Technology Evaluation Report:
Mattermost

Report Contents

Note: This report summarizes outcomes of a specific UBC pilot. Findings do not reflect broader or official UBC opinions about the learning technology evaluated.

Executive Summary

This evaluation sought feedback from UBC instructors, teaching assistants, and students piloting Mattermost, a self-hosted open-source chat tool for facilitating online communication and collaboration. Seven instructors, one teaching assistant, and 202 students who had used Mattermost to complement a course were consulted between September 2017 and April 2018. The 11 courses in the official pilot were predominantly from Education but also included representatives from Arts and one from Science, although the latter did not ultimately roll out Mattermost to students. Half the courses were at the master's level, and first-year, third-year, and fourth-year courses comprised the rest. The majority of courses were online, with only a handful including an in-person classroom component.

Instructors generally noted pedagogical value in Mattermost for teaching because it helped keep communication flowing in their courses and cohorts. Most instructors felt Mattermost specifically improved 1-on-1 communication between themselves or the TAs and the students (particularly through private channels and direct messages), and many appreciated the opportunity to crowdsource basic answers to course questions by inviting students to interact with one another in public channels. Some instructors also thought Mattermost encouraged more informal conversation (both academic and non-academic) that fostered a sense of community, presented a modern interface with interactivity relevant to today's workplaces, and had the potential to offer learning spaces that could persist for students outside an individual course context.

As for issues, instructors struggled most with the real-time chat aspect pushing them to be more fluid with their time and work/life boundaries. Some were fine committing more time and energy to monitoring and responding to Mattermost; others pushed back (and this may account for some of the lack of uptake in those courses). Instructors also found it challenging to know how much to drive students to use the tool, recognizing that students are already weighed down by multiple technology platforms and outside commitments. And, as with instructors themselves, they wanted to respect not all students naturally gravitate toward this medium as a means of communication. Finally, some instructors

wanted more functionality (especially better participation and activity statistics) from Mattermost to be able to use it more robustly as a teaching and research tool.

Students also saw pros and cons of using Mattermost, with nearly equal amounts reporting a neutral and positive experience overall (with minimal negative experiences). Some students thought Mattermost offered: 1) a stronger sense of connection with other students (due in part to improved ease of answering course-related questions with the help of peers), 2) several usable and useful features (in particular, timely notifications to draw the student's attention back to the course), 3) an immediacy to interactions with other students and instructional teams that helped remove work blockages more quickly, and 4) in the most active course specifically, a way to engage more informally around a course.

On the other hand, some students perceived that Mattermost presented: 1) an unwelcome additional external platform to access and log in to (with added frequency given its real-time nature), 2) a heightened sense of communication overload by adding this to the plethora of existing personal, professional, and academic communication mediums, 3) a few features with poor usability (or initial learnability) and in particular, channels becoming harder to parse the more content gets added, and 4) a feeling of being left out of discussions when timing seemed off for participating (whether due to time zone differences, non-academic commitments, or a desire to reflect more deeply first).

Based on this pilot's outcomes, the recommendations for how Mattermost could best be implemented at UBC include:

1. Setting up for smaller groups of students at once, so interacting feels manageable and meaningful
2. Organizing content into clear channels and guiding shared organization to improve usability
3. Setting clear expectations around instructional team availability, so students know what response times to expect
4. Integrating with the Learning Management System (LMS) or regularly prompting from primary course sites to promote use
5. Setting loose guidelines for student participation, possibly including:
   a. Establishing explicit times for real-time discussions

b. Highlighting a specific channel, hashtag, or thread each week to help students who aren't broadly engaged to focus on this one conversation

c. Adding marks or badges to participating

d. Assuring students they can still meaningfully contribute later (not everything has to be real-time)

e. Helping students determine reasonable and manageable limits to their platform use

6. Emphasizing private communication options with instructors or TAs, especially for fully online courses

7. Explaining why Mattermost over other more established chat tools, using this opportunity to educate more on the importance of privacy

Implementing Mattermost with these recommendations may help resolve some of the concerns brought forward by instructional teams and students and improve future users' perceptions of the tool's pedagogical value.

Goal

This evaluation sought feedback from UBC instructors, teaching assistants (TAs), and students piloting Mattermost, a self-hosted open-source chat tool for facilitating online communication and collaboration.

In the context of teaching and learning, Mattermost allows for the creation of course- or cohort-based "teams". Each team gets access to an online space (available through a website login or installing a desktop or mobile app), where instructors and students can freely share messages and files. Conversations can occur in public channels (which everyone may join/participate in), private channels (constrained to specific individuals), and 1-on-1 direct messages.

In Mattermost, real-time and asynchronous communication are combined, meaning quick flurries of messages (i.e., chats) and slower-evolving threaded discussions can coexist in the same space. All types of posts are persistent and searchable, so individuals can follow conversations as they happen or return to track them later on.

Mattermost was selected to pilot at UBC because of the need for a chat tool, specifically one that could support fully online courses and programs while still respecting the privacy policies of the province. A more rudimentary tool called Blackboard Instant Messenger (BBIM) was previously decommissioned (due to high licensing costs, low usage, and approaching end-of-life for the product[1]), leaving a void for those UBC instructors relying on it in their courses.

The Faculty of Education developed use case studies to drive the replacement project and worked with LT Hub to generate a list of requirements for a new tool[2]. An environmental scan was conducted to find chat tools that met the primary requirements, narrowing the field to six candidates. Further requirements were then adapted into a rubric and two technologies (Rocket.Chat and Mattermost) surfaced as finalists. Both were installed on

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[1] See bulletin on Blackboard's site.

[2] This list incorporated pedagogical, technological, usability, and accessibility requirements based on Tony Bates's SECTIONS framework.

UBC servers for more thorough evaluation and testing with UBC Learning Technology Hub staff and Faculty of Education stakeholders. Mattermost emerged as the top candidate due to a simpler user interface and relative lack of bugs.

This report will detail the methodology used in evaluating Mattermost, why instructors chose to pilot it, the potential pedagogical value identified by people in the pilot, and how the tool could best be implemented at UBC.

Methodology

The Mattermost official pilot ran during the 2017/18 W1 and W2 terms in 11 courses, although many instructors had also used Mattermost in previous terms[3]. Seven instructors and one TA were interviewed near the end of the relevant term. Each interview consisted of 16 questions (see Appendix A.1), directly or indirectly addressed during in-person meetings.

Students from 9 of the 11 courses were asked to respond to online surveys at the end of the relevant term; 202 in total responded prior to mid-April 2018. At the time of the survey, all students had been provided a Mattermost team environment to use for the duration of their course or cohort (lasting a minimum of one term). The student survey included 11 questions, although Course 6 chose to use a single, open-ended question instead (see Appendix A.2 and A.3 for both versions).

The courses in the official pilot were predominantly from Education but also included representatives from Arts (Psychology and Political Science) and one from Science (Atmospheric Science), although the latter did not ultimately roll out Mattermost to the students. Half the courses were at the master's level, and first-year, third-year, and fourth-year courses comprised the rest. The majority of courses were online, with only a handful including an in-person classroom component.

All but one instructor left the use of Mattermost optional for students (though some required initial registration) and no instructors graded the interactions (though a few did allow this to increase participation marks).

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[3] Mattermost has been operational at UBC since April 2016, piloting with the original use cases.

The primary difference in tool application was how active/responsive instructional teams were in the platform. Some instructors and TAs actively encouraged Mattermost use with public prompting and/or quick response times; others were more hands-off about use and/or responded more as was convenient.

Summarized details for each course are provided below.

Course	Faculty	Type	Environment	Enrolled / Response Rate	Instructional Interactivity
Course 1	Science	Course 1st Year	Online	300+ students (not surveyed)	n/a
Course 2	Education	Cohort Master's Level	Online	15 students 27% responded	High
Course 3	Education	Cohort Master's Level	Online	25 students 68% responded	High
Course 4	Education	Course Master's Level	Online	36 students 3% responded	Medium
Course 5	Education	Course Master's Level	Online	24 students 8% responded	Low
Course 6	Education	Course Master's Level	Online	47 students 89% responded	High
Course 7	Education	Course Master's Level	Online	23 students (not surveyed)	Medium
Course 8	Arts	Course 4th Year	Blended	16 students 88% responded	High
Course 9	Arts	Course 1st Year	Online	110 students 61% responded	Low
Course 10	Arts	Course 1st Year	Online	75 students 57% responded	Low
Course 11	Arts	Course 3rd Year	Blended	170 students 3.5% responded	Low

While no classroom data was gathered, support staff were able to provide numbers for each active course that reflect high-level usage on public and private channels.

Course	Students Registered	Channels	Posts Breakdown	% Private Posts
Course 2	13/15 students	3 public 5 private	**44** public posts: "Town Square" - 43 posts "Off-Topic" - 0 posts "Tech Help" - 1 post **1,094** private posts	**96%** private
Course 3	25/25 students	3 public 5 private	**383** public posts: "Town Square" - 354 posts "Off-Topic" - 28 posts "Tech Help" - 1 post **9,083** private posts	**96%** private
Course 4	12/36 students	5 public 1 private	**42** public posts: "Town Square" - 23 posts "Off-Topic" - 18 posts "Tech Help" - 1 post **6** private posts	**13%** private
Course 5	20/24 students	4 public 4 private	**104** public posts: "Town Square" - 79 posts "Off-Topic" - 24 posts "Tech Help" - 1 post **45** private posts	**30%** private
Course 6	43/47 students	5 public 4 private	**1,286** public posts: "Town Square" - 713 posts "Off-Topic" - 96 posts "Tech Help" - 3 posts "Knowledge Sharing" - 353 posts "Mechanization: B&A"- 121 posts **179** private posts	**12%** private
Course 7	23/23 students	3 public 3 private	**104** public posts: "Town Square" - 71 posts "Off-Topic" - 32 posts	**66%** private

			"Tech Help" - 1 post **199** private posts	
Course 8	16/16 students	6 public 1 private	**103** public posts: "Classroom" - 62 posts "Tech Help" - 0 posts "Course documents" - 34 posts "Qualitative" - 0 posts "Quantitative" - 0 posts "Theory" - 7 posts **27** private posts	**21%** private
Course 9	83/110 students	7 public 1 private	**356** public posts: "Gathering Place" - 224 posts "Off-Topic" - 4 posts "Tech Help" - 0 posts "Peer Material Qs" - 13 posts "Peer Online Support" - 18 posts "Instructor's Office Hours" - 70 posts "TA's Office Hours" - 26 posts **214** private posts	**38%** private
Course 10	52/75 students	7 public 0 private	**404** public posts: "Gathering Place" - 175 posts "Off-Topic" - 5 posts "Tech Help" - 11 posts "Peer Online Support" - 41 posts "Peer Quiz questions" - 83 posts "Instructor's Office Hours" - 60 posts "TA's Office Hours" - 29 posts **164** private posts	**29%** private
Course 11	131/180 students	3 public 3 private	**262** public posts: "Gathering Place" - 256 posts "Off-Topic" - 6 posts "Tech Help" - 0 posts **192** private posts	**42%** private

The table above shows public posts (from public channels in a course) and private posts (from private channels in a course). Direct messages are the third type and exist outside

the course team. As such, private direct message counts on a per-course basis were not available; however, it is notable that for all courses using Mattermost (which included courses and teams outside the official pilot), direct messages accounted for about 60% of all posts.

Findings

Instructor motivations

Instructors expressed two primary, interrelated goals in using a team chat tool like Mattermost: 1) to improve their efficiency in communicating with students in a course and 2) to enhance the student experience generally, especially for distance courses.

Improve efficiency in communicating with students

To the first point, most Instructors acknowledged a challenge in keeping up with UBC email, "*which sometimes can be quite annoying*" due to the volume of messages. A chat tool offered an attractive way for these instructors to filter out messages pertaining to a particular course or cohort, a way to "*declog their mailbox*" and "*avoid the streams of emails with individual students*" that can be hard to follow and manage in one inbox. Some explicitly told students chat was their "*preferred mode of communication*" and planned to respond more quickly via chat than they traditionally did by email, since the messages would theoretically be surfaced more easily.

Most instructors also saw a way of improving efficiency by outsourcing the answering of common course questions (often answer-able from a syllabus) to the class as a whole. The thought was "*if somebody had a question they could ask it on [chat]*" in a public channel, and thereby hopefully eliminate the relatively "*long wait*" for an instructor's 1-on-1 response (often made longer for distance courses where students and instructors may be in significantly different time zones). "*If they can't ask us, they can at least ask their peers*" and more quickly "*ease this sense of not being sure what's going on*", particularly with regard to assignment requirements and due dates or basic "*clarification for key terms and concepts*" in course readings.

Enhance the student community experience

To the second point, both in answering one another's specific questions and discussing the course or related topics generally, most instructors also viewed chat "*as a way to create community*" and "*encourage some sort of socializing*" publicly or privately, so students could better "*connect to their classroom*". The idea was a tool could provide a nice "*one-stop shop*" for communication both formal and informal and ideally add to a stronger sense of cohesion for the students. Especially for the fully online courses and cohorts, "*everything is asynchronous, they do feel that disconnect*" normally, and "*if we know that student interaction is important, then online students should have student interaction too*".

Instructor response to using Mattermost

In terms of achieving the instructor goals, Mattermost seemed to clearly help with the first, increasing the efficiency of instructor-student communication.

Good 1-on-1 instructor-student communication

Most instructors found better ease particularly in reaching individual students, often either using private channels—"*that was a great way to chat with them*"—or direct messages—"*that's how I provided feedback*". The benefit of Mattermost as a medium for this communication was severalfold. One, "*it didn't have to be long and formal*" the way this sometimes felt over email (with greetings and sign-offs and signatures); rather, "*we could just have a quick dialogue connection and move forward*". Two, "*it's close and yet not too close*", that is, Mattermost chatting provided a sense for students "*they have my focus and undivided attention*" in real time yet "*at the same time, it's quiet*" without the video or audio component "*some people shy away from*". Three, for blended courses, "*if they weren't on campus we could have a conversation about what [they're] working on*" during regular office hours, without students having to make an extra trip out.

Ability for peers to answer each other's questions

Many instructors also felt the crowdsourcing of basic questions to other students ended up being an important part of this increased efficiency. "*In many cases, they will ask questions in the open town square environment*" instead of asking privately, and often "*someone else could provide the answer without me*". The ability to reach out to peers in some courses helped substantially, so that even "*the clarification of terminology and notions of how to do things was way clearer for all of them*". Part of the benefit here was "*avoiding that small problem becomes a mountain problem*"—when one student had a question that ended up being an issue for several students, the answer was immediately available to everyone (rather than sitting unanswered for some in an instructor or TA inbox). Additionally, for deeper questions, "*if a student is doing that, if they're answering questions, they're benefiting themselves*" further by explaining course content to peers.

Stronger sense of online community

The second instructor goal of fostering community also appeared aided by Mattermost, at least for those courses where students took to the platform. From several instructors' point of view, Mattermost supported a more informal communication between students. "*They have super rich conversations that had nothing to do with me*" and would sometimes reach out to each other "*to talk in non-academic ways*". But the conversations were also of a friendly academic type, "*asking each other 'hey what are you doing with regards to this activity?' or 'I just saw this and I thought I would share it with you'*". Mattermost seemed to provide "*a positive and non-threatening environment*" for deeper connection on both levels in these more active courses, resulting in "*a space for growth in learning*" collaboratively. In larger courses especially, "*it's kind of hard to get to [every] person*" who doesn't understand something, but the community helped fill in the knowledge gaps, and one instructor reported "*just anecdotally, I saw more study groups forming*" in a blended course through Mattermost.

Modern, relevant interface and interactivity

The modernity of Mattermost was another benefit brought up by the majority of instructors. "*The layout and how you can move between the different channels, it all seems to be more explicit and visually available and intuitive*" than a lot of other teaching tools out there. For most instructors, "*it seems clean and efficient*" and "*more user-friendly*" overall, and a couple instructors stressed the importance of this for the students as well. Since all technology teaches students "*behavioural patterns*" in interacting with it, "*if people can get familiar with these kind of tools that are actually being used in real environments, that's kind of meta teaching*". In other words, teaching with a modern tool that mirrors the functionality of something currently popular in real-world workplaces (i.e., Slack) offers an added bonus for students of familiarizing them with a new but increasingly common medium. And for those already familiar with similar technology, "*they knew how to use it and they just used it*" with "*zero conversations about tech support*", making this a "*low-cost tool*" to incorporate.

Potential of persistent learning space

Finally, many instructors were excited by the potential of Mattermost in creating more persistent learning spaces. Sometimes "*you want to enable and foster a community*" in teaching, not just an individual course, particularly at a master's level. These instructors thought many students "*invest a lot of time and resources and providing information and responding to prompts and assignments*", so why not continue to give them access to this space they've taken such ownership of? Some future use cases suggested for Mattermost included allowing cohorts to establish and keep a space throughout and after their time at UBC, inviting alumni into existing spaces to create connections with new graduates, and organizing general communities around a topic that could cross disciplines and even include the general public.

Pressure on instructional team work-life boundaries

As for downsides, the biggest issue mentioned by all instructors—though not all framed it this way—was how the real-time chat aspect pushed them to be more generous with their time and work/life boundaries. With multiple ways of accessing the platform and receiving

notifications on the go, Mattermost could easily become a 24/7 commitment, particularly in larger courses ("*when you've got 150 students, there's an expectation to always be around*"). For some instructors, heavy involvement seemed a fair trade-off. "*At work I use the web environment, at home I use the desktop app, while I'm commuting I use the phone*" so "*I'm really really responding to them all the time*" and that was okay. For others, "*I didn't want to have to respond right away*" or feel obligated to multitask all day as "*it's not just a matter of workload, it's also about splitting one's attention*" constantly. Instructors tried setting explicit unavailable hours ("*boundaries to create space*"), using email instead of push notifications ("*so it's not tormenting me the whole time*"), turning off all notifications (otherwise "*there was something dinging all the time*") or avoiding installing apps in the first place (knowing with these "*I wouldn't have a life*"). But pushing back in this way did leave some instructors worried they were working against the concept of real-time chat, i.e., not doing it right[4].

Unclear how much to encourage student uptake

Trying to decide how much to push student participation was another challenge to work through, especially since most instructors preferred tool use "*to have developed organically*" without prompting or requirements. In courses with less uptake, instructors could see "*it was one additional layer of technological connection*" that was not necessarily wanted or needed (partly "*because it's external to [the LMS]*"). So students "*stuck with what they knew they had to do in terms of grades and requirements*" and connected with each other through already-known platforms (e.g., UBC's LMS, Facebook) instead. Even in courses with more uptake, instructors recognized that "*some students gravitate to this as a communication tool*" whereas "*some students didn't want to engage that way at all*" or "*feel uncomfortable with the trend of more and more and more*" to keep them online, so it was hard to know how much to force interaction on Mattermost (as well as how they would go about grading that interaction fairly in the future). Particularly in the master's program, "*the amount of obligations and responsibilities that they have*" in and outside academics was a concern, as well as the sometimes less tech-savvy inclinations of more mature students.

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[4] One instructor of a blended course noted it would feel like a better use of this additional course time to "*have a one-on-one*" with more students, *"rather than spending more time opening up something and typing into it*", essentially combining "*10 [online] interactions into 1*".

Missing functionality

Finally, some instructors expressed a desire for more functionality[5] in Mattermost to increase its pedagogical and research value. Specifically, requests included easier access to participation statistics (of which there is little currently) for grading and self-reflection purposes[6], better integration with other learning tools (primarily the LMS), more restrictions on what students can and can't do in groups and channels, and the ability to directly embed content from links to ease playing catch-up on past conversations.

## Student response to using Mattermost

For those courses with response rates of at least a quarter of the class, the student experience was largely rated neutral or positive, with a notable absence of negative responses for 2 of the 5 qualifying courses (N = 159).

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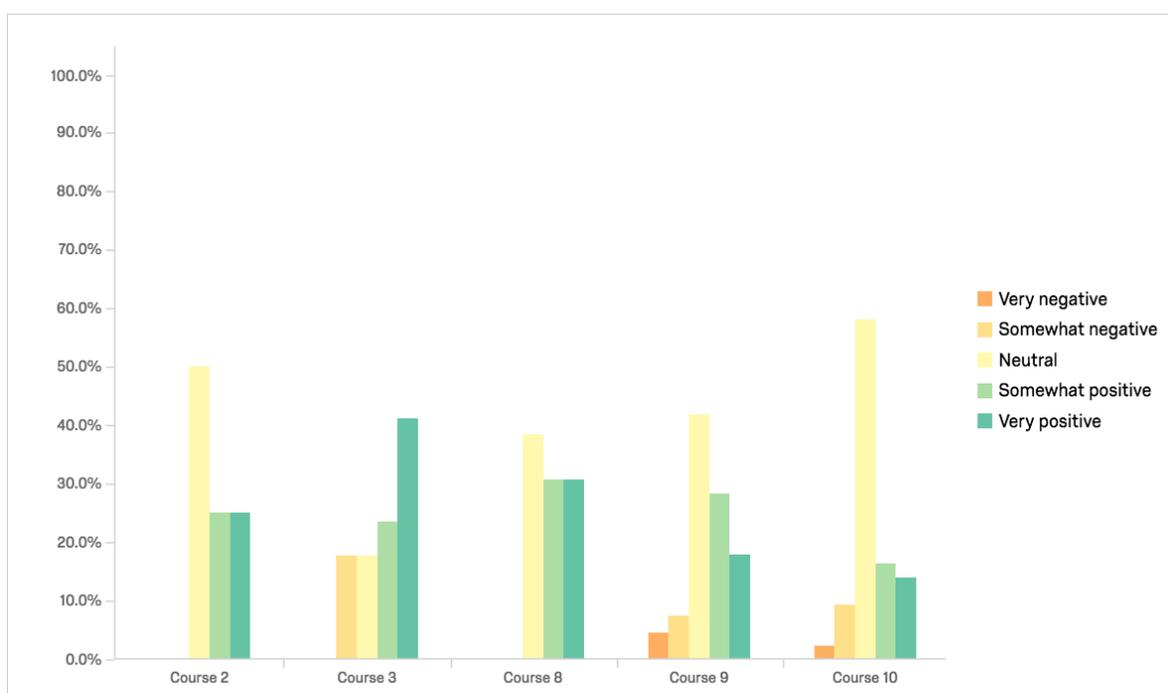
[5] The primary ways of adding more functionality would be to either explore Mattermost's paid options or allocate UBC in-house resources to custom develop the open-source code.

[6] Regarding the latter, insight into how the tool is being used privately between students would go a long way toward reassuring instructors who have fostering community as a goal. At present, this information is limited to administrators, and instructors are left in the dark about whether *any* private activity is happening (which, as the pilot stats reveal, may sometimes be the majority use).

Out of respondents for all 8 courses surveyed, about 43% reported a neutral experience (below, N = 159). Rather than indicating apathy about the tool, this seemed to reflect how students genuinely "*feel mixed about it*" and often saw "*there are upsides and downsides*" to using Mattermost.
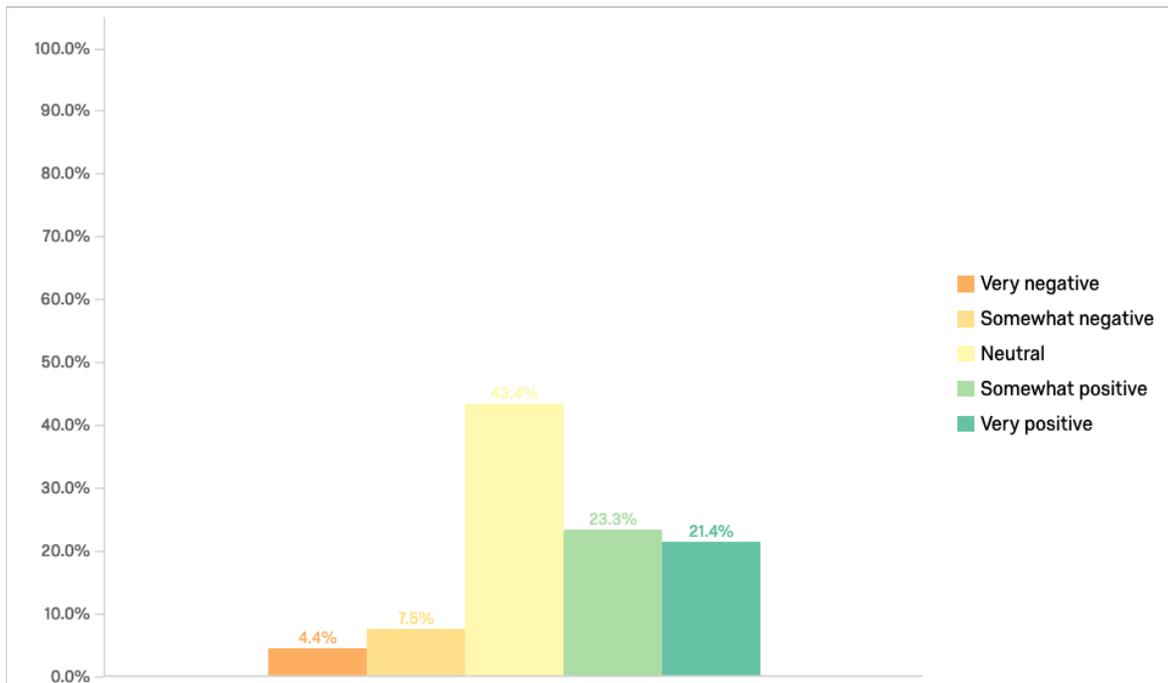
Further reinforcing this ambivalence, the 42 comments left in the single text box for Course 6 (easily the most active course in Mattermost for this pilot) coded as about half positive and half negative. However, around half (20) of the total comments contained *both* positive and negative sentiments, as students freely shared pros and cons of the tool in responding to the open-ended prompt.

In terms of perceived benefits and downsides of Mattermost for students, four primary themes surfaced in each between the two surveys (see Appendix B.2 and B.3 for related visualizations).

Helpfulness of peer interactions and connection

First, many students simply "*liked the ability to connect and chat with classmates in real time*". Receiving answers to course-related questions from peers largely contributed to students' positive perception of this additional student connection. Either *"I'm able to ask questions and get responses quickly*" or *"able to see answers to questions I'd thought of, but others had already asked*". One student mentioned "*public discussions were very helpful in directing me to the right direction of how to approach certain assignments*", indicating observing more extended dialogue between peers could also provide helpful guidance. Further "*it is a good sounding board*" for "*getting other people's opinions*" when there was not a definitive right answer.

While the student connection offered with chat was "*very helpful for quick messages regarding smaller course questions or content*", in some courses, it also "*allowed us to really discuss issues, which can be difficult in online courses*". The real-time aspect in particular "*feels much more connected than just having the discussion forums*" and "*goes a long way in fostering a sense of community, a struggle that is not easily overcome in online education*". Interestingly, of those students who reported a "Very Positive" experience, nearly half (46%) commented on the student-to-student interaction specifically vs. around a third noting the instructional team connection.

Good overall ease-of-use and features

A second reported benefit for some students was the usability of Mattermost (in response to agreeing with "Mattermost was easy to use" below, N = 159). These students either thought the tool was generally "*WAY more user friendly*" than other learning technologies they'd used in the past or noted a specific feature or function that contributed to better ease of use. In particular, students focused on "*how it sends us an email notification*" and/or "*message alerts to my smartphone*", which "*alerted me to important conversations I may have missed*" otherwise.
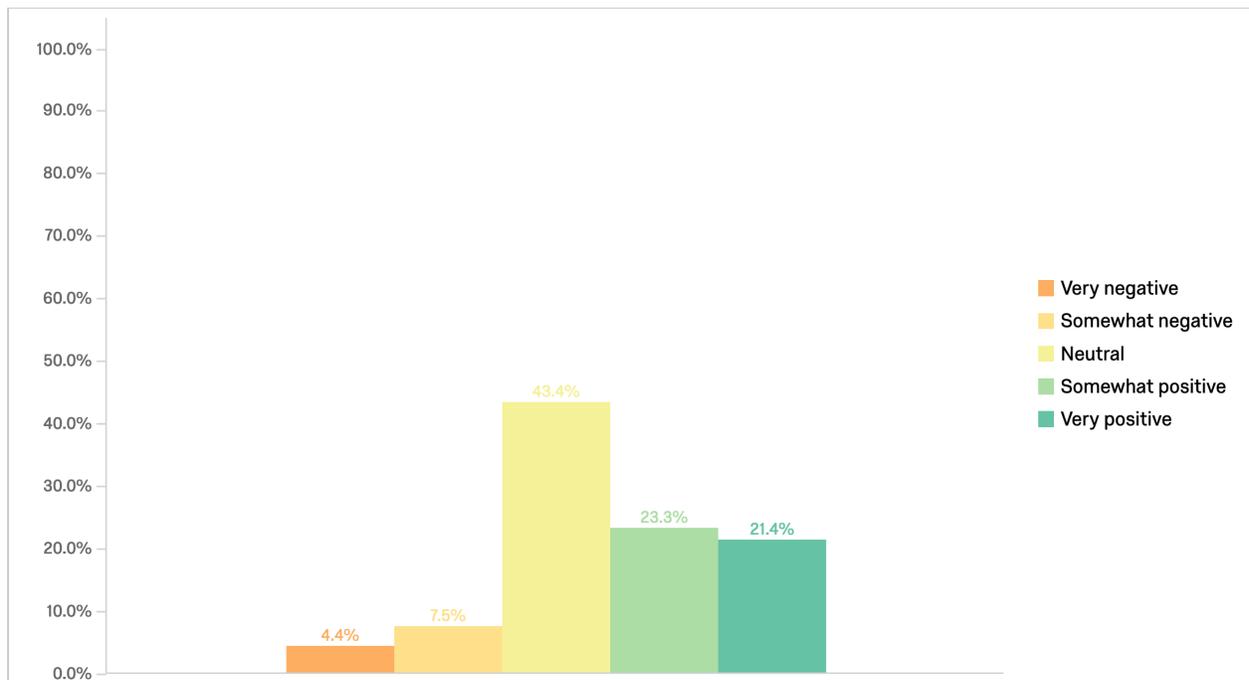
Immediacy of interactions removed blockages quickly

Third, many students positively noted the more immediate interaction with peers and instructional teams. Students frequently described communications as "*quick*", and this "*speed of connecting with the professor and other students*" in Mattermost helped avoid "*having to schedule a meeting or waiting until the next class*" so students could move forward on their course work. Faster and better access to instructional teams specifically was appreciated for those who felt they had it. "*The ease of being able to have quick communication with my professor and TAs*" meant students could check in about something (a question, a clarification, a draft) "*without the hassle of sending emails*" and the sense these messages are simply going into the void (especially "*if a professor decides to stop using email completely*" or gave that impression through lack of response). One student noted the immediacy even "*made me more inclined to ask questions*" in the first place[7].

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[7] Two instructors made similar statements about students asking more questions, but in a less positive light: "*any technology invites you to send off things right away, without giving it any thought*", so "*I can see how that can be a problem too because they might start relying on 'what can I say immediately?' vs. reading instructions*" first.

Nice to share informal space with peers

Finally, the chance to engage informally emerged as a benefit specifically in Course 6. Many students in this course liked the "*space for informal conversation beyond courses*" provided by the chat, where conversations seemed "*free flowing on a variety of topics*". This "*provides a more informal forum to share ideas and resources*" with "*lots of valuable additional information that [...] wouldn't be in a more formal discussion arena*", where topics can feel more specific, restrictive, and strictly academic (i.e., less tangentially related).

Platform disconnected from primary course sites

On the flipside, one of the biggest downsides of Mattermost for students was that it existed outside of the main course site for most ("*it was on yet another platform*") and required a separate login ("*another account, another password*"). This frustration coupled with "*the time commitment of learning and attending to one more format*" is not limited to Mattermost and commonly expressed by UBC students, but Mattermost seemed to heightened it a bit because of the real-time aspect of discussions. Some students felt more pressure to try to stay up-to-date, and the lack of integration "*made it more difficult to make the effort each week to check up*" on conversations, especially if students did not install an app (due to a deliberate choice or lack of awareness)[8]. "*If I am busy working on my course home page - I don't want to leave*", and this meant some students "*remember to check Mattermost as an anxious afterthought*" or not at all.

Information overload with existing commitments

Similarly, since most students already interact with one or more social platforms outside courses (including email) and may already be asked to keep track of a course site, blog, and/or discussion forum, some did not welcome another avenue for communication. "*The last thing I want or need is yet ANOTHER way to chat*" when there are already "*many other modes of communication to keep up with in personal, professional and now academic life*". For these students, Mattermost became "*essentially an additional platform to check*" and in

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[8] The majority of students in most courses accessed Mattermost through the website itself, so regular signing in was a part of their experience.

courses with more Mattermost content to parse, some found "*checking it on a frequent basis makes me feel overwhelmed and distracted from other things*" including importantly "*engaging in the course content independently*".

Usability issues, especially as more content added

Third, some students also struggled with specific features of Mattermost that did not work as they expected. Particularly early on—while still becoming familiar with the platform—if students ran into issues with learning how to access, set up apps, or download files, they sometimes concluded *"it seems more convenient just using email"* to communicate and abandoned Mattermost. Even some students who spent time getting familiar noted a difficulty when the content in an individual channel started to become "*clogged*" or "*cluttered*". Excess content for some made it "*challenging to find the start of a thread*" and "*overwhelming and time consuming at times to be interactive*" because "*it's not easy to sort through and find what's relevant to me*" or where it made sense to jump in[9]. Some students thought part of the confusion had to do with how their peers interacted with the platform (not necessarily how Mattermost itself worked), but "*I am just not sure how to encourage others to post in a more organized fashion*".

Feeling of being left out at times

A final downside of Mattermost was a reverse reaction to those who noted a stronger community feel: some students (particularly in Course 6) thought they were missing out. In courses with minimal uptake, students who checked in hoped to find more of their peers active and were disappointed—"*I would have used the group chat if more of my classmates used it*". In courses with more uptake, the issue was students feeling "*left out*" of activity. This was sometimes due to time zone differences or work/home life commitments, so "*when I get a chance to log-in, often I feel very 'out of the loop' of the discussions*" or "*the topic has moved on*". But this was also a matter of personality, mirroring struggles with in-person classroom participation. Some students who were available/online were simply not as ready to contribute in real time, whether because they were "a *more pensive contributor so*

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[9] This overwhelm makes sense in looking at the statistics noted earlier, wherein some of the main public channels (often titled "Town Square") contain hundreds of posts in total.

need more time to reflect" or "*find it difficult to jump into a conversation*" when "*there are a lot of cooks in the kitchen*" already.

Recommendations

Based on this pilot's outcomes, these are some recommendations for how Mattermost could best be implemented at UBC to maximize its perceived benefits and minimize its perceived shortcomings.

1) Set up for smaller groups of students at once	
May address	• [Usability issues, especially as more content added](#) (student issue) • [Feeling of being left out at times](#) (student issue) • [Helpfulness of peer interactions and connection](#) (student benefit) • [Nice to share informal space with peers](#) (student benefit)

Mattermost may be better suited for smaller numbers of students at once, so students feel they can meaningfully contribute and interact without being drowned out or overwhelmed by the content of too many peers. As one instructor acknowledged, "*it's hard when 40 people are interacting*" in the same space, and this individual was not alone in thinking "*one thing that I will change is I will keep both sections separate*" or otherwise break the students into smaller groups for future uses of the tool[10]. One instructor with experience using smaller groups in team chat also advised keeping group minimums to 10, since "*sometimes groups don't gel*" when arbitrarily split up, so each group needs enough students for varied participation of its members.

One implementation approach could be to add students immediately to private group-based channels within each larger Mattermost team, and direct students there as soon as they join (as was done in Course 7). This allows public channels to remain shared spaces for things like course-wide announcements.

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[10] Notably, the two courses with 50% and higher reported positive experience had just 15, 25, and 16 students registered in Mattermost.

2) Organize content into clear channels and guide shared organization

May address	• Modern, relevant interface and interactivity (instructor/TA benefit) • Information overload with existing commitments (student issue) • Usability issues, especially as more content added (student issue)

A common theme in student comments regarding advice they would give instructors was that Mattermost "*needs to be organized*" into more or better channels, especially for public channels anyone can join. Instructors can potentially help by establishing core public channels for different types of interactions, topics, weeks, or assignments and explicitly articulating (and modeling) what these are intended for. Subheaders areas in Mattermost channels and could be used as instructional descriptors for further emphasis.

Instructional teams explaining the basics of when to use a direct message vs. an @mention vs. a private channel and the purpose of (and difference between) channels and tags could also be useful, especially for students new to this kind of communication medium. Ideally, support staff could write and make available a general overview document or help page to aid with this kind of high-level training, so all students understand better how to contribute.

3) Set expectations around instructional team availability

May address	• Pressure on instructional team work-life boundaries (instructor/TA issue) • Good 1-on-1 instructor-student communication (instructor/TA benefit) • Immediacy of interactions removed blockages quickly (student benefit)

Instructors/instructional teams should decide ahead of time roughly when and how they will use and monitor the communication on Mattermost—as one TA stated, "*from the get-go, provide a schedule*". This pilot did not surface clear findings in terms of availability best practices; what seemed more important was how well expectations were communicated to students.

If instructional teams were available when students expected, they seemed satisfied with response rates (and dissatisfied if expectations were unclear or unmet, e.g., office hours unattended on Mattermost). As one student explained, the instructor "*gave us reasonable expectations of how [the instructor] sought to use it, which allowed us to use the platform more*

as we understood the norms around it". In other words, when students understand how (and when) an instructor will interact, they may be able to adjust their interactions accordingly. And these boundaries can benefit both sides so, as one instructor put it, "*even though I get messages, I have the sanity and the peace of mind*" from not having the pressure to respond all the time, right away.

Availability guidelines could be as simple as setting times students can expect real-time responses and times to expect a delay (as well as how much of a delay, e.g., within a couple hours, half day, full day).

4) Integrate or regularly prompt to promote use	
May address	• [Good overall ease-of-use and features](#) (student benefit) • [Information overload with existing commitments](#) (student issue) • [Feeling of being left out at times](#) (student issue) • [Platform disconnected from primary course sites](#) (student issue)

Mattermost would certainly benefit from integration inside an existing LMS (e.g., Canvas), so students can access it within the context of the rest of their course content. But without this, instructors may still help uptake by prompting students to use the chat from the course site, when appropriate—"*go [there] and say I just posted something to Mattermost*"—to spark discussion, even linking directly to the post. Or, as happened with Course 8, instructors could consider hosting the core content in Mattermost—*"post all the course documents in the channels*"—rather than having a separate repository.

Additionally, instructors could encourage students to use and customize the built-in email or push notifications, which many students said reminded them to check in more regularly. Instructional teams triggering notifications by regularly adding new content to top channels could also help (and RSS feeds can be integrated with Mattermost as a means of automatically adding content to specific channels).

5) Set loose guidelines for student participation

May address	[Ability for peers to answer each other's questions](#) (instructor/TA benefit) [Information overload with existing commitments](#) (student issue) [Unclear how much to encourage student uptake](#) (instructor/TA issue) [Immediacy of interactions removed blockages quickly](#) (student benefit) [Feeling of being left out at times](#) (student issue)

Since this pilot was a trial run of Mattermost for many, instructors were understandably reluctant to define how students should interact with it. However, setting future guidelines for student participation could alleviate some of the student stress brought on by having a new additional communication channel to monitor that could feel like a 24/7 commitment.

In particular, instructors could consider:

- Establishing explicit times for real-time discussions (with varying time slots that allow all distance students to participate, regardless of time zone).

- Highlighting a specific channel, hashtag, or thread each week (mimicking "trending" feeds on other social media platforms) in more active courses, possibly by using the pinning feature in Mattermost, to help students who aren't broadly engaged to focus on this one more manageable conversation.

- Adding marks or badges for participating at least x number of times in a term (or x number of times each week to encourage more regular contributions) and/or providing marking or other incentives specifically for asking and answering peer questions in chat.

- Assuring students they can contribute later and take their time; conversations don't have to be synchronous and replying to an earlier post will bring the original comment back around in the user interface, so other students are reminded of the context.

- Helping students determine limits around their use of this social platform and emphasizing, as one instructor articulated, "*they don't need to be glued to it the whole time*" rather, "*it's like everything 'with measure'*".

Regarding the final point, addressing this directly could provide a similar benefit as familiarizing students with a modern communication tool: they would learn an important skill (determining how much and how often to monitor and participate in a social technology) with potential direct real-world applicability in personal and professional life. This could help ease, as one instructor put it, the sense with these technologies that "*it doesn't feel like we are really in charge of our lives*".

6) Emphasize private instructor-student communication options

May address	• [Good 1-on-1 instructor-student communication](#) (instructor/TA benefit)

As noted earlier, private communication use in the form of direct messages and private channels dominated in many of the courses, and several instructors felt it offered heightened value for 1-on-1s between themselves and students in online courses. One instructor noted this "*allows me to increase the quality*" of online courses specifically, and it may make sense for instructors to highlight these options especially with distance students.

7) Explain why Mattermost over other more established chat tools

May address	• [Platform disconnected from primary course sites](#) (student issue)

Some student comments reflected a sense of confusion about why they were directed to use Mattermost over more established chat tools like Slack or Facebook (since many already have accounts there for personal use). Explaining how Mattermost complies with privacy legislation and why this should matter to students both in and outside academics could be a good learning opportunity, in addition to justifying the use of a separate tool.

Implementing Mattermost with these recommendations may help resolve some of the concerns brought forward by instructional teams and students and improve future users' perceptions of the tool's pedagogical value.

Appendices

Appendix A - Instruments

A.1) Instructor interview questions

1. What were your main objectives for using Mattermost?
2. How was Mattermost integrated into the course overall?
3. How were students introduced to and prompted to use Mattermost?
4. How did you integrate Mattermost into your workflow? Specifically, how often did you monitor Mattermost and set expectations for your availability via chat?
5. What parts of the term, if any, did you notice Mattermost seemed heavily used or particularly useful?
6. How did you access Mattermost (check all that apply)?
   a. Via the Mattermost website
   b. I used a desktop/laptop Mattermost app
   c. I used a mobile Mattermost app
7. On a scale of 1 to 5, with 1 being "not at all helpful" and 5 being "very helpful", rate how helpful or not the following features of Mattermost were for you.
   a. Public channels (aka town square)
   b. Private channels
   c. Direct messages to/from teaching team
   d. Direct messages to/from students
   e. File sharing
   f. Search
   g. Ability to see who is online
   h. @ mentions
   i. Threaded discussions
8. How effective or not was team chat in supporting your objective(s). Why?
9. How effective or not was Mattermost in supporting team chat? Why?
10. On a scale from 1 to 5, with 1 being "strongly disagree" and 5 being "strongly agree", rate how much you disagree or agree with the following.
    a. Mattermost's capabilities met my requirements
    b. Mattermost was easy to use

11. What were the main benefits of using Mattermost?

12. What were the main drawbacks/inconveniences of Mattermost?

13. Have you used another learning technology that also supports real-time communication? If so, how did Mattermost compare?

14. When you needed pedagogical/technical support with using Mattermost, how did you get it?

15. On a scale of 0 to 10, with 10 being highest, how likely are you to recommend Mattermost to a colleague or friend for use in teaching and learning?

16. After using Mattermost, what other ideas, if any, do you have about using this technology or a team chat technology for teaching and learning?

A.2) Student survey questions

1. On a scale from 1 to 5, with 1 being "strongly disagree" and 5 being "strongly agree", rate how much you disagree or agree with the following.
   a. Mattermost's capabilities met my chat requirements
   b. Mattermost was easy to use

2. How did you access Mattermost (check all that apply)?
   a. On the Mattermost website
   b. On a desktop/laptop Mattermost app
   c. On a mobile Mattermost app

3. How often did you use or check Mattermost (select one)?
   a. Rarely
   b. A few times during the term
   c. About once a week
   d. A few times a week
   e. About once a day
   f. Multiple times a day

4. On a scale of 1 to 5, with 1 being "not at all helpful" and 5 being "very helpful", rate how helpful or not the following features of Mattermost were for you.
   a. Public channels (aka town square)
   b. Private channels
   c. Direct messages to/from instructor(s)
   d. Direct messages to/from students
   e. File sharing
   f. Search

g. Ability to see who is online

h. @ mentions

i. Threaded discussions

5. How would you rate your overall experience using Mattermost for team chat in this course (select one)?

a. Very negative

b. Somewhat negative

c. Neutral

d. Somewhat positive

e. Very positive

6. What did you like and/or not like about using Mattermost?

7. On a scale of 0 to 10, with 10 being highest, how likely are you to recommend Mattermost for use in other UBC courses?

8. On a scale from 1 to 5, with 1 being "did not at all benefit" and 5 being "greatly benefited", rate how much or how little benefit you saw from using team chat.

a. Communicating with the instructor(s)

b. Getting quick answers to course-related questions

c. Understanding the course topics

d. Completing individual assignments

e. Completing group assignments

f. Preparing for quizzes or assessments

g. Connecting generally with other students

h. Contributing my own thoughts and opinions

i. Other (please specify): _____

9. On a scale from 1 to 5, with 1 being "greatly decreased" and 5 being "greatly increased", rate how team chat affected your motivation to participate in this course. (If you felt no effect, please select "3".)

10. What advice would you give instructors about the best way to they can use team chat in this or a similar course?

11. Is there any other feedback you'd like to provide about team chat? (Anything about how team chat affected your learning or how else it could be used?)

A.3) Student open-ended single feedback question

1. What do you think about Mattermost in the context of this course?

Appendix B - Compiled Student Data

(See: Qualitative codes for these questions)

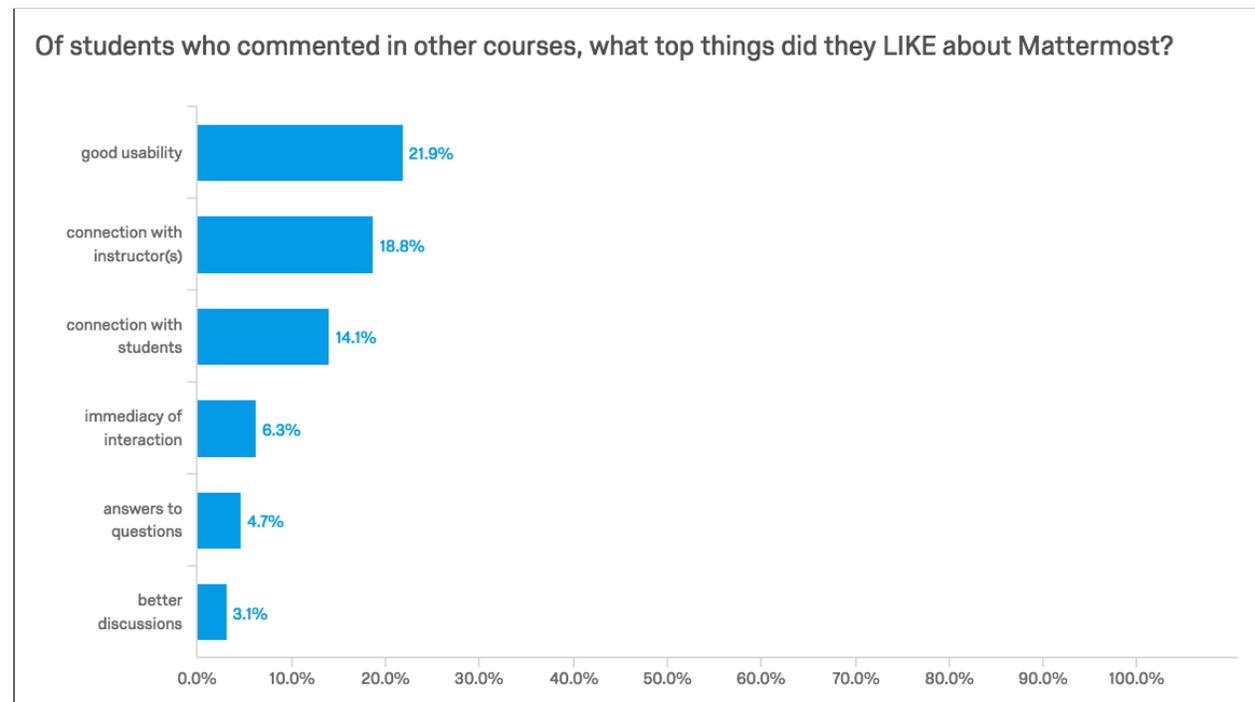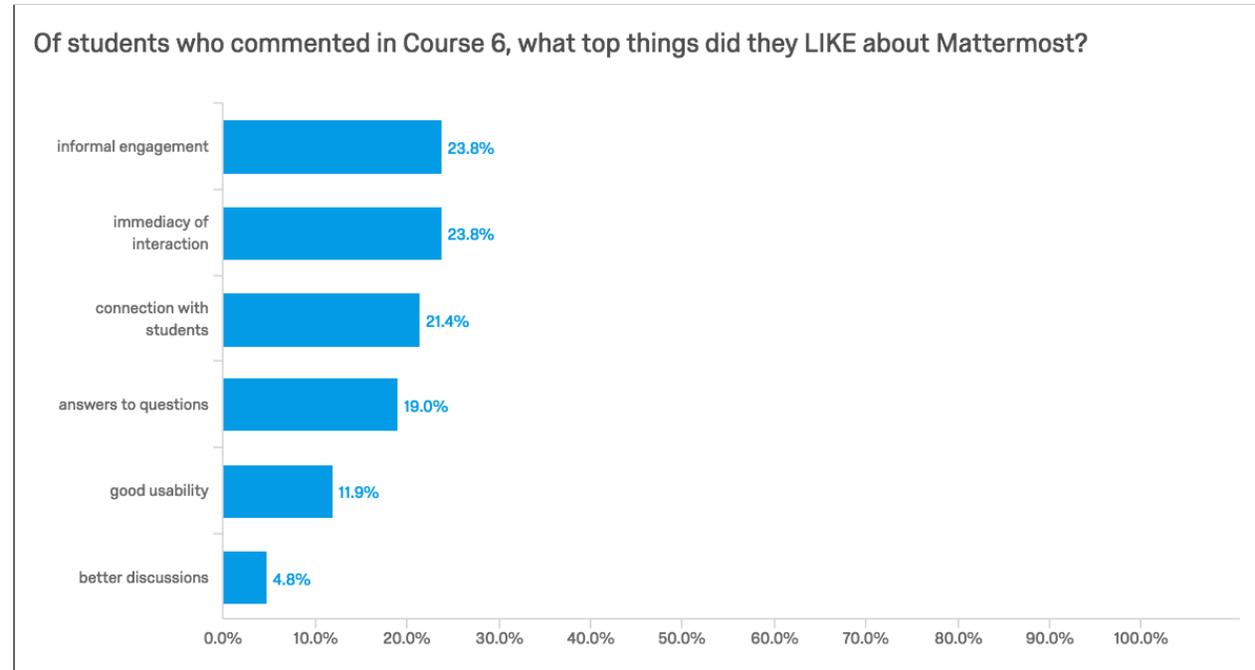### B.1) Student Mattermost "Likes" and "Dislikes" Top 25 Words (N = 42, 64)

What words did students who commented in Course 6 use to describe Mattermost likes or dislikes?

What words did students who commented in other courses use to describe Mattermost likes or dislikes?

B.2) Student Mattermost "Likes" (N = 42, 64)

Of students who commented in Course 6, what top things did they LIKE about Mattermost?

Category	Percentage
informal engagement	23.8%
immediacy of interaction	23.8%
connection with students	21.4%
answers to questions	19.0%
good usability	11.9%
better discussions	4.8%

Of students who commented in other courses, what top things did they LIKE about Mattermost?

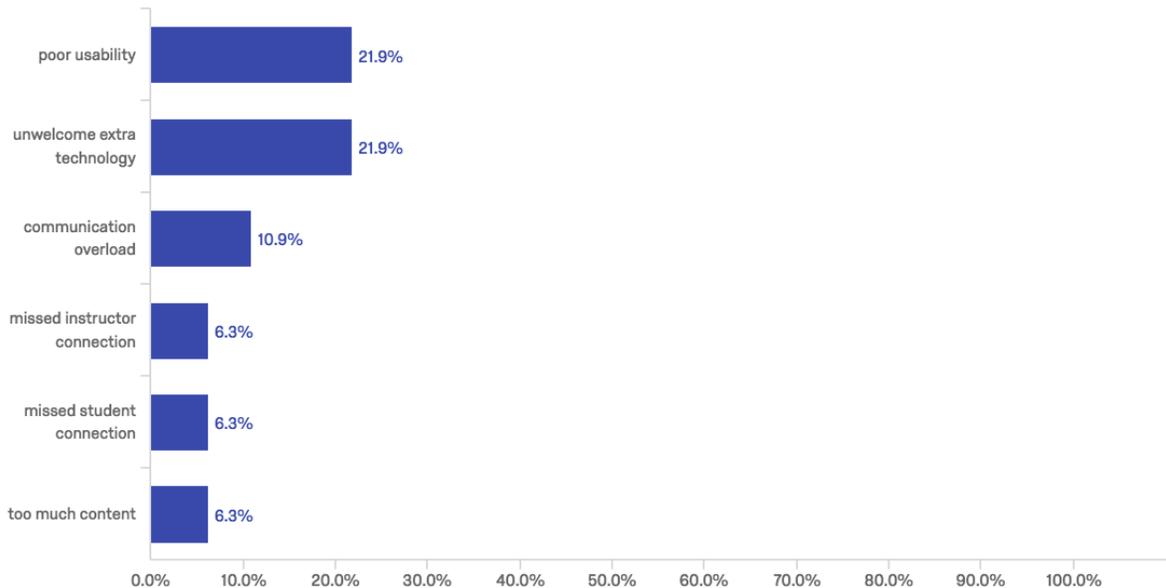| Category	Percentage
good usability	21.9%
connection with instructor(s)	18.8%
connection with students	14.1%
immediacy of interaction	6.3%
answers to questions	4.7%
better discussions	3.1%

B.3) Student Mattermost "Dislikes" (N = 42, 64)

Of students who commented in Course 6, what top things did they NOT like about Mattermost?

too much content	40.5%
poor usability	21.4%
unwelcome extra technology	21.4%
missed student connection	16.7%
communication overload	9.5%

Of students who commented in other courses, what top things did they NOT like about Mattermost?

poor usability	21.9%
unwelcome extra technology	21.9%
communication overload	10.9%
missed instructor connection	6.3%
missed student connection	6.3%
too much content	6.3%
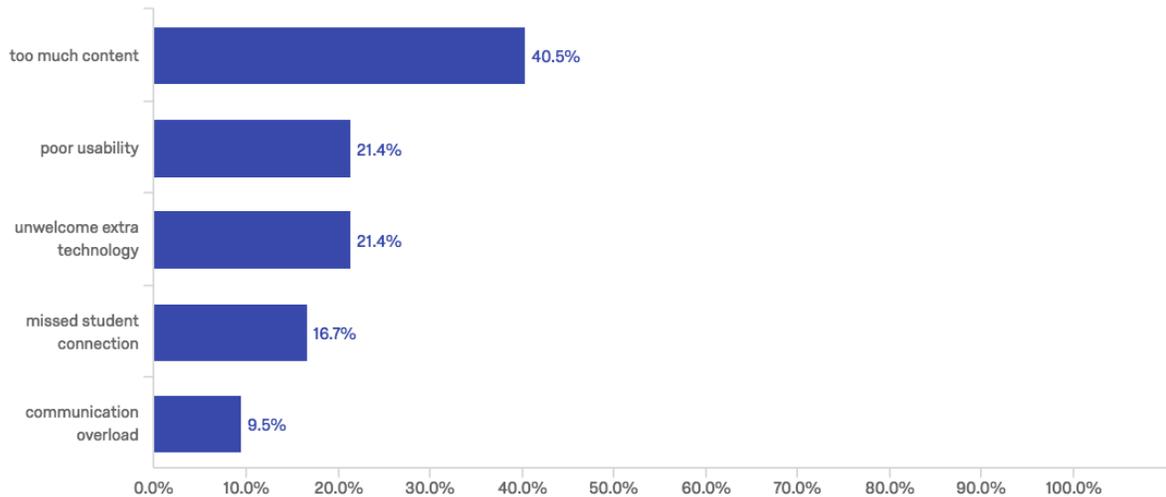
B.4) Student Reported Benefits (N = 146)

Where did students perceive benefits in using Mattermost (in 8 courses combined)?

Legend:
- 1 - Did not at all benefit
- 2
- 3
- 4
- 5 - Greatly benefited
- n/a (never used)

Categories:
- Communicating w/the instructor(s)
- Getting quick answers to course-related questions
- Understanding course topics
- Completing individual assignments
- Completing group assignments
- Preparing for quizzes/assessments
- Connecting generally with other students
- Contributing my own thoughts and opinions

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Englund, L., Linkletter, I., & Zerdin, J. (2018, April). *Mattermost Technology Evaluation Report*. University of British Columbia's Learning Technology Hub.