



# COMPETITIVE ASSESSMENT

TEAM MANTA

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# RESEARCH OVERVIEW

The sudden COVID-19 pandemic outbreak has made such a dramatic impact on K-12 education that a large number of students and teachers had to move to online classes. However, due to the differences of remote learning/teaching and very limited time to adapt the new tools/technologies and the learning/teaching ways, many teachers have reported that they are facing a great challenge to increase student engagement efficiently in the remote and blended learning environment.

# COMPETITOR PROFILES

## Remo

### What is it?

Remo is a virtual event platform that empowers event organizers to create a more engaged virtual gathering space for different types of events such as networking, workshops, meetings, conferences, educational seminars, and other social events.

### Why is it Relevant?

Remo is picked as one of our competitors because we share one similar goal, which is to facilitate online engagement for various types of events and/or activities (which in our case, is educational related activities). And it's built-in engagement tools offer great insights that would help us later formulate our design recommendations.

## Adapting Playful Learning (PL) Pedagogical Approach Study

### What is it?

Playful learning is a relatively new pedagogical approach that aims to equip the traditional curriculum-based education with digital technology in order to create creative, collaborative and playful learning environments (PLEs) for students. A study that aims to evaluate this approach is piloted in 15 classrooms with 331 Finnish and Dutch students aged six to 13 years.

### Why is it Relevant?

With the possibility of bringing more stimulus and energy to the classroom, this pedagogical approach might be helpful for mitigating the low engagement issues teachers are facing because of the online format. Therefore, we found this approach worth studying.

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## Ohyay

### What is it?

Ohyay<sup>1</sup> is a video and audio conferencing tool. Creators can build interactive, infinitely configurable virtual spaces and share them with their friends and customers.

### Why is it Relevant?

Ohyay is a tool which provides customizability for teachers to tailor their teaching style to the platform. It also provides more ways for teachers and students to send and receive feedback about the learning environment as compared to tools such as Zoom.

## Possibility Mentoring

### What is it?

Possibility Mentoring<sup>2</sup> is a mentoring program being piloted in two Philadelphia public schools. It pairs graduate students of the University of Pennsylvania Graduate Department of Education with middle schoolers to help them plan for their futures.

### Why is it Relevant?

It's difficult for kids to stay motivated to learn if they don't see a reason for the learning. The possibility mentoring program helps middle school students reflect on their interests and develop a plan to achieve their goals.

1. <https://ohyay.co/>

2. <https://penntoday.upenn.edu/news/possibility-mentoring-helps-philadelphia-middle-schoolers-plan-their-futures>

# COMPETITOR PROFILES

## Zoom

### What is it?

Zoom is a major video-conferencing application that supports online communications, with a cloud platform for video and audio chat and webinars.

### Why is it Relevant?

They did a great job in the video conference interaction and tried to keep the application simple and intuitive to use instead of focusing on playfulness and user engagement.

## ClassVR

### What is it?

ClassVR is a company that provides VR headsets and software and content that support educational VR experiences. ClassVR comes with a wide range of pedagogically sound, engaging content along with structured lesson plans to help visualize and understand complex educational subjects.

### Why is it Relevant?

Their online platform is called ClassVR Portal, allowing teachers to plan, add, and upload VR content. They have very similar goals of improving student engagement in the classroom.

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## Class

### What is it?

Class is an educational tool that allows teachers to simplify attendance, grade assignments, talk one-on-one with students, and more without leaving Zoom.

### Why is it Relevant?

One of the features that Class has is to help teachers to maximize student engagement by providing an interactive and connected learning experience.

## ClassIn

### What is it?

ClassIn is an online teaching platform that enables teachers and students from across the globe to come together, face-to-face, and learn in a collaborative online environment.

### Why is it Relevant?

ClassIn contains many different interactive teaching tools to increase student participation and learning retention, and engage students at all levels.

# EVALUATION CRITERIA

## **Basic Information**

**Demographic:** What demographic does this tool target? Who do you think the product is targeting? What companies/tools target a similar audience?

**Medium:** What form does this tool take?

## **Environment**

**Space type:** What kind of space does the tool create?

**Space Vibe/aesthetic:** What kind of feelings are communicated to and felt by others?

## **Affordance**

**Presence:** Does the tool have multiple ways of indicating participants' presence/attendance, and how?

**Communication:** Does the tool support different types of communication (such as a spontaneous hallway conversation), and how?

**Reflection:** How does the tool support self-reflection or meta-cognition?

**Feedback:** Does the tool allow for users to send and receive feedback?

**Retention:** Can users know the time duration they stay on the tool?

## **Design Principles / Values**

**Adaptability:** Is the tool able to adapt to different types of users, and how?

**Accessibility:** Is the tool able to support different range of abilities, and how?

**Inclusivity:** Does the tool support an inclusive learning environment, and how?

**Community:** Does it facilitate a stronger community for learning and support, and how?

# ANALYSIS MATRIX

CRITERIA	REMO	PL APPROACH
<b>Demographic</b>	Could be used by people of all ages looking to create virtual spaces but focus on supporting adult-adult interactions.	Primary school teachers follow the playful learning pedagogy and redesign the class for elementary school students aged 6 to 13 years.
<b>Medium</b>	Browser-based App allows users to skip the hassle of downloading and installing. Participants can join an event with just a click of a link.	The PLEs are new types of learning environments that engage students with learning processes in a playful way such as including physical gameplay and bodily actions.
<b>Space type</b>	<ul style="list-style-type: none"> <li>- Private one-on-one conversation</li> <li>- Small/Medium/Large table conversation (2-20 people)</li> <li>- Large scale events (ex. conferences)</li> <li>- Doodle space</li> <li>- Workshop room</li> </ul>	By adapting this approach, teachers can create: <ul style="list-style-type: none"> <li>- Traditional classrooms</li> <li>- Outside the classroom such as an outdoor playground</li> <li>- A physical-virtual environment such as a playground with not only the facilities but digital technology like a computer</li> </ul>
<b>Space Vibe/ Aesthetic</b>	<ul style="list-style-type: none"> <li>- Expressive (via different) communication ways</li> <li>- Collaborative (via whiteboard, simultaneous screen shares and others)</li> <li>- Playful (vector illustration visual design)</li> <li>- Serendipitous (shuffle mode)</li> </ul>	By adopting this approach, teachers can make the learning environment: <ul style="list-style-type: none"> <li>- Playful (by letting the students learn through play)</li> <li>- Creative (by allowing not only teachers but also students involved in constructing learning activities)</li> <li>- Collaborative (by asking students to design, play, and learn together)</li> </ul>
<b>Presence</b>	Yes, it allows: <ul style="list-style-type: none"> <li>- Emoji reaction</li> <li>- Showing attendee number</li> </ul>	Students are able to show their presence / attendance by being in whatever the learning environment constructed by teachers and through participating in the learning activities.
<b>Communication</b>	Yes, it supports different types of communication such as: <ul style="list-style-type: none"> <li>- Non-verbal: Chat, Emoji &amp; Image</li> <li>- Verbal: <ul style="list-style-type: none"> <li>- Individual private &amp; group collaborative conversation</li> <li>- Lively panel discussion</li> <li>- Spontaneous Conversation</li> </ul> </li> </ul>	Yes, it supports different types of communication such as: <ul style="list-style-type: none"> <li>- Group collaborative discussion, for example, students will be asked to co-create learning activities.</li> <li>- Gesture and posture communication during the gameplay.</li> </ul>
<b>Reflection</b>	Yes, it allows note taking.	Yes, it requires both students and teachers to constantly reflect on decisions they have made. For example, in this study, teachers would reflect on the learning process through blogging and adjust learning goals accordingly; for students, they would reflect on the activities they designed and discuss how to improve it, if needed.
<b>Feedback</b>	Yes, it supports real-time feedback: <ul style="list-style-type: none"> <li>- Q &amp; A</li> <li>- Random chat</li> </ul>	Yes, students would give each other comments and advice during the co-creation and gameplay phases.
<b>Retention</b>	Yes, it allows screen recording and comes back to review the recorded events.	Yes, with this approach, to let students co-create learning activities, teachers would introduce learning goals, learning methods and topics, which successfully evoke students' motivation to continue.
<b>Adaptability</b>	Yes, it allows different types of expression and communications.	Yes, it does not limit learning to traditional classroom settings and not to desk-bound activities. It expands the learning space outside such as the playground.
<b>Accessibility</b>	No, it misses assistive technologies: Live captioning for deaf attendees	It depends on how teachers will structure the space for learning activities. For example, in this study, it was not that accessible by having activities involving bodily actions because this excludes students who have mobile disabilities.
<b>Inclusivity</b>	No, it doesn't include accessibility features for attendees with different ranges of abilities.	It depends on how teachers will structure the space for learning activities.
<b>Community</b>	Yes, it serves up to 15K+ participants for interactive seminars and conferences.	Yes, in this study, teachers were trained in the PLE and required to familiarize with the ultimate idea of playful learning.

# ANALYSIS MATRIX

CRITERIA	OHYAY	POSSIBILITY MENTORING
<b>Demographic</b>	Anyone looking to create or explore customizable virtual spaces.	Possibilities Mentoring pairs graduate education students with middle school students.
<b>Medium</b>	Ohyay is a virtual meeting space set up like an event space with a stage, stage participants, and audience.	Possibilities Mentoring is a strategic, structured, face-to-face, in-class mentoring program facilitated at the students middle school.
<b>Space type</b>	Because Ohyay is highly customizable, you can create any type of space you like ranging from a large scale event or presentation to an informal gathering space for friends and/or co-workers. It is quick and easy for admins to create breakout rooms with discussion prompts.	The mentoring program is staged in the student's actual classroom so they have access to all the space and tools of the student's regular classroom. Mentors work with small groups of three or four students or individually.
<b>Space Vibe/ Aesthetic</b>	Ohyay lets hosts configure meeting and event spaces to convey whatever vibe or aesthetic they like including, for example, options for room background, mood, and music. This can help instructors establish a "friendly vibe" before class even starts.	Because the mentoring takes place in the students' classrooms, the space vibe and aesthetic mirror that of a classroom. That said, the graduate students know how to make the mentoring space relaxed and comfortable, often sharing personal stories to help build trusting relationships with their students.
<b>Presence</b>	Ohyay allows meeting administrators to see a list of participants and who has "onboarded". Participants will appear on the screen as an avatar, "face-over" or live camera feed. The reaction emojis (anonymous) also help instructors "read the room". There are also features such as Chat and a question board (optionally anonymous).	Just like in a regular classroom, students are able to communicate their presence / attendance by being in the room. They meet weekly at the students' school and bond over snacks while discussing how the students' week has gone. Small group settings have worked best because students build relationships with each other as well as their mentor. The small group setting increases the likelihood that students participate.
<b>Communication</b>	The tool can support spontaneous conversations by setting up breakout rooms that anyone can enter and participate in. The rooms can be accessed 24-7 which emulates a brick and mortar school. Participants can "whisper" to one another which allows them to have private voice conversations.	The program is discussion, reflection and activity-based. Students and mentors meet weekly, either one-on-one or in small groups. Mentors use storytelling, mock interviews, and fun activities to find a common ground with the students and to build strong, trusting relationships. Mentors meet as a group every week for two hours to record notes about their sessions and share experiences and possible solutions with one another.
<b>Reflection</b>	No. The tool doesn't appear to have an ability for participants to self-reflect.	The mentoring model has five steps: exploring interests, prioritizing interests, planning for action, taking action, and assessing progress. It's a very reflective program for both students and mentors. Students reflect weekly and bring a checklist to discuss at the start of the mentoring session. Mentors meet weekly with their peers and group leaders. They discuss the week's reactions and progress and make plans for the future.
<b>Feedback</b>	Yes, Ohyay allows participants to give feedback to speakers in the form of reaction emojis, comments, questions, video or voice.	Students are excited to have the attention of the grad students, have their voices heard in a different way, and to talk to them about their passions, skills and where they want to go in life. Students get direct feedback from their mentors. Mentors get feedback from the students directly at the start of each weekly session and from their peers in their weekly peer and group leader reviews.
<b>Retention</b>	Rooms can be set up to be accessible 24/7.	Absenteeism is one of the biggest challenges for the pilot school. The school has noticed student attendance is higher on the mentoring days. Because students know mentors are a non-judgmental support for them that acknowledges their strengths and students don't want to miss that.
<b>Adaptability</b>	Yes, Ohyay provides multiple ways for different types of students to choose how they want to participate, if at all.	Mentors work with students to complete a weekly checklist of items to gauge how well they are doing. Mentors can adapt the conversation based on this feedback. They can also share this feedback with their peers and group leaders and work together to adapt plans to most benefit the students.
<b>Accessibility</b>	The tool is complex, so it may take some more time than others to be comfortable creating and participating in the environment. Doesn't appear to have an auto transcript. English only for now.	Right now the program is being offered in a couple of Philadelphia middle schools. The team hopes to expand the program to other Philadelphia public middle schools, and eventually, to other school districts in the United States. Visiting scholars from China plan to replicate the program in their country.
<b>Inclusivity</b>	Emoji reactions, chat and question boards give students a chance to participate in multiple ways. They can anonymously ask questions or use Emoji reactions if they are uncomfortable sharing publicly.	The program mentors students individually and in small groups. Every week students have the opportunity to connect with their mentors who try to help them overcome some of their social and emotional challenges, "Whether that's feeling anxious or upset or whatever it might be on that given day, but also to build on some of the strengths in their lives too".
<b>Community</b>	Ohyay supports community development in that you can create a themed or customized space you invite others to participate in. You could also create a space like a lunchroom and post the location URL where anyone can view it and join in. You can choose a premade template from a template gallery or simply view the gallery for inspiration. You can also contribute to the gallery if teachers want to collaborate on their room creations.	Possibility Mentoring supports in-school community development in that it: (a) fosters a sense of community among students and mentors participating in the program; and (b) helps students deal with real-life challenges.



# ANALYSIS MATRIX

CRITERIA	ZOOM	CLASSVR
<b>Demographic</b>	Anyone who needs online meeting	For students of all ages
<b>Medium</b>	A web browser, or apps on either laptop or mobile device	<ul style="list-style-type: none"> <li>- A website that can manage the VR content and personal profile</li> <li>- A VR headset that delivers the VR content</li> </ul>
<b>Space type</b>	<ul style="list-style-type: none"> <li>- An online video conference space where users can open or close their camera</li> <li>- Users have the ability to share, and control each other's screen</li> <li>- Users can also annotate the shared screen with text, stamp and pen tools</li> </ul>	<ul style="list-style-type: none"> <li>- An online social space with virtual immersive environments</li> <li>- A classroom with interactive visual elements related to school content</li> <li>- In the portal, where teachers can plan the VR session, there is a library and dashboard that allow them to manage the content and monitor the VR headset that connects to the activities they created</li> </ul>
<b>Space Vibe/ Aesthetic</b>	Very simplistic style	<ul style="list-style-type: none"> <li>- Minimal, colorful</li> <li>- "Blocky" visual style, like Minecraft</li> <li>- Very realistic environments without any additional style</li> </ul>
<b>Presence</b>	<ul style="list-style-type: none"> <li>- Each user will have a profile icon and user name to indicate their presence</li> <li>- Auto make-up and retouch tools</li> <li>- Various backgrounds available</li> </ul>	<ul style="list-style-type: none"> <li>- Each user will have an avatar and a name on top of their avatars</li> <li>- They are not able to chat or communicate with each other</li> </ul>
<b>Communication</b>	<ul style="list-style-type: none"> <li>- It worked very well with Google, Slack, and other team collaboration tools to facilitate the team works</li> <li>- A lot of choices for meeting settings. EX, recording method, subtitle, chat...</li> </ul>	<ul style="list-style-type: none"> <li>- Very simple user interfaces</li> <li>- Providing educational activities, futuristic environment, and experiences</li> <li>- Control with simple gestures</li> </ul>
<b>Reflection</b>	<ul style="list-style-type: none"> <li>- Users can see who is in the meeting</li> <li>- Users can send direct messages to other users without public the messages</li> <li>- Subtitles, and auto real-time transcript</li> </ul>	<ul style="list-style-type: none"> <li>- Teachers are able to monitor every student's view on one screen</li> <li>- Students can see teacher other's avatar</li> </ul>
<b>Feedback</b>	It allows students to give virtual feedback to instructors. Students can also send emojis as feedback to others.	Users cannot give feedback to others.
<b>Retention</b>	<ul style="list-style-type: none"> <li>- The popularity is a big advantage for retaining the users.</li> <li>- Simple user experience design</li> <li>- Seamless connection with other collaboration tools</li> </ul>	<ul style="list-style-type: none"> <li>- Immersive experience</li> <li>- A big community with various content</li> <li>- Easy to use, no need for hand controllers, only hand gestures</li> </ul>
<b>Adaptability</b>	<p>Yes, the screen-sharing and annotation meet most of the needs of business and personal account</p> <ul style="list-style-type: none"> <li>- No, for users who want to hand draw or having creative meeting environments</li> </ul>	<ul style="list-style-type: none"> <li>- Teachers can choose ready-made 3d content to form their class activities</li> <li>- Teachers can also upload their own content to the dashboard</li> </ul>
<b>Accessibility</b>	<ul style="list-style-type: none"> <li>- This tool has a free version</li> <li>- Screen Reader Support</li> <li>- Keyboard Accessibility</li> <li>- Customize the font size of chat and closed captioning in our accessibility settings.</li> </ul>	<ul style="list-style-type: none"> <li>- The price of the VR headset is less than the average VR headset</li> <li>- They support users wearing glasses</li> </ul>
<b>Inclusivity</b>	<ul style="list-style-type: none"> <li>- Breakout room allows users to group up and discuss in an independent meeting space</li> <li>- Annotate feature allows more casual collaboration</li> <li>- Rearrange videos</li> <li>- Create your own custom gallery view by clicking and dragging videos to a different position.</li> <li>- Customizable background</li> </ul>	<ul style="list-style-type: none"> <li>- Students can see each other in the same digital space</li> <li>- Teachers can monitor each student's view in real-time</li> </ul>
<b>Community</b>	Not really having a community	They have the ClassVR Portal which is the community with quality content, including original playlists, virtual reality content and resources

# ANALYSIS MATRIX

CRITERIA	CLASS	CLASSIN
<b>Demographic</b>	- K-12 and higher education students and teachers - Corporate training and collaboration	K-12, higher education, and after-school tutoring students and teachers
<b>Medium</b>	Desktop App	Desktop App, iPadOS, Android, iOS
<b>Space type</b>	Informal/formal virtual classroom, breakout room	Informal/formal virtual classroom, breakout room
<b>Space Vibe/ Aesthetic</b>	Rational and simple Zoom-style interface	Can be both serious or fun depends on what visual style a teacher choose
<b>Presence</b>	- Allows teachers to take attendance Presenter's mode places presenter in front of the visual presentations - Under participation tracking, students will be listed in order of their talk time to let teachers know who's less/more engaged - Virtual desk view provides a new way to show each student is sitting at their desk	- Allows teachers to take attendance - Allow schools/administrators to take attendance for teachers - Teachers can expand students' windows and drag them to the middle of the screen
<b>Communication</b>	- Users can unmute themselves and talk to each other verbally - Teachers can create breakout rooms - Teachers can facilitate one-on-one discussions - Allows students to raise their hands, send emojis, or type in chat - Teachers and students can communicate by drawing or typing on the virtual whiteboard - Teachers can monitor students' desktop during exams, so if students have any questions when they complete the exam on their desktop, teachers can easily help them	- Teachers and students can interact on the virtual blackboard - Users can type and send images in the chat box. Teachers can create breakout rooms - Users can unmute themselves and talk to each other verbally - Teachers and students can easily share their images, presentation slides, files, etc. on the blackboard - Allows students to raise their hands, send emojis, or type in chat - Screen sharing option allows users to control other people's screen
<b>Reflection</b>	It allows teachers to send assignment/quiz/test directly to students, and it can automatically synthesize the study report to help students better understand their academic performance	Students can view the quiz statistics and homework feedback to better understand their academic performance
<b>Feedback</b>	- Students can give their teachers feedback by sending emoji to the teacher/everyone - Teachers can give stars to students as a reward	- The statistics interface can show each student's performance on tests/quizzes synchronously - The reward system allows teachers to give virtual gold trophies to students - Students can receive feedback from their teachers on homework - Teachers can send learning reports to students - Teachers will also receive teaching report from the platform
<b>Retention</b>	The dashboard shows the time in/out and duration of each students	The dashboard shows the time in/out and duration of each students
<b>Adaptability</b>	It allows teachers to facilitate one-on-one meeting with students who are too shy to talk in front of others without leaving Zoom	The virtual dice, responder, and timer allow teachers to conduct more fun activities with their students
<b>Accessibility</b>	- Very accessible for people who are familiar with Zoom - Not accessible for people with visual/motor/hearing impairment	- Supports multiple languages - Not accessible for people with visual/motor/hearing impairment
<b>Inclusivity</b>	It allows teachers to easily share asynchronous course materials such as Blackboard or GoogleClassroom, etc. and different media with students	- It allows teachers to easily share resources and materials with students - It supports many different interactive features such as dice, timer, coding, selector, etc.
<b>Community</b>	No	No

# ANALYSIS SUMMARY

## Remo

With built-in engagement tools such as floor plan configuration, chat, private table conversation, simultaneous screen shares and more, Remo allows organizers to structure the online event space like what they will do in real life, guaranteeing a higher level of online engagement and is able to afford real-time, collaborative human interactions. Remo gives organizers a great flexibility to arrange and organize various types of social events; yet, it fails to support people with disabilities. One major pain-point is that the current Remo is missing some major assistive technologies such as live captioning. So definitely, Remo needs to add more accessible features in order to better support a greater number of people with different ranges of abilities and also to compete with other similar types of platforms. Overall, Remo provides a more interactive and engaging virtual event experience with fully customizable floor plans.

Through this assessment, we can draw inspirations from the built-in engagement tools. Features like the floor plan configuration and shuffle mode give the event organizers a lot control over the event structure and cadence. These inspirations can be used to make the online class more engaging since teachers have explicitly expressed their desires to have more configurations of the online learning environment to support students' various levels of engagements by adapting different pedagogies.

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## Adapting Playful Learning (PL) Pedagogical Approach Study

The current issues with low student engagements serve as a wake-up call indicating that it may be the time to rethink the education system and the traditional pedagogies that only work effectively for in-person instruction. Therefore, this specific study that explores a new pedagogical approach that seems to bring more energy and playfulness to the classes draws our attention.

Following the playful learning pedagogical approach, teachers splitted the classes into a total of four learning phases and engaged students in different ways. The four phases are: orientation, creation, play, and elaboration. During the co-creation phase, students have the chance to practice their research and teamwork skills. We surprisingly found out that students were very well motivated by the chance to co-create their own playing/learning activities with peers using digital technologies. The play and elaboration phases also did well on engaging students by asking them to be involved in physical gameplay and then to reflect on it. We recognize activities involving physical movements help to maintain students' attention and keep them engaged; however, excluding the kids who have mobile disabilities.

From this study, we couldn't draw direct insights that can help us form design recommendations. But we still gain some high-level inspiration by understanding the importance of integrated playful learning with curriculum-based education to create more engaging and meaningful learning experiences that could take place both indoor and outdoor. We see the value of playful learning and it could potentially be one of our design principles. We also love the idea of letting students co-creating learning activities and the collaboration aspects throughout the whole learning process.

# ANALYSIS SUMMARY

## Ohyay

Ohyay opened our eyes to the multiple ways tools can facilitate receiving feedback and measuring engagement that are missing from others such as Zoom. Ohyay allows teachers to customize and tailor their online classroom to their pedagogical needs. This type of platform has a lot of room to grow and provide opportunities to make the online event space more engaging for all. While there is a lot of room for the tool's features to expand, the customizability can be overwhelming. We would like our project to result in offering similar customizability that gives teachers the ability to recognize engagement through feedback. We would also like to consider ensuring teachers who are not looking for a deep level of complexity could still have access to the tool using premade environments and templates.

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## Possibility Mentoring

A mentoring program such as this helps students open their eyes to future career possibilities that fit their strengths and interests. This program has value because students may not be motivated to learn if they don't see a reason to do so. The program facilitates relationship building and future planning by providing a safe place and a structured model for students to explore their interests, skills, emotional state, and future with someone who can guide them. It resulted in increased students' school attendance, engagement, and success.

Right now the program is weekly, face-to-face only and hasn't been piloted online. It would benefit us to think about ways we could translate the program into an online environment that might allow more students to participate since it has proven valuable as a way of motivating students to learn and engage in school. If teachers are more aware of student interests and strengths, it would help them adapt their curriculum to better fit student needs.

# ANALYSIS SUMMARY

## Zoom

Zoom developed many features that support online interaction like screen sharing, screen control, chat, real-time annotation, close caption, recording, virtual background, face retouch, and emoji reaction to create a more flexible, secure, and confident meeting experience. This tool is not specifically designed for online schooling but for a broader target audience who need to talk to other people and share ideas. So that a lot of features in Zoom are oversimplified and giving fewer customization opportunities to users with special needs. I would create a separate mode for educators with more playful and interactive features to help teachers better connect with their students. Although Zoom is very prevalent and well developed today, it didn't meet the needs of online students, especially the K-12 students that we are researching with. We may think about the playfulness that can inspire younger students and consider simplifying the features of designers for video conferences.

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## ClassVR

ClassVR offers a service that allows people to experience immersive environments as a group using simplified VR headsets and a content-generating system. This service is an affordable one for a classroom setting that helps spark the imagination of students, leaving them with memories and experiences. The content includes 3d videos, VR environments, and 3d objects that can be programmed interactively. The pain point is that this service can only be used as a complementary teaching tool, and the interactive function is not developed at all. Students can only view and walk around the virtual environment, which is not what we are looking for. I would keep the hand gesture and simple navigation system they have and add more collaborative features that allow teachers to connect with students and build stronger relationships. This product showed us how emerging technology is currently being used at school and how we can push the boundary of educational VR in the future.

# ANALYSIS SUMMARY

## Class

For all the online courses that use Zoom as their virtual classroom platform, Class can be a great attaching tool. It allows teachers to better motivate students to engage by choosing different views or modes and giving virtual rewards to them. In addition, it also considers the different needs of students with different personalities. For example, it creates opportunities for introverted students who are not comfortable to talk in front of the whole class to communicate with teachers one-on-one without leaving Zoom. However, from the features that Class has we can assume that it still remains a basic understanding of "student engagement". For instance, it ranks students based on how long and how often they speak to estimate the degree of engagement, which totally misses the other forms of engagement such as typing in the chat or sending emojis. Also, Class does not provide teachers many choices to better facilitate their diverse pedagogies.

By learning more about Class, we believe one of our opportunities can be how to better meet teachers's needs on using different pedagogies to increase student engagement. We should also redefine student engagement in the online learning environment in order to meet the different needs of students with different personalities. In addition, Class's lack of accessibility also reminds us that we need to think about how to make online classes be more accessible for disabled people.

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## ClassIn

The various functions of ClassIn provide more possibilities for teachers to adapt different pedagogies in an online classroom. For example, the Dice function can bring more fun and surprises to students. And the Selector allows students to be more proactive in answering questions, and at the same time, they can estimate their academic performance by looking at the statistical data of each answer. However, ClassIn has too many detailed and complex functions, and the visual design of these functions is not intuitive. As a result, the learning curve of those functions are relatively high which cause users to spend a lot of time on learning how to use them. In addition, besides taking attendance and monitoring the duration in class of each student, the platform does not provide other different ways of monitoring student engagement.

The assessment of ClassIn inspires us that it can be very efficient to encourage students to engage in an online classroom by providing more fun functions to better assist the interactions between students, teachers, and contents. However, we should also keep in mind on how to lower the learning curve while adding more functions to the design. In addition, it is important to evaluate student engagement from different perspectives in order to better help teachers to monitor student engagement in the remote and blended teaching/learning environments.