A Field Guide to Online Collaboration Tools

Research done by the MIT Terrascope Learning Community
for remote learning during the fall 2020 semester

By: Danielle Allison, Laura Chen, Richard Colwell, Felix Li,
Neosha Narayanan, and Sarah Weidman

The research and opinions below reflect those of the student research team alone, and do not represent official institutional or Terrascope perspectives.

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Research Process

Our goal was to find the ideal software or combination of softwares to use as a platform for the remote version of the Terrascope first-year "Solving Complex Problems" (12.000) class in fall 2020. To begin, we sent out a survey to some student groups at MIT asking for recommendations and anecdotal experience with some virtual collaborative tools, and we generated an "online tools master sheet" in which we tracked recommendations and other platforms that we came across.

Next, we researched each tool and generated notes, from which we narrowed them down to a shorter list. We then reexamined each of these and rated them using a Pugh chart (these can be found in the appendix of this document), and with the top ranking tools, we did some internal and external (with the broader Terrascope community) trial collaboration sessions. Some of the tools on the Pugh chart have two rows of values because we had two people review and rate them. After this, we also tested two extra classroom experience tools, Sococo and Remo, which are not noted in the Pugh chart. Finally, once we had decided on our top contenders, we ran a simulated Terrascope class to gather more feedback and to see how it might all fit together.

What did we recommend to Terrascope?

For the purposes of the fall 2020 class, a project-based class typically with somewhere between 40-70 student collaborators, wcte recommended using Mural as the collaborative whiteboarding tool and a combination of Zoom and Discord as communication/classroom experience platforms. For the purposes of this document, we have ordered the tools in each section in a way that reflects numeric and qualitative criteria from the Pugh charts we created, *which were based on Terrascope-specific weightings,* going from most recommended to least.

Video + Audio Communication Tools

We looked into platforms for video and audio meetings that best suited the needs of 12.000. Features that we looked at included the ability for students to separate into smaller groups and move around them, video and audio performance in combination with other software students may be running, chatting features and the ability to have these save or not save, and general ease of use with considerations for the balance of overall effectiveness.

Summary of our findings

In general, many of the audio and video conferencing softwares were similar. Zoom has an advantage due to its familiarity and wide use, which is why it is at the top of this category. One limitation we ran into was the ability to switch between breakout rooms, which we consider a very important feature due to the flexible and fluid nature of the Terrascope class 12.000. Because of this, we determined that the voice/video channel feature in Discord was superior to the breakout rooms of Zoom. Large group meetings are much better in Zoom, however, so *we have recommended a hybrid model: starting and ending class in Zoom, and using Discord as the breakout tables during the remainder of class time.*
Microsoft Teams is also very comparable to Zoom in its functionality. Teams might also be preferable if the group is already using the rest of the Microsoft Suite for other purposes (Word, PowerPoint, Outlook, etc).

Zoom

[Zoom](), a video conferencing platform widely used for remote teaching this year, is a relatively superior video-calling option and is adept at screen-sharing, separating meetings into breakout rooms, and recording.
- Features include chats, screen-sharing, whiteboarding/annotating, breakout rooms, and recording.
- Pros: widely adopted, decent video and audio capabilities.
- Cons: previous privacy issues, can be memory and battery consuming, breakout rooms don't facilitate switching rooms well (unless co-host capabilities are given to each member during the session), limited capability to communicate across breakout rooms, chats disappear with the end of the call
- Best suited for larger group meetings and is widely adopted for classes and online meetings in general.

[All logos were obtained from their respective websites (linked in each description).]

Discord

[Discord](#) is a flexible communication platform with the ability to organize voice and text channels that supports user autonomy in moving between channels.
- Features include text channels, voice/video channels, and bot integration.
- Pros: very adaptable and modular for classroom environment, able to see and move between different channels, facilitating seamless group changes or intergroup exchange, conversations written in text channels remain whether anyone is active in the server or not.
- Cons: maximum of 25 people can have their video cameras on in a voice channel which can be a hindrance for larger group meetings, a bit of a learning curve to use whereas Zoom is more widely adopted and therefore people are more comfortable with it.
- Best suited for classes that would like flexibility to move among voice channels and are more focused on project/team work.

Google Meet

[Google Meet](#) is a video/audio calling tool that is a part of Google Suite.
- Google Meet features include screen sharing, calendar integration, captioning.
- Pros: can connect with MIT email or gmail, integrated into Google Calendar.
- Cons: audio and video quality is lower than Zoom, no breakout rooms feature, no admin/host security features, less functionality/adaptability in general in comparison to Zoom and Discord.

Microsoft Teams

[Microsoft Teams](#) (part of Microsoft Suite) is an all-encompassing team communication platform to communicate via video call, text/channel chatting, file sharing, and whiteboarding.
- Features include video/text chatting (comparable to zoom quality), file sharing, integration with other communication apps, whiteboarding integration.
- Pros: well developed system, has lots of features, available through MIT.
- Cons: Google suite may be more widely used since it's more accessible and people tend to have experience with it, Google's sharing and real-time collaboration is better.
- Best suited for groups/teams that have already adopted the use of the Microsoft suite and have existing infrastructure for file sharing/management through Microsoft. Otherwise, Google Drive/Suite seems to be more accessible and widely adopted.

[All logos were obtained from their respective websites (linked in each description).]

Webex

Webex, a video conferencing platform, seems slightly inferior to Zoom in video-call abilities, but includes greater privacy, ability to move between breakout rooms, and a wider adoption by private companies.
- Features include chat, breakout rooms, screen sharing.
- Pros: ability to move between breakout rooms, privacy, licensed by MIT
- Cons: does not work on Linux other than Ubuntu, Zoom is more widely adopted and supported by MIT

Jitsi

Jitsi is a video conferencing platform that is similar to Zoom.
- Pros: prioritizes privacy.
- Cons: a bit more laggy than Zoom, no waiting room feature.
- Best suited for small group meetings, however, it may be simpler to just use Zoom even for smaller group meetings.

[All logos were obtained from their respective websites (linked in each description).]

Whiteboarding Tools

We looked into software that best replicated the experience of brainstorming on a collaborative whiteboard. We focused on finding tools that were easy to use/navigate, had a good UI/UX on an iPad, and were flexible to the needs of the students, having functions that could replicate the typical in-classroom team brainstorming - drawing on a whiteboard, putting up stickies, casual information presenting/sharing, etc. Power and complexity of capabilities was important to us, as we felt that minimizing the amount of applications to juggle was preferable.

Summary of our findings

After testing many whiteboard softwares, *we found Mural to be the easiest and cleanest software to use for class.* The functionality of rooms within a workspace allows for groups within the Terrascope 12.000 class to have their own area to collaborate while still working together as an entire class. For general use, Miro, Mural, and ConceptBoard were comparable, powerful options, with Padlet (and Trello, which is explained in the Task Management section) swapping flexibility for organization. Stickies.io and Noteapp offered very simple and free options.

Mural

[Mural](), an online whiteboarding workspace enabling remote collaboration in real time, is powerful, simple, and easy to use.

- Features include drawing mode, built-in chat, commenting, stickies, voting sessions, templates, file attachment, has iOS app, ability to separate into separate subteams.
- Pros: short learning curve, very freeform, private rooms and organization is more intuitive than other comparable applications
- Cons: rooms full of murals may become disorganized, can be a bit difficult to maneuver depending on browser/app.
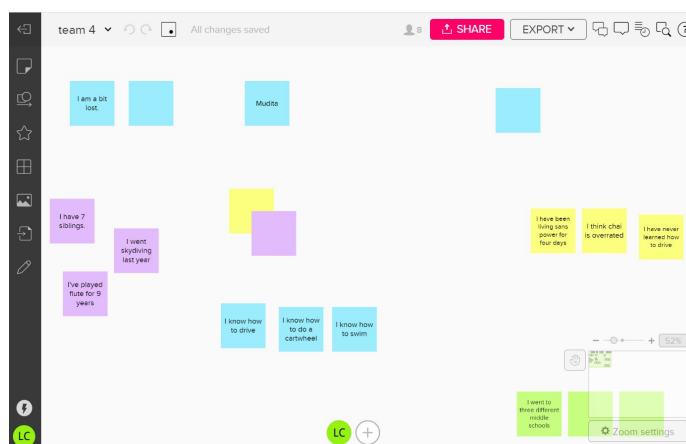
[All logos were obtained from their respective websites (linked in each description).]

Miro

[Miro](), an online whiteboarding platform enabling remote collaboration in real time, offers greater flexibility than Mural with optional plug-ins and may handle bigger groups better but with a longer learning curve.

- Features include integrated drawing mode, video for up to 25 people (with upgrade), integrated messaging system, commenting, stickies, templates, organize, tag and assign tasks, wide variety of integrations, file attachment, has iOS app, ability to separate into separate subteams.
- Pros: lots of tutorials, flexible with integrations.
- Cons: has a learning curve, the mobile app is not as intuitive as Mural's, interface is finicky at times and confusing.
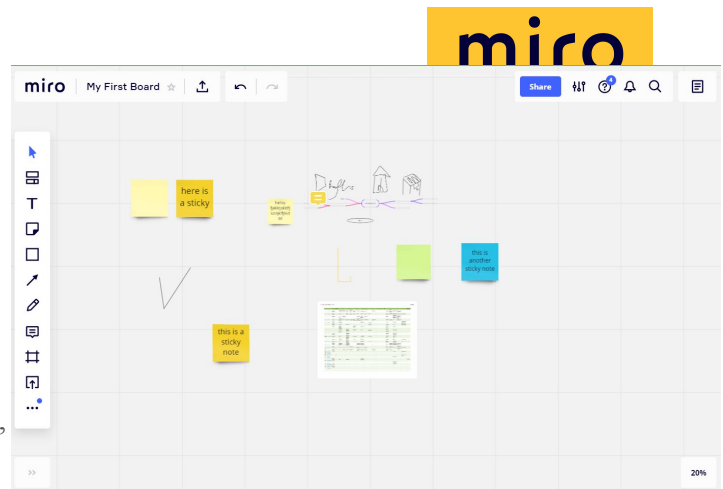
Explain Everything

[Explain Everything]() is a virtual collaborative whiteboard with an infinite canvas space.

- Features include: drawing, text, recording, integrated webcam/audio.
- Pros: Recording option allows you to narrate and write at the same time, can also go back and edit the audio and visuals afterwards, used by big companies like Google, mobile version's writing option works well, learning curve for navigating and managing board objects. Explain Everything has also recently been licensed by MIT.
- Cons: Tutorials necessary to make good use of features, some mobile version bugs. Sharing options are similar to Google Drive (folders with documents inside them), however you are not able to create nested folders, which is a major con for the Terrascope fall class. We found the workspace and room organization of Mural to be superior with its flexibility and ease of access.
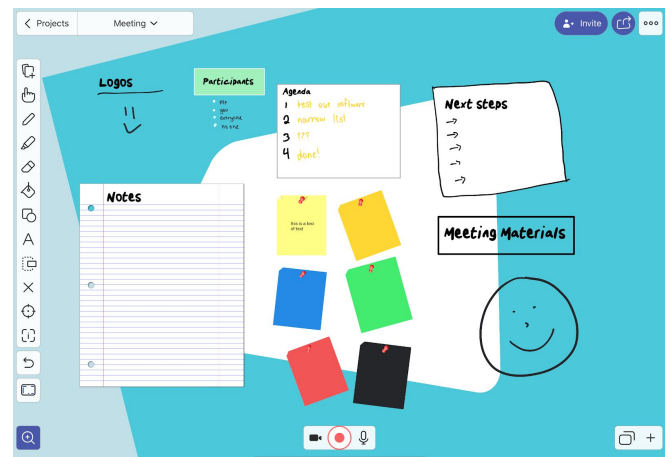
[All logos were obtained from their respective websites (linked in each description).]

Conceptboard

Conceptboard, a visual collaboration workspace for real-time collaboration, is easy to use but is less widely adopted than Mural/Miro and maxes out at 50 users per board.

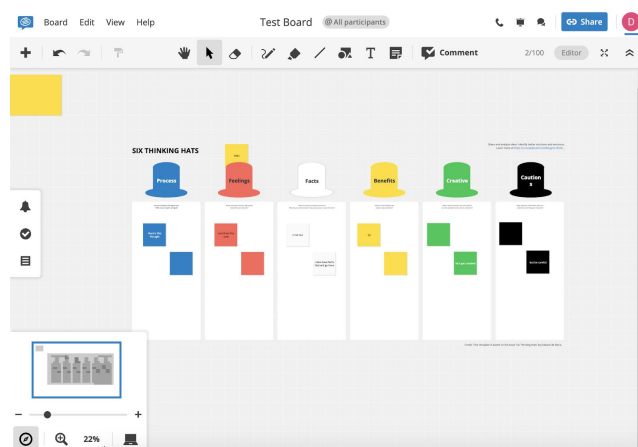- Features include drawing mode, built-in chat, commenting, built-in video conferencing, alerts, stickies, some task management, file attachment.
- Pros: relatively easy, intuitive to maneuver.
- Cons: less widely adopted, no free option, no app version, limit of 100 objects on board without upgrade, 50 users per board maximum problematic for larger classes

NoteApp (previously corkboard.me)

Corkboard.me (now NoteApp) is a basic online collaborative sticky board without much variety of tools but offers a limited free option for some simple brainstorming.

- Features include built-in chat, stickies, some task management, custom wallpapers, file attachment.
- Pros: very simple.
- Cons: not a lot of capabilities, no handwriting, need upgrade for collaboration, slightly difficult to navigate, have to use commands to change font size/style, cannot leave empty stickies, no app, doesn't run well on Safari on iPad.
- Best suited for simple brainstorming or visualization, perhaps initial stages of projects.
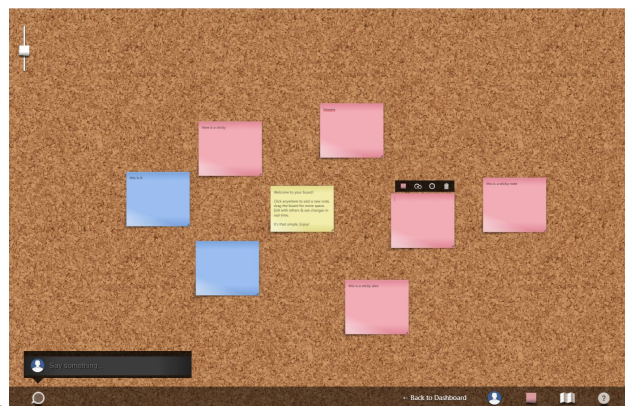
Note: The five apps above went through multiple rounds of testing. The remaining whiteboarding apps were not tested as thoroughly because they did not do well in our initial testing stages.

[All logos were obtained from their respective websites (linked in each description).]

Padlet

Padlet, a virtual bulletin board to collaborate and share thoughts, is more organized but less freeform than other brainstorming tools.

- Features include built-in chat, commenting, templates, facilitates task management, file attachment, more formal version of "stickies", Google Play, iOS app.
- Pros: variety of templates/features, very organized and relatively intuitive.
- Cons: less freeform (restricted to templates provided), no drawing capabilities between notes, can't see the whole padlet at once, file size limited.

LucidChart

LucidChart, a virtual online workspace for collaboration and diagramming, has more advanced data handling capabilities but a longer learning curve.

- Features include stickies, built-in chat, commenting, file attachment, data-to-diagram linking, conditional formatting, imported drawing capabilities.
- Pros: has unique, more advanced diagramming/data capabilities.
- Cons: longer learning curve, interface is less clean and intuitive than other options.

Stickies.io

Stickies.io is a free, no-frills virtual sticky board most suitable for simple/initial brainstorming activities.

- Features include stickies.
- Pros: very simple, no frills, free.
- Cons: only function is sticky boarding, no file attachment, drawing, etc.
- Best suited for initial brainstorming, low activation energy activities.

Sketchboard

Sketchboard is a cheaper virtual whiteboard that can be shared with teams of people but feels less developed and flexible than Miro or Mural.

- Features include commenting, integration with slack, mind maps/brainstorming diagrams, searching, team-specific board access.
- Pros: relatively cheap, has a more classroom feel than other whiteboards.
- Cons: hard to navigate around boards, clunky to use boards together, not very organized.

[All logos were obtained from their respective websites (linked in each description).]

Whiteboard Fox

[Whiteboard Fox](#) is a simple and free virtual collaborative whiteboard, but some users experienced issues when testing.

- Features include drawing, text.
- Pros: very simple, free.
- Cons: users experienced glitches, no file attachments, no stickies, etc.
- Best suited for simple sketches/communication of ideas through drawing.

MeetingWords

[MeetingWords](#) is a collaborative meeting minutes document creator that doesn't compete well with Google Docs or other free document editors.

- Is not competitive with Google Docs/like, experienced glitches and slow updating, limited formatting capabilities

[All logos were obtained from their respective websites (linked in each description).]

Task Management Tools

We looked into software that could help students track tasks and manage deadlines.

Summary of our findings

Although there were some useful and powerful options, namely Trello and Notion, we decided against recommending a task management tool because we felt there was not much added value for our class specifically, especially when a task management tool was not previously part of the suggested tools given to the students. Trello is a tool that we are open to suggesting later in the semester, but we did not want the students to be overwhelmed with different softwares and felt that they could use other tools for task management purposes.

Atlassian Suite

The Atlassian Suite consists of Trello, Jira, and Confluence.

Trello

Trello is a visual task management/brainstorming tool for project teamwork that is powerful but sacrifices more free-form brainstorming for organization.
- Features include power ups to integrate with other software/tools (first one is free), comment/interact on posts, create visual boards to brainstorm and organize ideas, can sort tasks, assign people and deadlines, templates, attachments for tasks, team-specific board access.
- Pros: can use power ups to integrate tools like Slack or Google Suite, very organized, easy to use.
- Cons: extra features like unlimited power ups are quite pricey, no drawing feature, cannot see whole board at once, trades organization for freedom.
- Best suited for teams looking to manage multiple projects/tasks, ideas, and brainstorm. Would also work great for teams that are using other tools that can be integrated into Trello.

Jira

Jira is a project management software designed for Agile workflows that functions well in conjunction with other Atlassian tools but does little by itself.
- Features include task and assignment management, commenting, file attachment.
- Pros: Project oriented and organized.
- Cons: slightly confusing interface, doesn't stand well on its own.

[All logos were obtained from their respective websites (linked in each description).]

- Best suited for teams who want to keep track of tasks/assignments and/or who work with more than one program in the suite - Trello, Jira, and Confluence.

Confluence

Confluence is a project organization tool to keep track of/centralize different kinds of information/documents that is visually appealing but may function best in conjunction with other tools.

- Features include document editor, blog posts, customizable, wide variety of integrations.
- Pros: lots of capabilities, can organize lots of information by topics/projects, visually appealing project summaries.
- Cons: learning curve, hard to understand all of its capabilities, trades organization for freedom, no direct whiteboarding/stickyboarding functions.
- Best suited for teams who value presentability and centralization of information and/or who work with more than one program in the suite - Trello, Jira, and Confluence.

Notion   [N] Notion

Notion is an all in one workspace to write, plan, and collaborate with a variety of templates for notes, wikis, and projects alongside Google Drive, best suited for managing tasks and projects.

- Features include templates (personal, project, notes, etc…), commenting, cards and subtasks, sorting tasks, assigning tasks.
- Pros: relatively cheap, manage many simultaneous projects.
- Cons: may be more cost effective to use Google Drive to keep track of notes, tasks, etc.
- Best suited for keeping track of meetings, notes, tasks and can be used along with Google Drive. Better for individual use unless a team is willing to pay for membership and adopt Notion as the hub for notes, tasks, etc...

[All logos were obtained from their respective websites (linked in each description).]

Google Suite vs. Microsoft Suite

Image from computercures.com.au

Google Suite, or G Suite, and Microsoft Suite, or Office 365, are comprehensive team-collaboration suites including email, word processing, spreadsheets, slides, whiteboarding, and more. While Google's suite focuses more on real-time collaboration and syncing/compatibility across devices, Microsoft's suite places a heavier emphasis on Office tools and functionality. After reviewing both of the platforms, we recommended Google Suite for the Terrascope fall class. The main reasons for this recommendation include ease of real-time collaboration, familiarity, and ease of shareability.

- Google Suite features include Google Docs/Sheets/etc., currents (social media platform for sharing ideas), jamboard (shared virtual whiteboards), sites (easy, no code website builder), calendar, keep (sticky notes and task lists), classroom (class management platform).
    - Students/faculty may be familiar with the standard/easy Google tools and may not want to try out the other features
    - Widely adopted already by students and would be the best place for the purposes of the Terrascope class to share and create files.
- Google's main strengths: hosted fully in the cloud, better real-time collaboration on documents, compatible with other 3rd party websites
- Microsoft's main strengths: doesn't require consistent Internet connection, Office products have more features than Google Drive
- See comparison chart (Appendix Table 3) for more detailed information.

[All logos were obtained from their respective websites (linked in each description).]

Classroom Experience Tools

The purpose of these software tests was to find an application that recreated elements of the classroom experience. Zoom and other video conferencing softwares are fairly impersonal and restrictive, so we searched for a more lively and engaging alternative. The features we prioritized the most were table-to-table movement, spatial audio capabilities, and computer power usage.

Summary of our findings

After doing a general 10-20 minute testing of every software to gauge its feasibility/potential to create a positive working environment, we narrowed the list down for extensive testing. We looked at Sococo, VirBELA, Remo, and High Fidelity for a longer period. *After weighing their pros and cons, we ultimately decided against recommending any classroom experience tool for the start of the Terrascope fall class.* This was because while each software had its perks, they either had a clear limitation (like number of people allowed in a room), used too much computer power, or had a high learning curve. For Terrascope, we are considering an introduction to Sococo later in the semester to serve as an option for an online meeting space, but we felt that introducing it at first might create more chaos than order at first.

Sococo

[Sococo](#), an online office or classroom workspace with audio and video capabilities

- Screen share capabilities
- Can chat entire rooms or just individuals
- Can move between different rooms while seeing where everyone is at all times
- Pros: Ability to move between rooms and see where everyone else is
- Cons: Medium learning curve and small issues with video/audio

[All logos were obtained from their respective websites (linked in each description).]
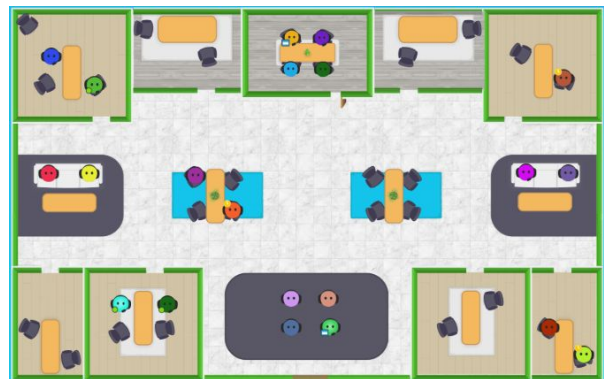
VirBELA

[VirBELA](#), a virtual world designed to work like an office space with customizable avatar that allows you to walk around and interact with objects

- Downloadable app (only Mac and Windows, not available on Linux)
- Variety of room type and has private spaces within rooms that isolate the room's audio and creates a private chat
- Screen share capabilities, sticky note capabilities, has a slightly effective spatial audio capability
- Other fun capabilities like playing soccer, doing a team game, or riding a boat
- Pros: varied functionality mentioned above, ability to interact with other avatars
- Cons: Takes up a lot of computer power, high learning curve, graphics/interface in general may be less realistic than seeing someone's video
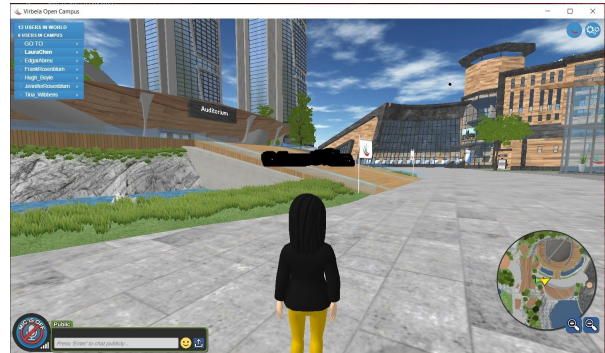
Remo

[Remo](#), an online office or classroom workspace with audio and video capabilities

- Similar to sococo, online office space, move between rooms, audio + video, screen share
- Whiteboarding capabilities
- Limits 8-9 to a table, less flexibility there
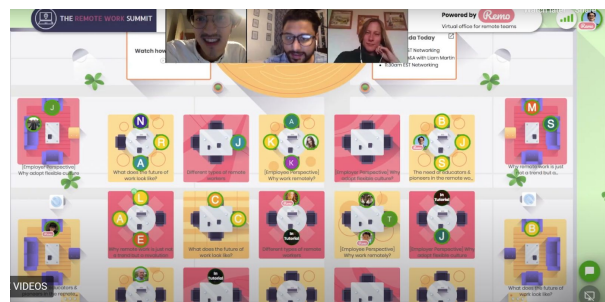
[All logos were obtained from their respective websites (linked in each description).]

- Pros: Ability to see where participants are in the room, used by incubators like Greentown Labs
- Cons: Limited number of spots in one table

High Fidelity

[High Fidelity](#), an online 2D world with incredible spatial audio capabilities
- No video, no chat, no screen share
- Pros: Simplistic and easy to use, small learning curve, low power usage
- Cons: Fairly consistent issues with audio, navigation, and seeing other participants (may improve in newer versions), still seems to have a lot of bugs
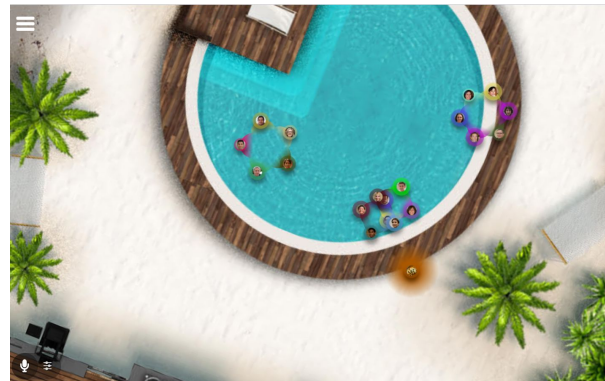
Cozyroom

[Cozyroom](#), a simple virtual 2D world with spatial audio capabilities
- No video, no chat, no screen share
- Pros: Simplistic and easy to use, low power usage, no limit on people in the room.
- Cons: Sometimes the room outlines and graphics would disappear and the spatial audio is not perfect, occasional sound issues, hard to ensure people can hear you or cannot, can be distracting.

[All logos were obtained from their respective websites (linked in each description).]

Online Town and Gather

[Online town](#) [smaller] / [Gather](#) [larger groups, customizable], a virtual meeting space
- Video calling, Spatial audio capabilities
- Pros: Great way to split up a larger group into smaller ones
- Cons: Issues with video and audio (may get better with newer versions), not the best for larger group conversations, seems to have some bugs, low-budget development
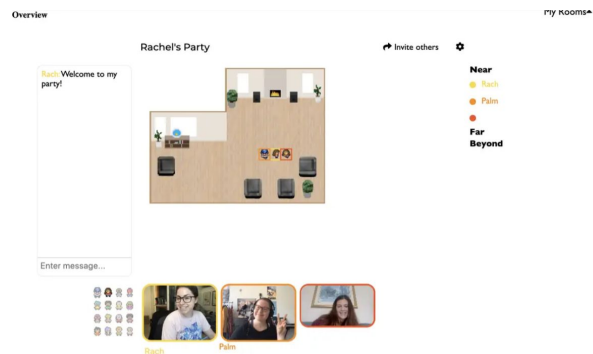
Image from Insider.com

Minecraft

[Minecraft](#), a well-known sandbox game that is generally used recreationally
- Lots of building and coding capabilities
- No audio or video (but could use discord voice channels or another alternative which is very commonly done)
- Pros: MIT has Minecraft world that would be fun to have class in
- Cons: not very practical for use by us, not professional and is intended for recreational use, can only use text chat to communicate (but can use Discord voice channels in the background to talk)

Image from bigtechquestion.com

[All logos were obtained from their respective websites (linked in each description).]

Hubs Mozilla

Hubs Mozilla, virtual room with video and audio capabilities

- 3D environment to interact with objects and meet with others.
- Pros: file sharing, text chat, video/audio capabilities
- Cons: for more casual and informal meetings, objects, environment and avatars can be distracting, controls can be a bit unintuitive.

Second Life

Second Life, a virtual world that is meant to be a virtual "second life"

- Spatial audio capabilities and chat capabilities
- Pros: Ability to voice chat spatially
- Cons: Compared to VirBELA (closest in concept), very recreational and more buggy, requires a lot of permissions from computer and tutorials that can't be skipped, can be quite demanding performance wise on computer

Image from mmporg.com

[All logos were obtained from their respective websites (linked in each description).]

Club Penguin

[Club Penguin Rewritten](#), a popular online children's virtual world

- Customize a penguin avatar and explore different areas of a map, play games, chat with others
- Much more recreational, does not have any capabilities that the other apps do
- Pros: May be a fun and nostalgic way for students to hangout
- Cons: Much more casual and less functionality for meeting/classroom, not professional at all

Image from community.cprewritten.net

VirBELA Frames

[VirBELA Frames](#) is a web-based 3D and collaborative virtual world designed for presentations and expos.

- *Has not been tested in a group, was discovered after we moved past testing phase*
- Intended for virtual exhibitions and presentations, can add whiteboards, 3d models, photos, videos, documents, etc.
- Has avatars, audio + video capability, screen share, and chat
- Pros: Works well on mobile, uses movement of mobile device as the virtual avatar's head movement
- Cons: still in Beta, less CPU intense version of the VirBELA app

Image from VirBELA Facebook page

[All logos were obtained from their respective websites (linked in each description).]

Other Tools

Catme

Catme is a research based program that facilitates teamwork management and evaluation through templates and surveys.

- Features include templates (agenda/minutes, peer evaluation/accountability, team assignment based on preferences and availability).
- Pros: "built on rigorous scholarly work," can create TA accounts.
- Cons: everything is viewable and controlled by an instructor (very top down), no communication or brainstorming functions.

Mentimeter

Mentimeter is an interactive presentation platform that can include polls, questions, and brainstorming tools.

- Features include word cloud surveys, questionnaires, and polls.
- Pros: helps to make presentations more interactive and engaging.
- Cons: free version gives a limit of two questions (may be more effective to use built in polling feature on Zoom).

[All logos were obtained from their respective websites (linked in each description).]

Appendix

Table 1: Comparison Chart - Video + Audio Communication

	Video quality	Audio quality	Grouping	Privacy	CPU / internet usage	Ease of use	Compatability with other tools	Learning curve / installation	Cost	Screen sharing	Total	Notes
Weighting	1	1	1	1	1	1	1	1	1	1		
Zoom	0	0	0	0	0	0	0	0	0	0	0	IS&T supports.
Microsoft Teams	0	0	1	0	0	0	0.5	0.5	0	0	2	IS&T supports. can use web app and is integrated with OutLook almost feels like zoom + slack
Google Meet/Hangout	-1	-0.5	-1	0	0	1	1	0	0	0	-0.5	Integrates nicely with google calendar.
Discord Voice Channels		1	1	0	0	0	0	-0.5	0	0	1.5	Would be a nice addition if they end up using Discord as their main communication platform.
Webex	-1	0	0.5	0	0	0	0	0	0	0	-0.5	IS&T supports.

Table 2: Comparison Chart - Whiteboard and Task Management Tools

	Organization (finding files, etc.)	Real-time typing collaboration	Use of drawings/shapes	Use of handwriting	Scheduling (dates, calendar)	Keeping track of tasks (marking them as complete)	File attachment & hyperlinks	Team separation	Brainstorming /stickie capability etc	Learning Curve	Ease of use	Averaged Total	Notes/Comments	Cost	Integration w canvas
Weighting	1	2	0.5	0.5	0.25	1.25	1	2	2	1.5	1.5				
Shared Google Docs/Sheets	0	0	0	0	0	0	0	0	0	0	0	0	Already well-known/used by everyone, not really taking into account uncommon apps from google suite	free	
Miro	-1	1	1	1	-1	0	1	-1	1	-1	-1	2	definitely has a learning curve. but looks like it could have a LOT of flexibility with all of the plug-ins	$10 / person / month (for upgrades)	
	-1	0	1	1	-1	1	1	0	1.5	-0.5	0		can chat or video call integrated in		
Mural	0	0	1	1	-1	0	0	1	2	-0.5	-0.5	4.75	has some good workflow templates	$12 / person / month	
	-1	0	1	1	-1	1	0	1	1.75	-1	-0.5		cant attach google drive files, only dropbox or onedrive; have private rooms that can separate things well		
Trello	0	0	-1	0	0	2	0.5	0.5	1	-1	-0.5	4.75	seems to emulate the sticky note boards we had last year, but with the ability to add files, due dates, etc.	$10 / person / month (for upgrades)	
	0	0	0	0	0	2	1	1	1.5	-1	-0.5		learning curve is real, have to play with it decent amount to figure out what its capabilities are		
Padlet	0	0	-0.5	0	-1	-0.5	0.5	1	1.75	-1	0	4.0625	also reminiscent of stickie boarding	$12 / month (teacher account with unlimited students)	
	-1	0	0	1	-1	0	1	1	2	-1	0				
Notion	0	-1	0	0	0.5	2	0	0	1.25	-1	0	2.28125	can create a lot of different workspaces, personally i found it confusing but capable of a lot fo different things	$4 / month (for personal but unlimited guests) or $8 / person / month for teams	
	-1	-1	0	0	-0.25	2	0.5	0.5	1	0	0		can set reminders for tasks but no direct calendar? has a lot of ways to organize by category		
LucidChart	-1	0	1	1	-1	0	0	0	1.5	-1	0	1.5625	it makes sense, but trying to figure out what boards to create and how to use it well seems complicated	$9 / person / month (for upgrades)	
	-1	0	1	1	-1	0.5	0.5	-1	1.5	0	0				
ConceptBoard	0	0	1	1	-1	0	0.5	0.5	1	-0.5	-0.5	5.25	feels similar to google suite UI; can chat or videocall integrated in	$6 / person / month (for upgrades)	
	0	0	1	1	-1	0	1	1	2	0	0				
Whiteboard Fox	-1	-1	0	1	-2	-2	-1	-1	-1	1	1	-8	it didn't even work for me? it couldn't connect	0	
	-2	-1	0	1	-2	-2	-1	-1	-1	1	1		basically only has whiteboarding capabilities		
Confluence	-1	0	0.5	0	-1	1	0	0.5	-0.5	-1	-1	-2		$5 / person / month (for upgrades)	
	-1	0	1	0	-1	1	0	1	0	-1.5	-1		very confusing; same company as trello		
Jira	-0.5	-1	0	0	-1	2	0	1	1	-1	-0.5	3.5	i guess if we used trello, confluence, and jira it might make more sense but personally i find their software hard to understand	$7 / person / month for upgrades	
	0	-1	0	0	-1	2	1	1	1.5	-0.5	0		designed specifically for agile methodology; same company as trello		
Stickies.io	-1	0	0	0	-1	-1	-1	-1	2	1	0	0.5625	if we choose another whiteboarding platform to tell them about, this option is irrelevant because they all have similar capabilities + more	0	
	0	0	0	0	-1	-0.5	-1	0	1.5	0	0		basically only has stickie capabilities		
Corkboard.me	-1	0	-1	0	-1	1	0.5	0.5	1.5	1	0.5	6.375	pretty simple, mostly just creating stickies that you can attach documents to	$19 (or $29) / per month	yes
	-1	0	0	0	-1	1	0.5	1	2	0	0				
Meeting Words	-2	0	-1	0	-2	-1	-1	-0.5	0	0	0	-6.5	like google docs but...worse	0	yes
	-2	0	0	0	-2	-2	-1	0	0	0	-0.5		creates a link, could just share that link with certain people; tried to import a file but wasn't able to		

Table 3: Comparison Chart - Google Suite vs. Microsoft Suite

	Organization (folders, files, search)	Collaboration/ Whiteboarding	Video/Audio Call	Documents	Spreadsheets	Presentations	Task-tracking	Team Separation	Learning Curve	Ease of Use	Integration with Existing Apps in Use	Centralization	Total	Notes/Comments
Google Suite	2	0.5	1	2	2	2	0	0.5	2	1	1	0	14	Google suite has the added advantage that most of us are already quite familiar with the main/biggest features. However, beyond this there is so much more, with a large emphasis on data analytics and developer tools. The downside of Gsuite is just that there isn't much whiteboarding/task-tracking ability beyond just spreadsheets or google draw/google docs, and it's hard to join new groups (like Slack would help with, for example)
Microsoft Suite	1	1.5	1	1	2	2	1	1	0.5	0.5	2	1	14.5	Microsoft teams seems to have a bigger emphasis on teamwork, with more functionality for chat groups and team-oriented working which is a lot more difficult for Google suites. However, collaborating on files at once is a little more janky (although possible)

Table 4: Comparison Chart - Classroom Experience Tools

	Bandwidth use	Making announcements	Table to table movement	Bonding/fun	Voice quality	Distractions	Ease of installation	Ease of Use	Learning curve	Spatial voice	Total	Notes/Comments	Cost
Zoom	0	0	0	0	0	0	0	0	0	0	0		0
VirBELA	0.5	0	2	1	0	0	-1	-1	-1	1	1.5	-pretty intuitive to use -has voice and chat capabilities -less distracting than other platforms (looks more professional) -option to get a virtual tour -can sit down / go to conference / share screen for presentation -can't download on linux	100 / month for a team
Hubs Mozilla	1	0	1	1	-1	-2	2	1	0	1	4	can chat to room voice in room can use whiteboard type thing, send documents / files, add objects we were on a small room but might be able to get bigger with log in controls weren't the best, seems very experimental	0
Cozy Room	1	-1	1	1	-1	-1	2	2	0	1	5	really simple, easy to use can create other rooms and label them can add objects chat disappears quickly voice is louder / quieter based on location in map it's available on a website so it's more accessible	0