score better on a test in a blended learning environment with larger influence of tutoring, than in a traditional classroom setting where all activity is from lecturer to students, with limited time for tutoring and feedback to students. We believe that this study gives some good pointers for course development and the further application of blended learning methods.   Satisfaction with the course delivery is higher, mainly because of the greater flexibility that the blended learning provided. And better results on student satisfaction also seem to indicate better learning.

6.1 Limitations of the Study

The limitations of the study are that the response rates in the survey are quite low, which in turn limits the interpretation of the results. It is also a weakness of the study that the survey data applied in this study does not include the actual grade obtained by each student. Future research should include data on exam results and GPA prior to the program start. As there is no direct link between the student course evaluation survey results and the exam results obtained at the completion of the course, this is a limitation.

6.2 Suggestions for Further Research

There are several ways that a study on blended learning can be improved. First, it would improve the quality of the study if it also included the students' grade from other courses, or their results from high school. Second, inclusion of demographic variables such as gender and age

would be preferred. In addition, data on after-of-school activities such as hours worked in jobs / family care commitments would give a richer picture.

Future research course also investigate to what degree the learning environment of different schools, campuses and national settings impact the success of blended learning. The bachelor course in strategy that was the focus of this present study is run at all four campuses within the school in question. It would be possible to make a variation on the blended learning activities for each of the eight classes that take the course every year. Nevertheless, one would then have to control for some differences between the classes, such as the average grade in other majors. In conclusion, with blended learning now a strategic learning approach in a growing number of business schools globally, this study has attempted to explore to what degree blended learning can have a positive impact on learning and student satisfaction in large classes. By meeting students in multiple learning environments, we can work with economies of scale philosophies where teaching time resources can be utilized in many platforms and varied learning environments to increase reflective learning

> *"Tutoring on Adobe Connect was very ! good. More people had the chance to ask questions about their paper and other subject questions. Slack was a bit messy, but easier to access because it was an app and not a webpage." (Student 2016).*

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