Documentation

Purdue UX Design | *Fall 2020*

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Meet the Team

Zoë Morken | *Project Owner*

Zoë Morken is a junior at Purdue University pursuing a B.S. in User Experience (UX) Design with minors in Communication and Psychology. Being fascinated about how individuals interact with technology as well as how it influences their interpersonal relationships, Zoë is drawn toward creating pleasing experiences through beautiful and functional products. Previously, she has worked with clients as the lead UX designer through HiDelta, a startup based in Indiana. During her employment, she mastered prototyping tools such as Figma and worked in a cross-functional team setting. Outside of UX, Zoë is either cooking, reading, or petting her black lab. She can be reached at zmorken@purdue.edu.

Ria Sali | *Team Lead*

Ria Sali is a junior in the User Experience Design program at Purdue University. She is currently working towards securing a bachelor's degree, along with a minor in Psychology and is set to graduate in May 2022. Her main interest is engaging in user research, but she has also undertaken UI design during her internships at CredPal and HiDelta. Ria strives to be an engaged and inquisitive worker when it comes to projects, and is a team player that strives to work collaboratively in order to get the best input to push a solution forward. She aims to be able to create designs that are creative, intuitive, and above all, a positive addition to users' lives. You can reach Ria at rsali@purdue.edu and view her work at https://rianitinsali.wixsite.com/uxdp

Kanika Rao | *Team Lead*

Kanika Rao is currently a junior studying User Experience Design with minors in Psychology and Communication. Her interests in user research led her to join the SCSJ Lab in June, 2020. Kanika is also passionate about further developing her project management skills through leadership and mentorship opportunities. Some of Kanika's other passions include fashion and music; she strives to incorporate these passions into her academic curriculum and is constantly looking for ways in which UX can be applied to these sectors. The many opportunities that lie within the space of user experience design to improve or enhance the experience of different users while enacting direct change in different communities excites Kanika. She can be contacted at rao100@purdue.edu.

Alex Gearhart | *Team Member*

Alex Gearhart is a sophomore in Purdue's User Experience Design program and is minoring in communications. He spent last summer in an online internship with Landon Young and has continued working for Landon part time during the semester. During this internship, Alex learned how to use design tools such as Figma, Procreate, and Adobe XD. Although he doesn't have much experience coding yet, he plans on learning much more this semester. He thinks that he will enjoy coding and he will want to focus on that in the future if he does. You can reach him at agearha@purdue.edu

Matthew Will | *Team Member*

Matthew Will is a first semester Junior at Purdue University, and is in his second semester within the UX Design Program. After taking his first Learning Studio and Experience Studio courses in the Spring of 2020, he has gained a more nuanced understanding of UX principles and methods, as well as having the experience of being immersed in a UX Research team for Indiana Farmers Insurance. Matthew also has specific interests in the areas of UX Research and UX/UI Design in video games. On the personal side, Matthew enjoys hobbies such as running and playing video games, which has led him to an interest in entering the video game industry upon graduation. He is always eager to learn more about UX and design in general, and you can reach him at will10@purdue.edu about anything related as well.

Katie Jewell | *Team Member*

Katherine Jewell is a sophomore studying User Experience Design while minoring in psychology at Purdue University. She grew up in San Diego, California where aesthetic is highly valued in experiences and products. She thrives interacting with others, which is shown through her past job as a nanny and her many volunteer experiences. She loves to travel to other countries and learn about the people and their culture which allows her to gain invaluable life experiences that cannot be gained from classes. She is looking for an internship as a UX Designer to conduct user research with a lean of web development. Katie is able to be reached at jewell9@purdue.edu.

Raghav Mandadi | *Team Member*

Raghav Mandadi is a current sophomore at Purdue University, pursuing a BS degree in User Experience Design, with a minor in Psychology and Organizational Leadership. From a family with a background of all engineers, Raghav found passion in trying to understand people and applying it to design. In his free time, Raghav loves to hike in his hometown of Seattle, play a multitude of instruments, and travel across the world. Raghav is motivated to learn more about human computer

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interaction, leadership, entrepreneurship, and business in his time as a student and beyond. Raghav can be contacted at rmandadi@purdue.edu

Sponsors and Advisors

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Executive Summary

Problem Space

According to the initial brief we received, our project goal was to improve the K-12 e-learning experience for parents, teachers and students.
This document outlines our process, with descriptions of our employed methods and main takeaways that influenced the progress and final outcome.

Exploring the Problem Space

Interviews:

We conducted interviews with a general pool of parents and teachers involved with children in the K-12 education system. The goal of these interviews was to provide insight into the workflow of these stakeholders, as well as the barriers they faced in their personal experiences with the transition to remote learning. We conducted a total of nine interviews for this preliminary research; seven were with teachers, and two with parents.

Main Takeaways:

- The core issue was the lack of efficient social interaction; this was in terms of teacher-student interaction during classes, student-teacher interaction for one-on-one help, and almost a complete absence of peer interaction among students.
- Younger students (K-5) faced the most barriers due to insufficient support at the ages crucial for their overall development.
- First-graders presented a set of unique and specific challenges to consider:
    - Their hands were too small for physical components like keyboards,
    - They had not developed a fully comprehensive understanding of computer and web navigation,

- It was crucial for them to develop their motor skills through handwriting practice - because of the transition to e-learning platforms, they were not receiving the proper direction needed to develop written skills.

Rescope

After having decided to focus on first-graders, there were still major influences such as socio-economic status to consider when thinking about the experiences of these students. In order to decide whether to focus on this disparity or work on improving the general education structure, we conducted literature reviews.

Taking note of the complex interplay of factors such as race, class, culture and individual household dynamics that contributed to a child's lived experience, it became clear that it would be impossible to design something that could fit the needs of every single student.

As a result, we decided to approach the problem through the perspective of a first-grade teacher. By designing a tool for teachers to facilitate their classes more smoothly, we would be giving them the freedom to leverage it to best suit the needs of their students as well.

Final Problem Statement:

To improve the overall first-grade e-learning experience by designing a tool that can better address the needs of first-grade teachers.

Concept Formulation and Design

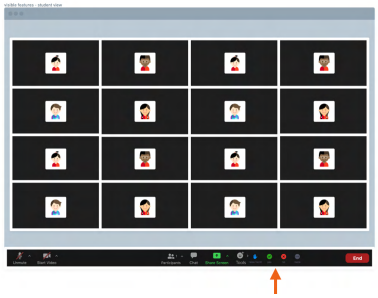
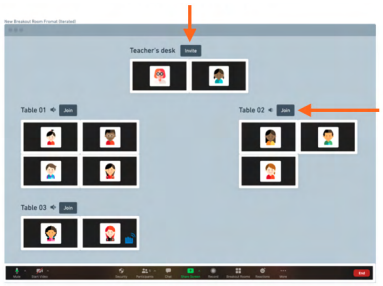
Based on the new problem statement, we conducted more interviews with first-grade teachers with the specific goal of discovering their pain-points and areas of potential interest to design for. The major problem that users mentioned was the **lack of tools to facilitate sufficient engagement** during class.

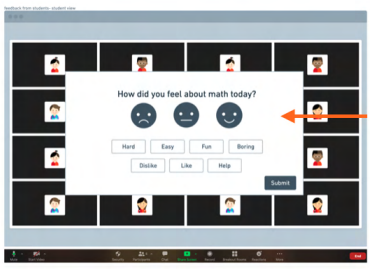
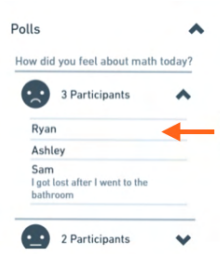
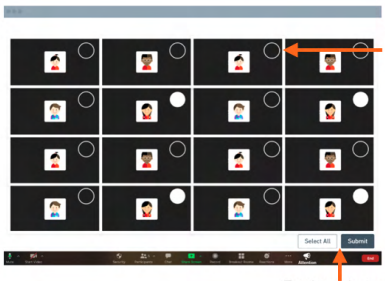
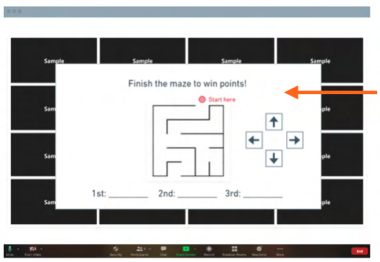
We ideated on this gathered insight, and evaluated our sketches with a user to receive feedback to guide the direction of our final design concept.

Final Concept

Mockups

To highlight the features of our concept we have organized it by the feature, its mockup, and its purpose (a walkthrough of our mockups can be found here):

Feature	Mockup	Purpose
Added raise hand, yes, and no buttons on the main toolbar.		*Making important features easier to find*
The teacher can see all the breakout rooms on one screen along with a video feed, ability to listen in or join the call, and to invite students to their personal breakout room.		*Addressing the needs of teachers through added breakout room features*

A feedback form, or exit option, that can be set up by teachers.	 	*Opening the channel of communication between students and teachers on student feelings.*
Teachers can keep students engaged over Zoom by sending them an attention grabber.	 	*Keeping students engaged during class.*

Concept Evaluation

To validate our concept and to gain additional insights into possible iterations we conducted a concept evaluation with a first-grade teacher. Our findings are as follow:

Main Takeaways:

- They were very vocal about how useful they found the new breakout room design and that it would directly address a lot of their pain points in regards to running class.
- They reminded us to reevaluate how our designs could work at the ability levels of the first-graders, not every student is at the same reading or writing level.
- They also asked us to consider the possibility of visual customizations of their Zoom classrooms

Next Steps

In the continuation of this project changes the following changes should be made, based on insights gained from the concept evaluation:

- Adding customization features for background color, classroom color, and other visual aspects of the online classroom.
- Placement of buttons on the screen that fit with the current usability of teachers and students.
- Further fleshing out the interactions with features on the teachers end.

In addition, alternative formats such as a separate video communication platform should be considered, in the instance that Zoom does not have the technical capability to implement the features outlined in our solution.

Introduction

About Avanade

Avanade is a company based in Seattle that aims to transform businesses for its customers and employees by being a leading digital innovator, building great experiences, and creating genuine human impact. The company creates business solutions and provides digital and cloud services for its customers.

Project Overview

In light of the recent COVID-19 landscape, business and technology have been forced to adapt rapidly to remote means in order to remain functional. The general K-12 education system has faced immense pressure and challenge to quickly adapt the centuries old in-person model to virtual or distance models of schooling. **Our team worked with Avanade to improve upon a sector within the education system that deals with e-learning**. In coming up with a solution, we were to consider the stakeholders involved, including: students, teachers, staff, parents, and anyone else who plays an important role in this transition.

Project Goals

There are three overarching goals that guided our design process over the course of the project:

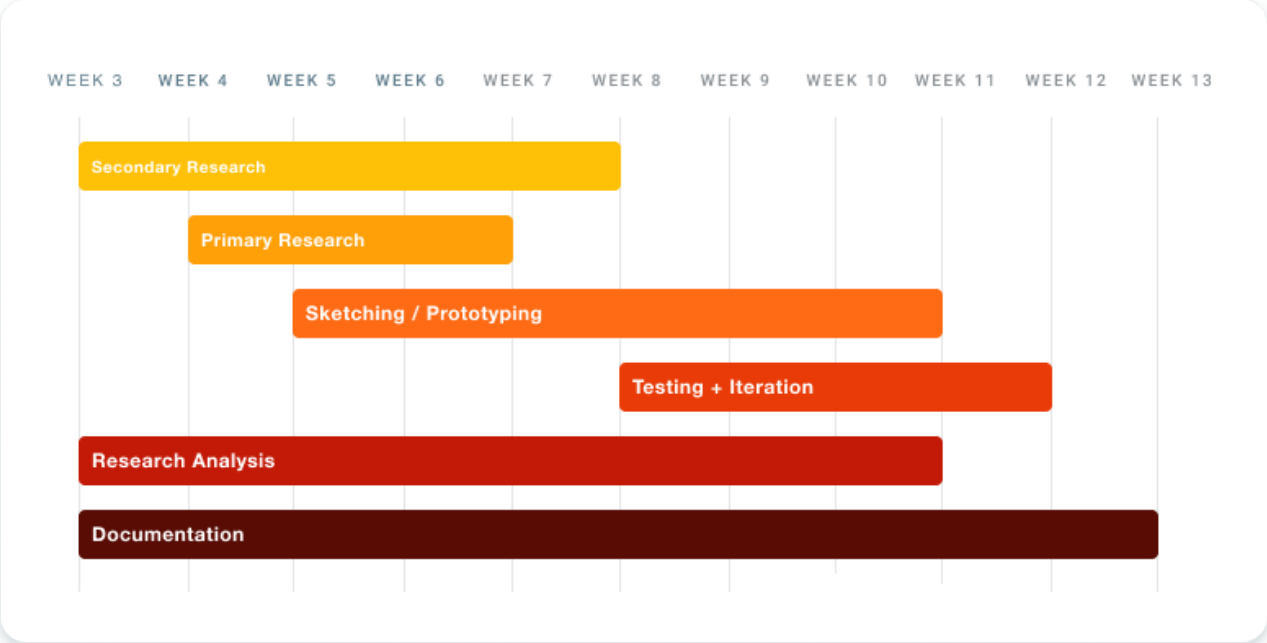
Understand the transition from in person learning to e-learning within the scope of K-12 education, and design to address user pain points.

Identify gaps in current tools and resources being used for communication between students, parents, and teachers within K-12 education.

Build upon opportunities and pain points in the e-learning space within K-12 education.

By the end of the project, we were able to attain our goal of understanding the experiences teachers and parents face with the transition to K-12 remote learning. The research that led to our insights will be described later in this document, as well as in an accompanying comprehensive research report. Because of this, we were able to move forward with building opportunities that would improve the e-learning space for these individuals which can be seen in the design concepts later in this document as well.

Project Timeline



This was the timeline we outlined for our project at the beginning of the semester. Our process is shown below:

Secondary Research (Weeks 3-8):

- Goal: Form an initial understanding of the space
    - Method: Literature review of existing struggles within e-learning
    - Method: Comparative analysis of existing platforms

Primary Research (Weeks 4-7)

- Goal: Discover the personal experiences of parents and teachers within the space of K-12 e-learning
    - Method: Interviews to explore specific frustrations with remote learning

Research Analysis (Weeks 3-11)

- Goal: Compile and analyze research gained from interviews and online sources for research report

Sketching and Prototyping/Testing + Iteration (Weeks 5-11/Weeks 8-12)

- Goal: Use insights gathered from research to ideate on potential solutions in order to create prototype
    - Method: Affinity diagram recurring needs/frustrations within our research
    - Method: Sketch concepts to address those needs/frustrations
- Goal: Form solution based on ideation
    - Method: Test concepts with stakeholders to determine if their needs would be met
    - Method: Iterate prototype based on feedback from stakeholders

Final Deliverables

The final deliverables include:

Research Report
A report collating the research research we conducted and the processes we used to gather that data

Wireframes
Representations of our design concepts we made based on our research

Documentation
This document, which covers the project's design process

Exploring the Problem Space

For further explanation and an in-depth look into our research, please reference our research report which can be found linked here.

Exploratory Research - Literature Review

Goal:

The goals of our research were to **identify common tools that are used within day-to-day school activities and learn more about how the transition from in-person learning to remote learning affected our stakeholders**. By completing this preliminary research before interviews, we were able to better understand our user group and ask additional in-depth questions about the tools teachers were using.

Method:

We used peer-reviewed sources as well as additional online resources that had information on this new space. The team began researching a variety of topics within this space initially but assigned specific topics that we could potentially design for. We looked into general information, then platforms, and lastly our stakeholders.

General

For the first five weeks, team members individually researched different areas within this space. Analyzing our findings as a team allowed us to define the issues of concern that we wanted to learn more about. The areas we investigated included:

- **Virtual reality in education:** this was not our main space, but we wanted to see if it could be a helpful addition to create more of the classroom feeling.
- **Mimicking games and social media in e-learning:** we wanted to look at the benefits and issues of making school platforms similar to social media.
- **Income inequality in e-learning:** we wanted to see where the most gaps between socioeconomic classes were.
- **Children with social impairment:** we wanted to see the different experiences that a student that had special needs would be experiencing with remote learning.

Findings:

Virtual reality:

- We found that an immersive experience allows students to:
    - Be present in the space
    - Increase their creativity
    - Make school feel more meaningful

Mimicking games and social media:

- Provides more interesting experiences for students
- Makes school easier to understand

Income inequity:

- Means that schools in a higher income area often have more resources to support their remote learning needs

Children with social impairment:

- Use online multiplayer games help them get regular social interaction

Platforms

There were many platforms already existing, including Zoom and Google classroom. Some combined many tools into one space, like Google classroom, and some focused

on one specific tool, like Zoom. The amount of platforms available was a deciding factor in adding features onto a platform rather than creating a whole new one.

What we found when researching more into the existing platforms was:

- The some platforms were just a single tool that focused on writing, showed videos, or allowed for polls
- Depending on the specific needs of teachers, they had multiple different options of platforms for that category, like multiple different platforms for polling systems that they could choose from
- Some of the platforms focused on the issue of immediate feedback that is lacking in the e-learning community

This information was helpful to see what was existing, but we chose to focus on the more popular tools to see what they are used for, why, and what difficulties come along with them.

Stakeholders

Widely used tools such as ClassDojo, Schoology, Google Classroom, and Zoom focused on communication and feedback to keep the students and teachers engaged and learning, but a lot of their feedback was not immediate. These sites were tailored to a targeted group grade levels, through their aesthetics and complexity.

The specific needs of each stakeholder group required different solutions to be created:

- Lower grades tended to struggle to focus, creating game-like education tools held their attention better

- Social media-like platforms helped with a lot of communication between the student-parent-teacher channels as it is more easily understood
- A lot of teachers, students, and parents struggled to understand the technology

Interviews

In order to better understand the current e-learning space and the pain points of individuals involved within the K-12 education sphere, our team began conducting interviews with stakeholders. We found that our initial research was much too broad to find the level of insight we were searching for.

Goal:

Our goal for interviews was **to learn about the personal experiences each interviewee had with the e-learning experience during COVID-19**. We wanted to learn more about the platforms interviewees used, pain points they faced, and if applicable, their success stories.

Method:

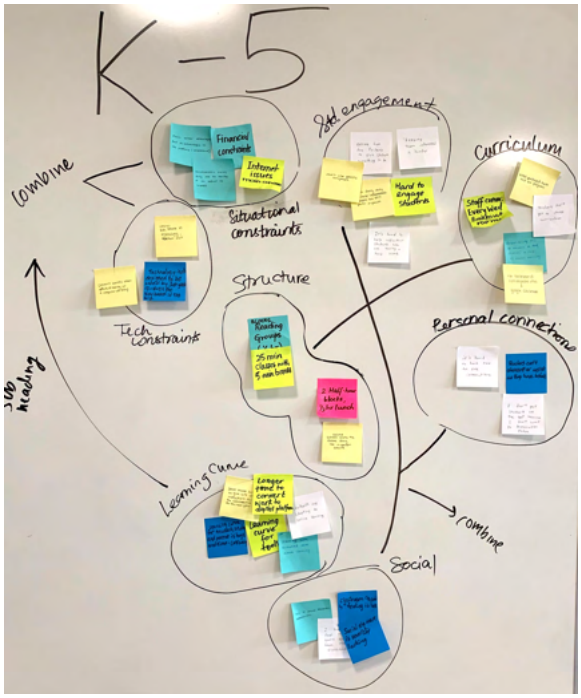
We conducted nine initial interviews: seven with K-12 teachers, one with a parent of two middle school children, and one with parents of a fifth grade student. We held the interviews over Zoom. Different interview protocols were used depending on whether the participant was a teacher or parent. The teacher and parent interview questions can be found in the Protocols in the appendix.

What we wanted to learn about:

- **Workflow:** How does switching to online learning affect schedules, how much time are the students actually in class compared to asynchronous work, how involved are the parents during class times.

- **Barriers:** What has been difficult during the switch, are there a lot of little issues or major issues arising, are the students struggling in school.
- **Interactions between students and parents:** whether students are able to interact with each other, how the teachers are facilitating interactions, how involved the parents are with monitoring their children's studies.
- **Successes:** What issues have happened and what did they do to solve them.
- **Contrasts between in-person and remote learning:** How is the curriculum different, what are different experiences between in-person and online learning.

Findings



Once we had completed the first round interviews, we organized our findings in an affinity diagram. We used the diagram on the left to identify overarching themes from our interviews.

Three main themes emerged:

Constraints

- *Situational Constraints*: This includes financial constraints faced by both students, and school districts when it comes to determining the resources that were to be used during the shift to online learning.
- *Technical Constraints*: It is difficult for younger children to navigate online resources and learning. There is a technological literacy gap between teachers and students.
- *Learning Curve*: There is a considerable learning curve involved for teachers, parents, and students when using online platforms and resources.

Engagement

Student Engagement: It has become harder for teachers to discuss and hold their students' attention. There is an inherent loss of social interactions, including one-on-one time, working together, and socializing, that typically lead to a "family" feeling in a regular classroom setting and necessary feedback.

Structure of Learning

- *Curriculum:* Teachers do not get to decide the method of instruction (platforms and resources). There is a lack of activities outside of learning to promote overall development, such as art and physical fitness.
- *Structure:* The way the time blocks are assigned and structured for live classes varies - it is important to find a balance that works so that students do not get fatigued by continuous hours by incorporating breaks.

Takeaways

After comparing and analyzing our findings, we found three main takeaways that we considered when moving forward to ideation:

- **Reframed Scope:** The group within K-12 that was the most difficult to teach in a remote setting was the elementary level grades. The technology is not designed for them in mind (e.g. keyboards are too large for their hands). They are also just starting to develop their social skills and may have attentional difficulties. Older students are more familiar with technology and can manage their own learning better.
- **Alternative to Virtual Solutions:** From ergonomic findings such as the difficulty young students have with standard keyboards, we considered the possibility of designing a physical prototype as our solution.

- **Regain Social Interaction and Other Elements Lost:** One of the most prevalent themes we found in almost all of our interviews was that the social element present in the classroom has been lost or is lacking within the e-learning space. Student engagement, communication, and other crucial aspects of education have been changed by the remote transition so, as a team, we decided to consider this as an area within the problem space to be one of our focuses.

Narrowing Our Scope

After our primary research with both high school and elementary level interviews, it was clear that the students struggling the most were in elementary school. Students in elementary schools are going through key learning stages where they are developing reading, writing, math, and social skills. This means these children need more individual attention than middle and high school students that have already developed

this base of knowledge and know how to use technology. Therefore, we narrowed our scope to design for K-5 students and teachers to create either a physical or digital design to improve the remote learning experience. Throughout interviews, it was said that the kindergarten and first grades seemed to have more difficulties with the online learning since each grade had very specific curriculum needs and the older grade levels understood the technology aspect better.

Preliminary Ideation

Since we decided to focus on these younger students, we began ideation in two rounds on potential physical and digital solutions. The rounds were broad so that potential solutions were physical tools, add-ons or plugins to existing platforms, or already existing platforms.

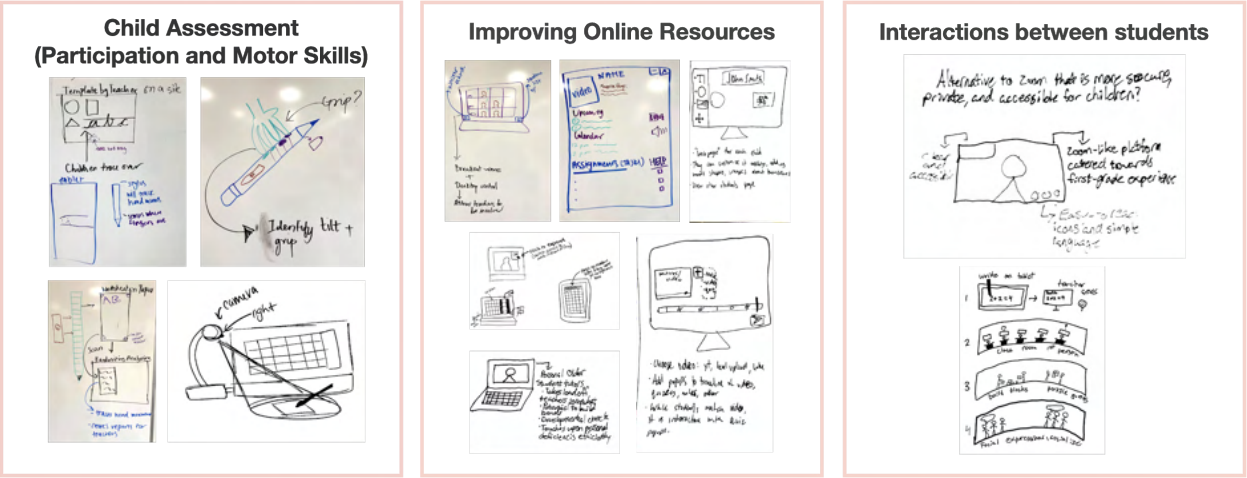
Goal:

To explore different ideas based on the problems that we saw through interviews and secondary research.

Process:

- **First round:** We first began ideation by sketching together, adding onto each other's sketches on whiteboards.

- **Second round:** With a few sketches done on our own we discussed the ideas we came up with.



Some of the sketches from both round one and two that show these three routes we were ideating on.

All of our sketches can be found in the appendix, [linked here](#).

Insights:

- We separated our ideas into three main categories
    - **Tools for child assessment:** pencils that track finger placement to monitor grip, a projector so the teacher can see the children's work
    - **Improving pre-existing online resources:** different ways of displaying students work, agendas, and ways to limit distractions
    - **Facilitating interactions between students:** more friendly video platform for young children and changing how students interact with each other like virtual reality

We decided to stray away from designing a physical tool for three main reasons. It would be another cost that would widen the gap between different socioeconomic classes. Adding onto pre-existing tools that the teachers already use would be the most beneficial since there are already many other small platforms for targeting an action. Lastly, there are already many frustrations within the platforms that are being used.

Rescope

Working off of the decision to scope down to K-5, we narrowed down even further. There is still a lot of variation of needs from kindergarten to fifth grade given the different ages of children, so choosing one grade to design for would allow our team to target specific problems. Ultimately, we decided to focus on the first grade. This was decided based on the interview insights discussed above, where we identified specific challenges pertaining to first-graders that are not often considered when thinking about the space as a whole.

We also kept in mind a major additional influence on the experiences of our user group - socioeconomic status. Since we had not fully fixed on a final problem statement, we chose to conduct some more research to determine whether to focus on the issues of disparity, or the general existing education structure.

Literature Reviews

In order to explore the possibilities related to this chosen user group, the team conducted literature reviews.

Goal:

To learn more about **existing structures of education**, **challenges** teachers face with e-learning, and the **disparity** between different **socio-economic** backgrounds.

Method:

Researching and making use of existing sources and studies to obtain relevant data.

Findings:

The main findings we gathered are as follows:

- There are numerous **variables** influencing the personal lives of students from different backgrounds.
- The complex interplay of factors such as race/ethnicity, culture and social class are too broad to account for when considering a student's remote situation.
- Students have different support structures in place at home when it comes to additional learning - some are monitored by their parents extensively, while some parents are unable to help out.
- The main challenge with e-learning is facilitating participation and interaction between student and teacher due to technical constraints.
- Academic support for students was emphasized in the case of schools in more affluent areas, while mental health was more important in lower SES backgrounds due to COVID-19 affecting them in different ways.

Summary

In light of the information we gathered, it quickly became clear how difficult it would be to devise a solution to fit the needs of every student, especially given the interplay of variables so out of our control that are rooted in long-standing institutionalism.

As a result, we decided to approach the problem from the teacher's perspective. **By designing with a focus on first-grade teachers, we would be giving them the ability to facilitate classes more smoothly. This gives them the freedom to use the tool in a way that best suits them and their students.**

Final Problem Statement

To improve the overall first grade e-learning experience by designing a tool that can better address the needs of first grade teachers.

Concept and Design

With our newly revised and final scope of first graders, our group set out to construct and validate a final concept of our solution. To do this, we conducted grade-specific interviews with teachers, as well as an informal idea evaluation through presenting our sketches.

First-Grade Specific Interview

In order to more closely examine the specific pain points and insights within first grade learning, our team conducted an additional round of interviews with first grade teachers only.

Goal:

Our goal was to gather and probe for insights from first grade teachers on our initial sketches, and to gain any additional insights that could further inform our wireframes.

Method:

We interviewed two current first grade teachers. The overall structure of the interviews were similar to our initial round, but there were some deeper probing questions that were specifically designed to gain an understanding of the way teachers interact with their first graders in digital means, and the pain points of the means. The interview protocol is referenced in the appendix under 1st Grade Specific Interview.

Findings:

Most insights were teachers voicing concerns over a multitude of topics, but overall we noticed the following were more frequently mentioned across all interviews:

- Decrease in engagement
- Lack of methods by which engagement can be increased
    - Whether through use of existing tools in use, or additional tools and outside resources

Idea Evaluation

The idea evaluation round our group conducted was to informally evaluate our concepts with first grade teachers.

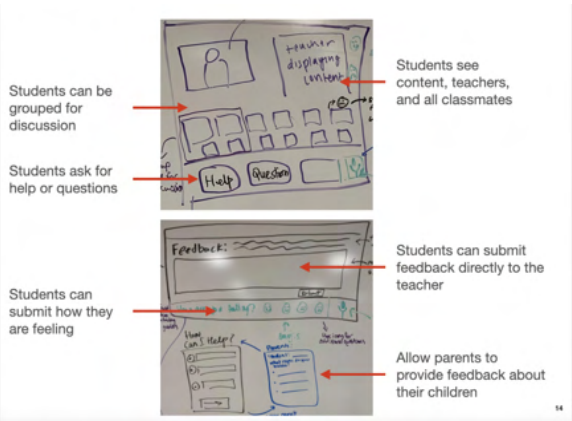
Goal:

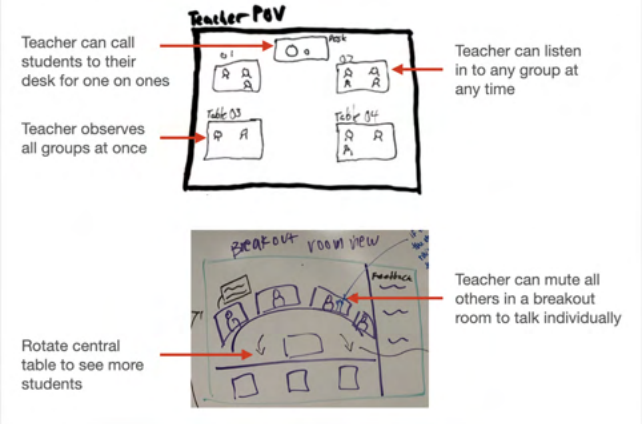
Our goal for idea evaluation was to confirm that our concepts from sketching were addressing specific teacher's needs successfully, as well as gathering inspiration for iterations.

Process:

This interview was split up into three parts:

- The first part was a brief set of introduction and pre-testing questions about teacher to student interaction in the virtual classroom. These were meant to gauge in a direct manner if the ideas behind our sketches would be beneficial for the teacher.
- The second part of the interview was the presentation of our sketches. We showed our sketches with minimal guidance, but explained the sketches in a brief manner and presented a probing question. The sketches are below, and the questions are referenced in the Idea Evaluation section of the appendix:





The final part of the interview was a short debrief to get any additional thoughts or ideas from the teacher.

Findings:

Our overall insight from the feedback we received was that our concepts were headed in the right direction. We received the following pieces of feedback:

- The concepts met first grade teacher's needs
- Received guidance over the specific directionality of the concepts such as the way we would lay out breakout rooms in the new format

Summary

The interviews and the idea evaluation overall validated the sketches we had made and the direction we were heading. We gathered actionable feedback and insights on how to address gaps in our sketches to then move on to create our wireframes. We were able to use this feedback to break our wireframes into these four main concepts that directly would meet the needs of first grade teachers:

- Highlighting important features to tailor to first grade students
- New breakout room format
- New method of receiving feedback from students
- New method of keeping students engaged

Final Concept

Our design concept is a Zoom plugin that supports 1st grade teachers based on their needs. The concept is organized into four main categories: make important features more visible, provide a new breakout room format, receive feedback from students, and keep students engaged.

User Group

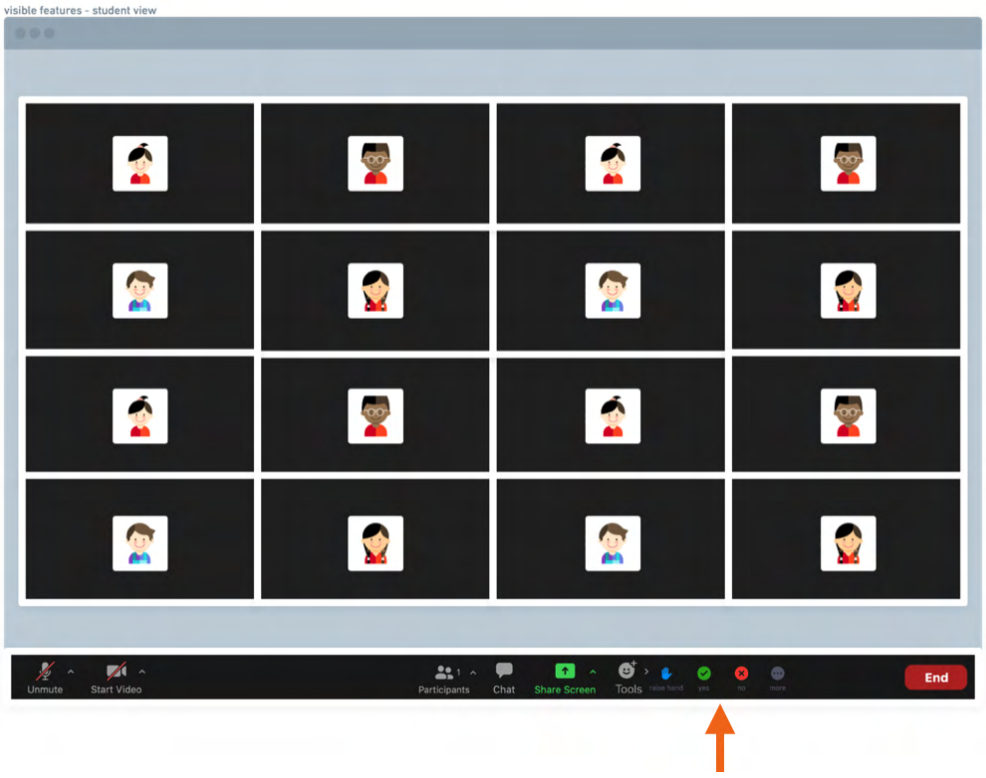
Our user group is 1st grade teachers who use Zoom for e-learning. They need a variety of different features/functions that currently do not exist in Zoom:

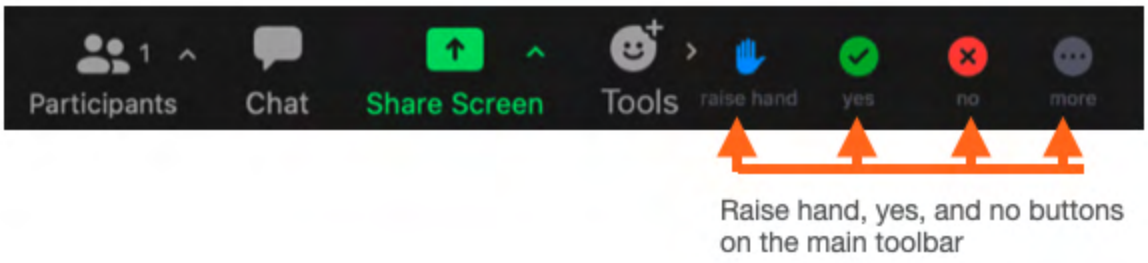
- Moving fluidly between breakout rooms
- Getting the attention of a distracted child
- Opening up communication from the student in regards to accessing materials or participating in class activities

Mockup 1

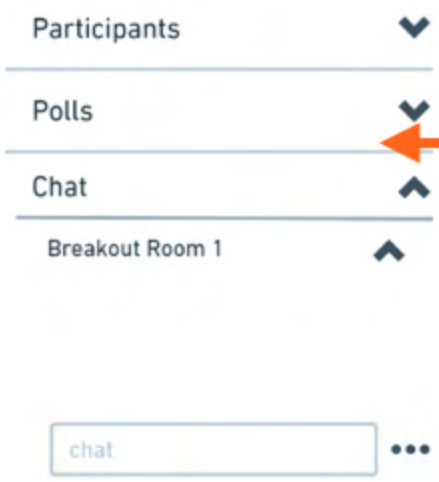
Highlighting important features

For our concept of making important features more visible, we added the raise hand, yes, and no buttons to the main toolbar for students.





Raise hand, yes, and no buttons on the main toolbar

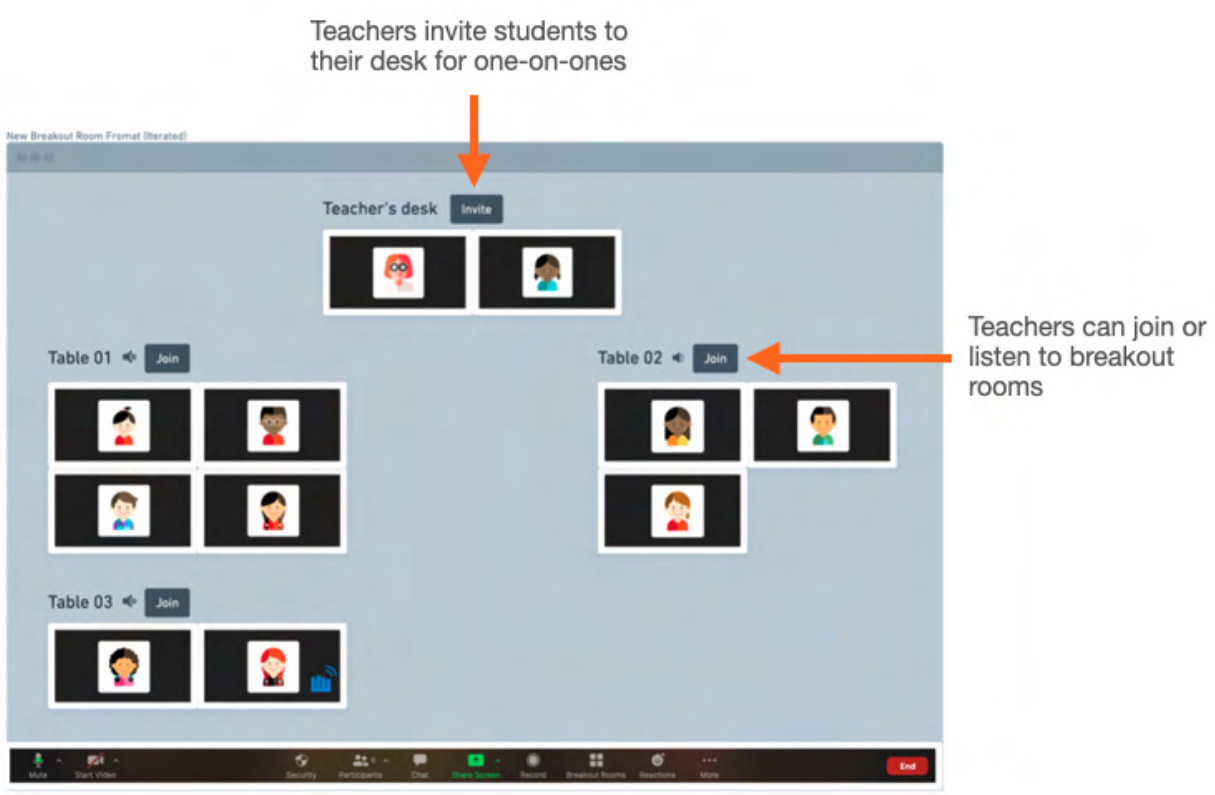


Teachers navigate between participants, polls, and chat in one sidebar

Mockup 2

New breakout room format

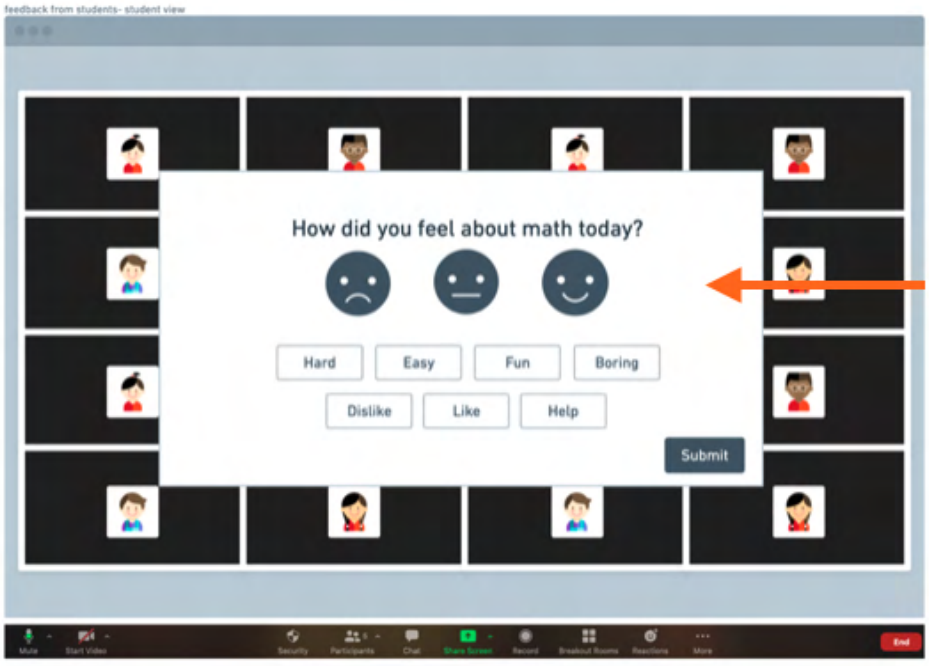
For our concept of creating a new breakout room format, we made it so the teacher can see all the breakout rooms on one screen along with a video feed.

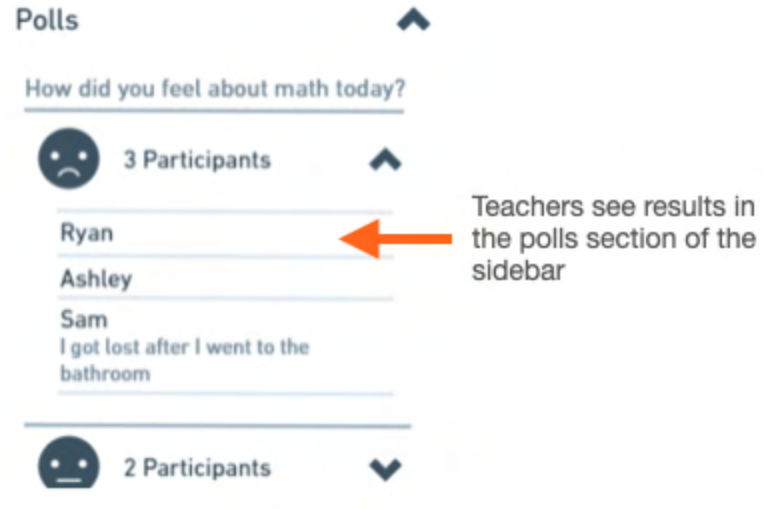


Mockup 3

Receive feedback from students

For helping teachers receive feedback from students, we created a simple way for 1st graders to say how they are feeling about class content.

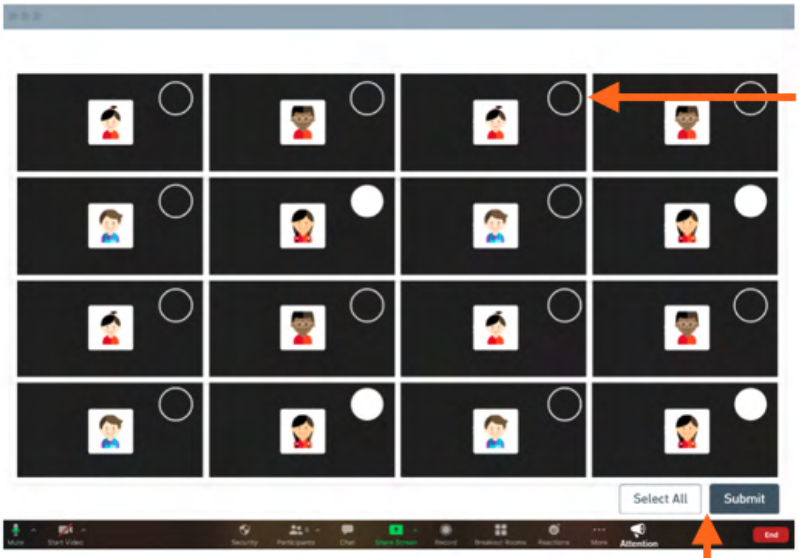




Mockup 4

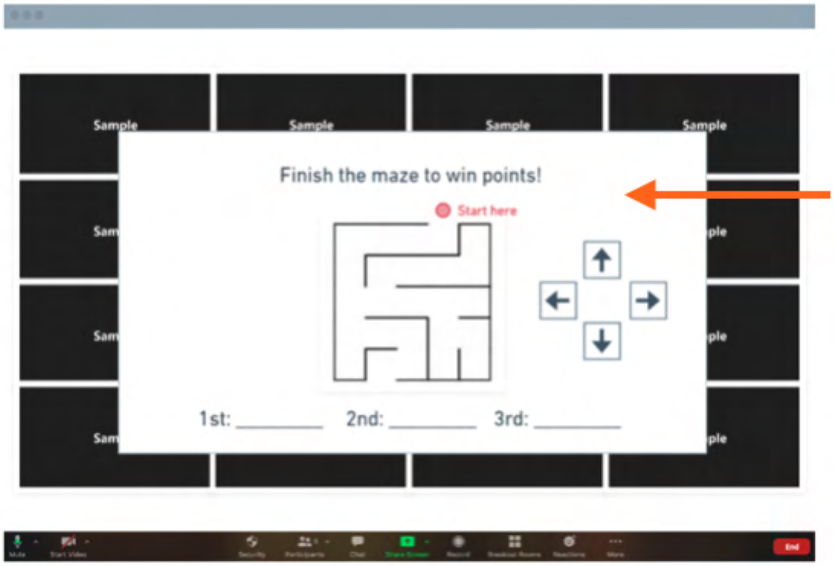
Keep students engaged

Students being distracted is something that teachers have difficulty dealing with in e-learning. To alleviate this, we designed a way for teachers to keep students engaged over Zoom by sending them an attention grabber.



Teachers select specific students that are distracted from class

Teacher selects all students or presses submit



The attention grabber is sent to students to get back to Zoom

Concept Evaluation

Goal:

The goal of our concept evaluation was to see what first grade teachers think about our concept, how they would use our concept in e-learning, and if the concept would be beneficial to them as a teacher.

Process:

We conducted a semi-structured evaluation of our design concept with a first grade teacher over a video call (see evaluation protocol in appendix). We alternated between presenting our design concept and asking for their feedback.

Findings:

- They were very vocal about how useful they found the new breakout room design.
- They mentioned that it would directly address a lot of their pain points in regards to running class.
- They reminded us to reevaluate how our designs could work at the ability levels of the first-graders, making sure to emphasize that not every student is at the same reading or writing level.
- They also asked us to consider the possibility of customizations of their Zoom classrooms, such as making use of color-coding to help students better associate colors with specific teachers that they are with at certain times.

Next Steps

Possible Iterations

In the continuation of this project changes should be made to address any insights gained from our concept evaluations. Some changes that could be made to address insights gained include:

- Adding customization features for background color, classroom color, and other visual aspects of the online classroom.
- Placement of buttons on the screen that fit with the current usability of teachers and students.
- Further fleshing out the interactions with features on the teachers end.

Along with this we would also like to further evaluate the features highlighted in our concept against the true abilities of first-graders. This could be done through observations of its use in classrooms as well as further evaluation with teachers.

Feasibility

Moving forward, the feasibility of a Zoom plug-in needs to be taken into consideration. Handing off this design concept to development and determining overall feasibility of the solution will affect the timeline and budget for the project. Alternative formats, such as a separate video communication platform, is also something that should be considered in the instance that Zoom does not have the technical capability to implement the features outlined in our solution. However, the core features we've highlighted in our concept can be applied in different mediums to address user needs.

Reflection

At the beginning of this project, the team was wary of what our outcomes would look like given the broad problem space we had. As we progressed through the research phases of our project though, we quickly realized the complexity of the space we were working in. We refocused our approach to the project to let our research define what we would do. As we did our best to empathize with the position of our broad user group we found common themes within our research, and then looked into what specific grade levels were most affected by these themes (pain points). As a team, we are proud of how we were able to narrow from such a broad scope to one that we were able to really understand and design for. Creating a design concept was also something our team worked on for the first time in our academic careers. It was eye-opening to see an alternative way to present our ideas and we enjoyed the process of learning about how to do so.

While we wish that we had the facilities, and time, to address the socioeconomic factors that play into the experiences of our users, we knew that adding such a complex and intricate constraint would only make the project more complicated. If we had the chance to continue this project that would be a main point of focus for the team, especially because of our team's shared interest in it.

Overall, we are proud of the work we completed over the course of this project and are excited to see how our findings can be applied to better the experiences within the K-12 sphere.

Appendix

Each of the following sub-appendices contains materials created or found, and utilized by the team for the project. Included is our additional research report, created in conjunction with our documentation.

A-1 Interview Protocols

A-2 Works Cited

A-3 Sketches

A-4 Research Report

A-1 Interview Protocols

Directions: Readers can reference this section of the appendix for the specific questions and scripts we used in our interviews.

Teacher Interview Protocol

Overall Goal:
To gather insights from parents and teachers regarding workflow, barriers, interaction with children, successes, and contrast between in-person and e-learning.

Script:
“Hello! Thank you for agreeing to speak with us today. My name is _____. I am a student in the UX program at Purdue University, and my team is currently working on a project dealing with addressing the current shift to e-learning given the pandemic. This interview is conducted as part of our user research to better understand the space we’re working in and get insight into the experiences of people involved in this space. We will be asking you a few questions to aid our process, and any information that you can give to us is valuable; there are no right or wrong answers, so feel free to let us know anything you think is relevant.

Is it okay if we take notes and record this interview? The details will be kept confidential.
The goal of these questions is to understand ***workflow of teachers***:

- What grade do you teach?
- Please describe your daily workflow. Walk us through a typical work day of yours.
- How do you currently feel about your remote situation?
- What would a general agenda for class time with your students include on a typical day? Have you taken extra-curricular activities and resources into account as part of the holistic learning experience for the kids? How are these facilitated?
- What resources do you and your students use most frequently now? This could be for communication, entertainment, learning or otherwise?

        - After the transition, what have you noticed in your students' performance and participation? How did the school handle it?
- Do you teach from home or travel to another location? How do you manage your familial and work responsibilities on a regular day?
    - What method do you conduct classes in?What are some things you do with your students on a typical day that became harder when you began teaching virtually/hybrid classes?
        - Are there some ways in which you have worked to address these problems? If not, what do you feel would help to make your work easier?
    - Can you give us a breakdown of the amount of time you spend in class with your students and prepping for class activities? How much more time do you spend preparing for class now, as opposed to the time you spent before.
- What ways do you try to maintain communication between your students and their parents? -- Teacher/Student and Teacher/Parent communications
- Now that you have gone through your experiences, are there certain ways you have learned to address this remote situation?
    - How have you learned to meet the changed needs of you and your students?
    - Are there any specific things you would like to mention about how remote learning differs from in person learning?
- Do you have any additional comments or any questions for us ?

Parent Interview Protocol

Overall Goal:
To gather insights from parents and teachers regarding workflow, barriers, interaction with children, successes, and contrast between in-person and e-learning.

Script:
“Hello! Thank you for agreeing to speak with us today. My name is _____. I am a student in the UX program at Purdue University, and my team is currently working on a project dealing with addressing the current shift to e-learning given the pandemic. This interview is conducted as part of our user research to better understand the space we’re working in and get insight into the experiences of people involved in this space. We will be asking you a few questions to aid our process, and any information that you can give to us is valuable - there are no right or wrong answers, so feel free to let us know anything you think is relevant.

We will be taking notes of everything that is being said over this interview, but do you mind if we also record it?”

The goal of this interview is to understand ***a working day of a parent and their interaction with their children***:

- How old (is/are) your (child/children) your children?
- How are your children currently attending school?
- How do you currently feel about your children’s remote situation?
- What online resources do you and your family use most frequently now? This could be for communication, entertainment, learning or otherwise.
    - What are your children’s feelings or experiences towards the switch to e-learning?
    - What is your opinion on how their school is managing the e-learning experience?
    - Can you tell us more about how you see the children engaging with their new way of living and learning? - (feelings, emotions, what they do)
- Do you work from home or travel to another location? Walk us through a typical work day of yours.

        - How do you manage your familial and work responsibilities on a regular day?
        - What advantages or disadvantages have you experienced or noticed during this transition to the remote situation in regards to your children and their learning? (*physically, mentally, and communication-wise*)
        - Can you give us a breakdown of the amount of time you spent with your children before e-learning?
- How involved are you with your children's education now?
    - What ways does communication occur between you, your children, and their teachers?
- Are there certain ways you have learned to manage this remote situation?
    - How have you met the changed needs of you and your children?
    - Is there anything else you would like to mention about the differences in learning style?
- Do you have any additional comments or questions for us?

1st Grade Teacher Interview Protocol

Overall Goal:
To gather insights from parents and teachers regarding workflow, barriers, interaction with children, successes, and contrast between in-person and e-learning.

Script:
“Hello! Thank you for agreeing to speak with us today. My name is _____. I am a student in the UX program at Purdue University, and my team is currently working on a project dealing with addressing the current shift to e-learning given the pandemic. This interview is conducted as part of our user research to better understand the space we’re working in and get insight into the experiences of people involved in this space. We will be asking you a few questions to aid our process, and any information that you can give to us is valuable; there are no right or wrong answers, so feel free to let us know anything you think is relevant.

Is it okay if we take notes and record this interview? The details will be kept confidential.
The goal of these questions is to understand ***workflow of teachers***:

- What grade(s) do you teach?
- Please describe your daily workflow. Walk us through a typical work day of yours.
- How do you currently feel about your remote situation?
- What would a general agenda for class time with your students include on a typical day? Have you taken extra-curricular activities and resources into account as part of the holistic learning experience for the kids? How are these facilitated?
- What are key developmental stages that the children go through at this age?
    - What skills are normally expected for students to learn in first grade?
    - How are these affected by switching to e-learning?
- What are some aspects of the classroom experience that in-person first graders were able to get that current first grade students can not? How do you believe this is affecting their education?

- In another interview for this project, we've learned that some first grade students have difficulty operating a keyboard because it is too large for their fingers. Are there any particular hurdles your class faces that you believe is correlated to your students' young age?
- What resources do you and your students use most frequently now? This could be for communication, entertainment, learning or otherwise?
    - After the transition, what have you noticed in your students' performance and participation? How did the school handle it?
- Do you teach from home or travel to another location? How do you manage your familial and work responsibilities on a regular day?
    - What method do you conduct classes in?What are some things you do with your students on a typical day that became harder when you began teaching virtually/hybrid classes?
        - Are there some ways in which you have worked to address these problems? If not, what do you feel would help to make your work easier?
    - Can you give us a breakdown of the amount of time you spend in class with your students and prepping for class activities? How much more time do you spend preparing for class now, as opposed to the time you spent before.
- What ways do you try to maintain communication between your students and their parents? -- Teacher/Student and Teacher/Parent communications
- Now that you have gone through your experiences, are there certain ways you have learned to address this remote situation?
    - How have you learned to meet the changed needs of you and your students?
    - Are there any specific things you would like to mention about how remote learning differs from in person learning?
- Do you have any additional comments or any questions for us ?

1st Grade Teacher Idea Evaluation Protocol

Overall Goal:
To gather insights from first grade teachers on our initial designs and to gather any additional insights that could further inform our wireframes.

Script:
“Hello! Thank you for agreeing to speak with us today. My name is _____. I am a student in the UX program at Purdue University, and my team is currently working on a project dealing with addressing the current shift to e-learning given the pandemic. This interview is conducted as part of our testing to see if our designs are viable and understandable. We will be asking you a few questions to aid our process, and any information that you can give to us is valuable; there are no right or wrong answers. Whatever you share will assist us in creating a meaningful and effective design, so please feel free to let us know anything you think is relevant.

Is it okay if we take notes and record this interview? The details will be kept confidential.

The goal of these questions is to understand ***if the ideas behind our initial designs could be beneficial to you while you’re teaching***:
Pre Testing:

1. Do you find breakout rooms to be helpful when teaching?
2. How do you receive feedback from your students in class?

Sketch Questions:

1. The first sketch gives you a point of view of the entire classroom with students grouped into their own breakout rooms. You can listen in to any group at any time or call a student for a 1 on 1 if needed. If you were to integrate this functionality into your daily e-learning class, how do you think this could affect how your class runs?
2. This second sketch provides a more realistic breakout room view with you and the other students sitting around a table. You have the ability to mute others so you can talk to an individual student and you can see live feedback from all students in the group. How do you think this functionality could affect the way you use breakout rooms and talk with students?

3. The third sketch shows the students perspective of class, with a large frame of the teacher and content along with their classmates underneath. Students have the ability to easily ask for help, ask questions, and react to content to show whether they are understanding it or not. How do you think this functionality could change the way you receive feedback from students during class?
4. The last sketch shows the student perspective of a feedback screen where they are given a question or a statement that they need to respond to. Additionally, they can submit how they are feeling with emojis or record something for the teacher. How do you think this functionality could affect the way students give feedback in your class?

Debrief:

3. Are there any interactions between students that you want to see more of during class?
4. Is there anything else you would like to share with us that you think could help us with our project?

Script:
“Thank you so much for taking the time to speak with us on our project and our ideas. Everything that you have shared will help us better design a solution that fits the needs of who we are designing for. “

1st Grade Parent Interview Protocol

Overall Goal:
To gather insights from parents and teachers regarding workflow, barriers, interaction with children, successes, and contrast between in-person and e-learning.

Script:
“Hello! Thank you for agreeing to speak with us today. My name is _____. I am a student in the UX program at Purdue University, and my team is currently working on a project dealing with addressing the current shift to e-learning given the pandemic. This interview is conducted as part of our user research to better understand the space we’re working in and get insight into the experiences of people involved in this space. We will be asking you a few questions to aid our process, and any information that you can give to us is valuable; there are no right or wrong answers, so feel free to let us know anything you think is relevant.

Is it okay if we take notes and record this interview? The details will be kept confidential.
The goal of these questions is to understand ***struggles of first-grade students***:

Questions:

- Tech constraints
- Icebreaker questions: Where do you live, how many kids do you have, (anything related)
- “In another interview for this project, we’ve learned that some first grade students have difficulty operating a keyboard because it is too large for their fingers.
- Are there any particular hurdles your class faces that you believe is correlated to your kids’ understanding of technology and their ability to use it?”
- How is your child being taught in school - material, techniques, structure. (come back to this) --What methods are being used to teach your child? (materials, techniques, structure)
- What overall struggles do you see your child facing since the transition to online learning?

- Do you supervise your child during their class time? If not you, do you have a caretaker/relative that does it?
    - How do you make sure they are able to do/doing their school work?
- Usually at school, children's development is kept track of by their teachers, and they are given practice in things like writings, social interactions, etc. that help the child progress[……] Now that everything has shifted to online means and they do not get that active training and support, how is your child being "trained" in these aspects?
  - Does the online curriculum set up by the school take these into account to help them in the best way possible, or has that responsibility fallen onto you?
  - Do you think the curriculum designed has been/will be effective enough in taking these things into consideration and accomplishing them?
- Do you have an older child?
  - (if yes) can you compare and contrast their learning experience/development during regular instruction with your younger child?

Evaluation Protocol

Introductory Script:

(Set up the scenario as that they're starting your class for the day then show the Zoom screen)

Ask them what they think the screen does or how to use it (How would you interact with them), and afterwards present them a scenario and ask them what they think of the concept(??)

Planning Class

Scenario:
Feature(s) tested: setting up breakout rooms, (setting up polls?),

- Setting up polls, assigning people to rooms - ask if that's something prepared beforehand or something done during class --- maybe ask them how it fits into their workflow instead of presenting it as before or during
- How they plan for their class → what is considered beforehand like groupings and work distribution/blocks → have alternatives for different answers

During Class

Scenario:
Feature(s) tested: monitoring students (layout, listening in), getting attention, polls

- Send students to assigned rooms to discuss-- would hearing and seeing all the breakout rooms affect which students you talk to? How would it change the amount of time spent in breakout rooms?
- Sending out a poll to see if the students felt good about a math concept-- what would the teacher do with this information?

A-2 Works Cited

Directions: Readers can reference this section of the appendix for the sources of our secondary research.

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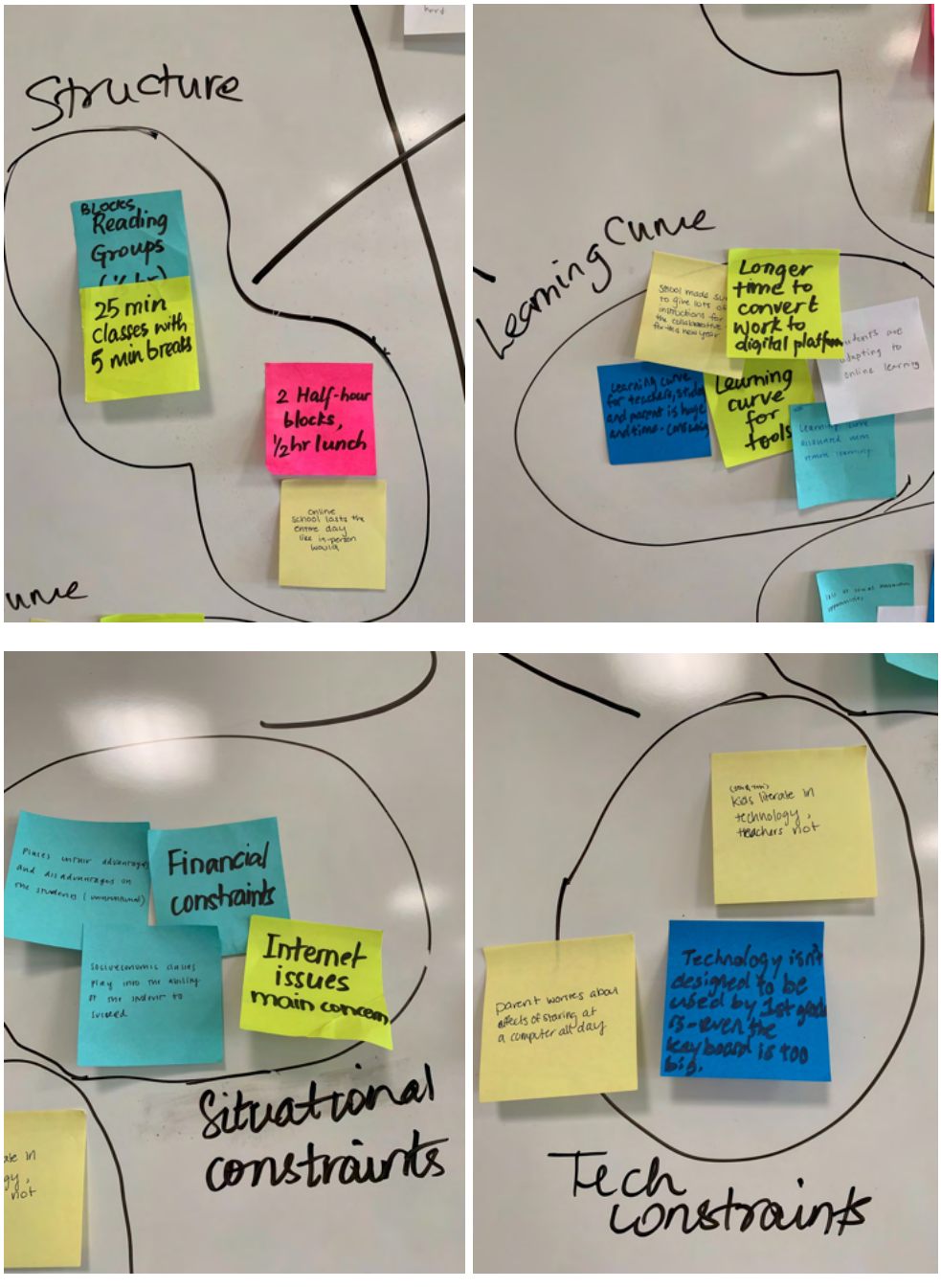
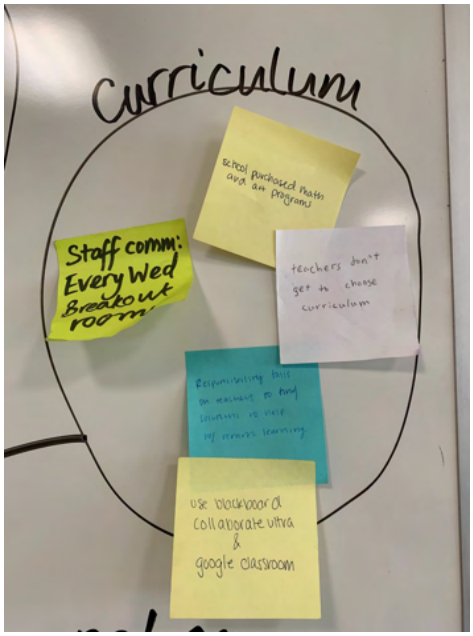
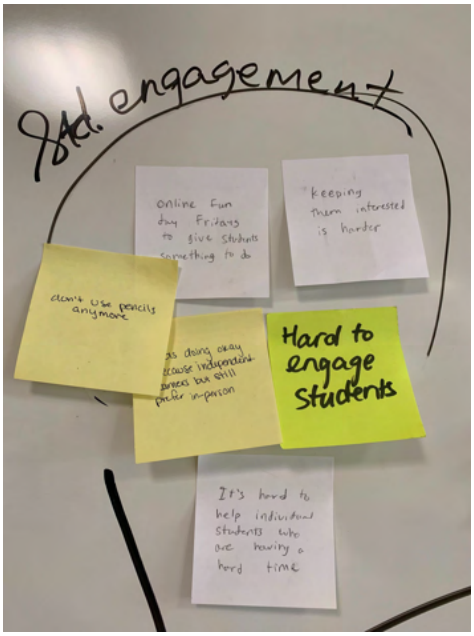
A-3 Sketches

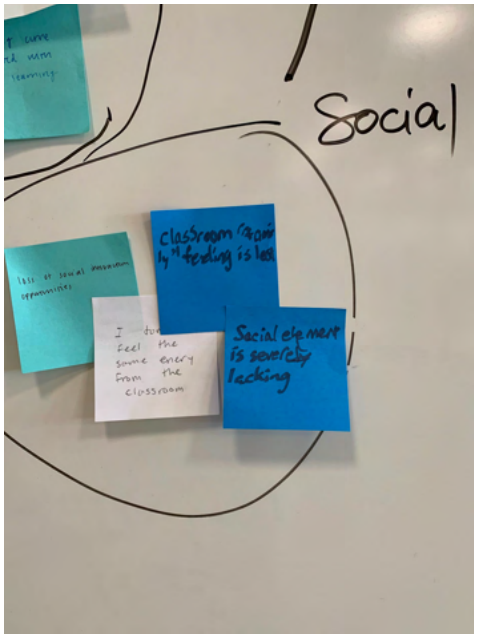
Directions: Readers can reference this section of the appendix for the sketches produced by our team during the design process.

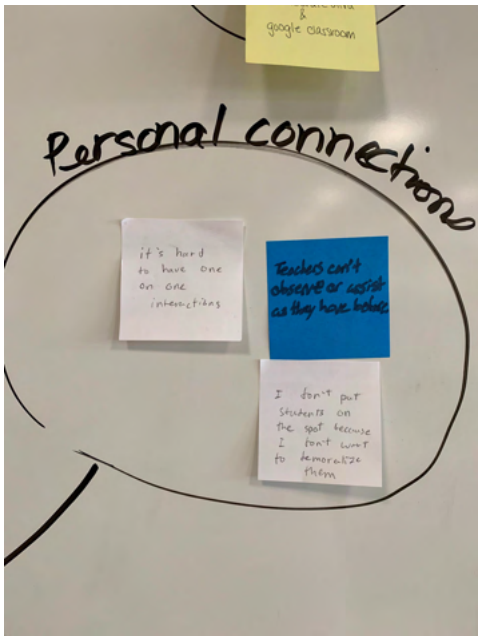
9/25 Affinity Diagram:

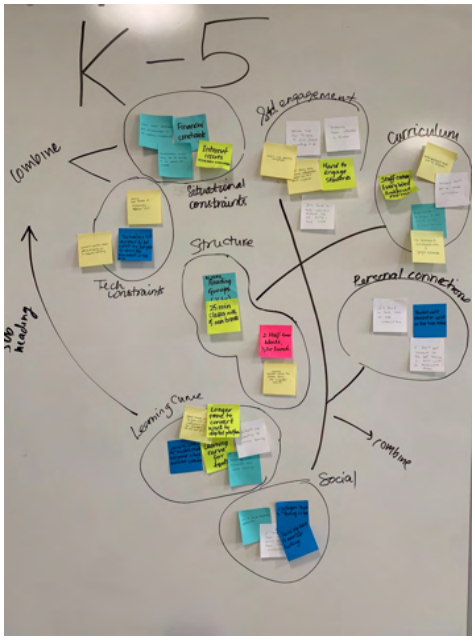



Curriculum
school purchased maths and art programs
Staff comm: Every Wed Breakout room
teachers don't get to choose curriculum
use blackboard Collaborate ultra & google classroom

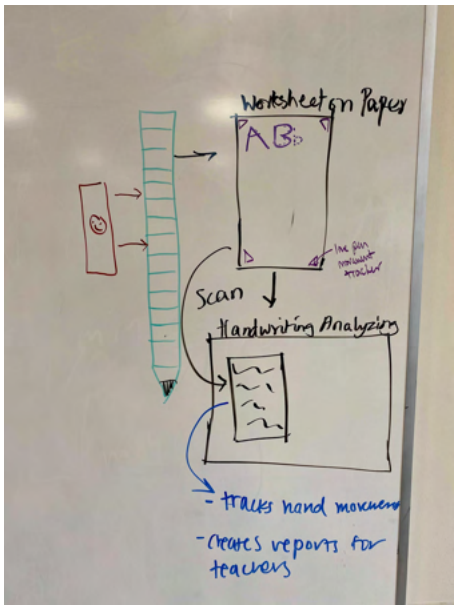

Std. engagement
online fun day Fridays to give students something to do
keeping them interested is harder
don't use pencils anymore
Hard to engage Students
It's hard to help individual students who are having a hard time

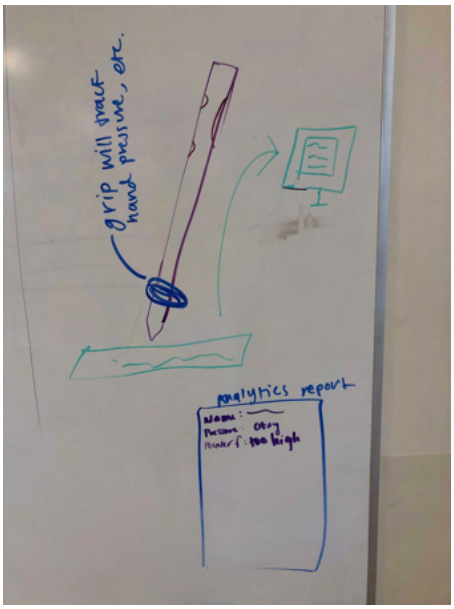

Social
Classroom
feeling is less
Social element is severely lacking

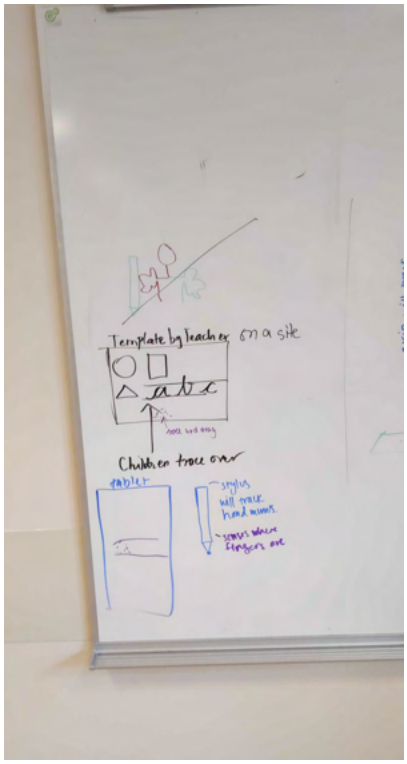

google classroom
Personal connections
it's hard to have one on one interactions
Teachers can't observe or assist as they have before
I don't put students on the spot because I don't want to demoralize them


K-5
Combine
Financial constraints
Structural constraints
Tech constraints
Structure
Student engagement
Curriculum
Personal connections
Learning Curve
Social
Combine

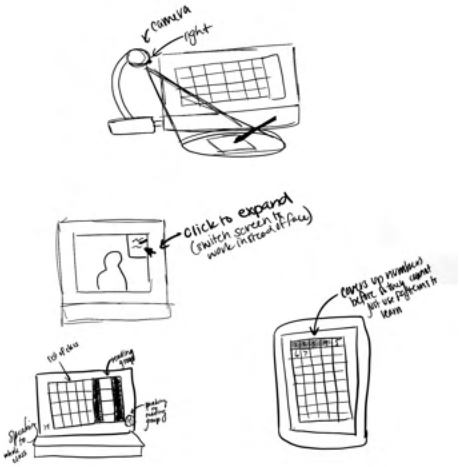
10/02 Sketches:

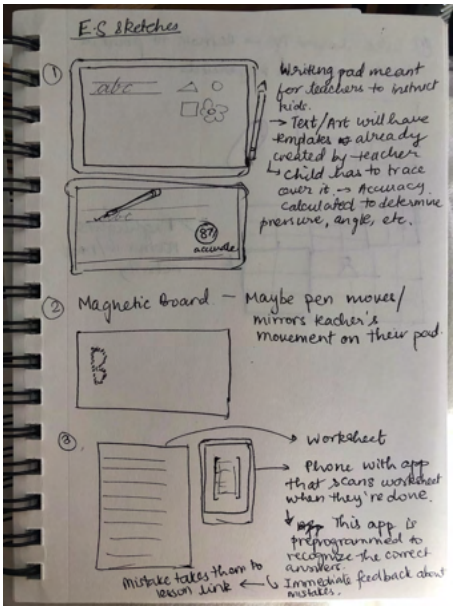


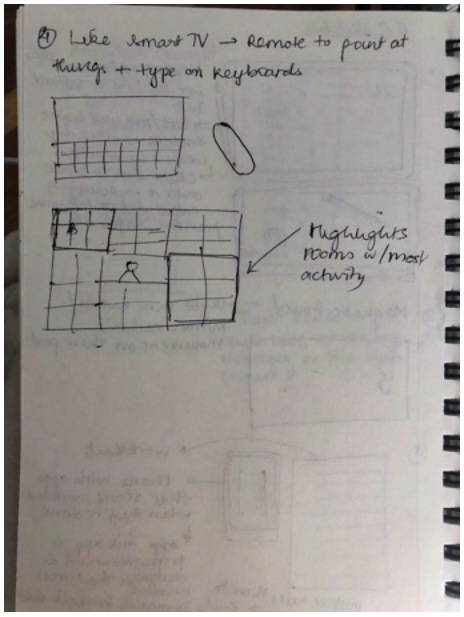


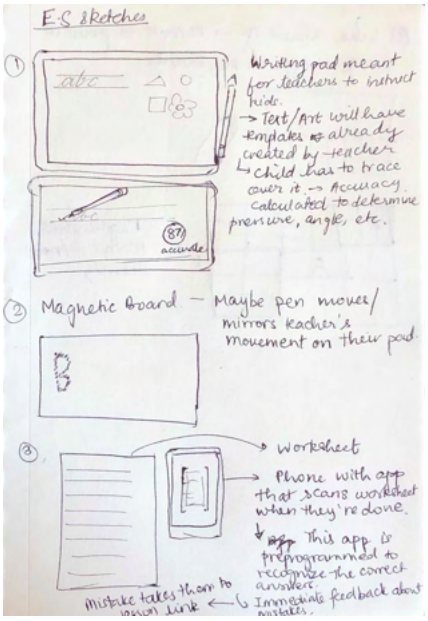


10/05 Pre-Meeting Sketches:


Camera right
Click to expand (switch screen to move instead of face)


E·S Sketches
Writing pad meant for teachers to instruct kids.
→ Text/Art will have templates already created by teacher
↳ child has to trace over it → Accuracy calculated to determine pressure, angle, etc.
87% accurate
Magnetic Board – Maybe pen mover/ mirrors teacher's movement on their pad
Worksheet
Phone with app that scans worksheet when they're done.
This app is preprogrammed to recognize the correct answers
Immediate feedback about mistakes.
Mistake takes them to lesson link


Like Smart TV → Remote to point at things + type on keyboards
Highlights rooms w/ most activity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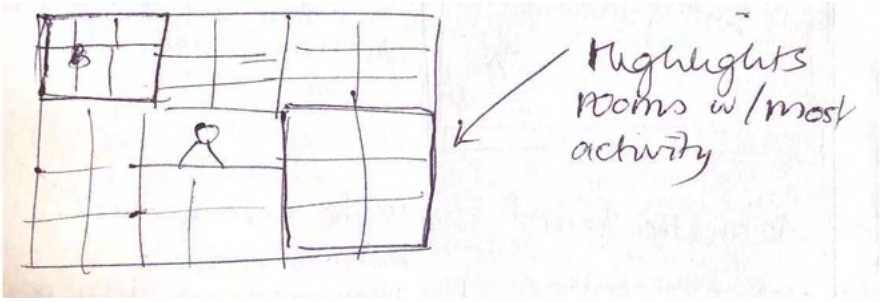
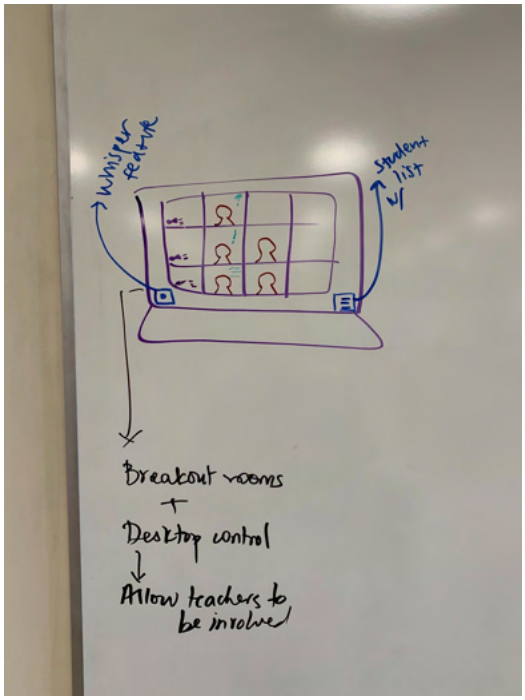
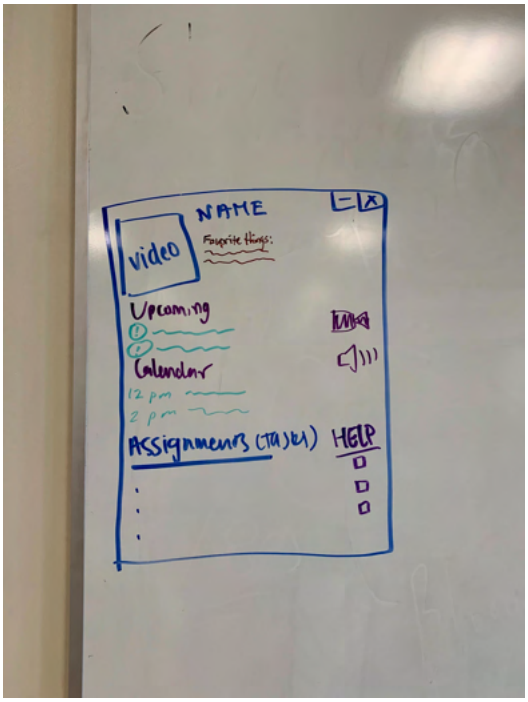
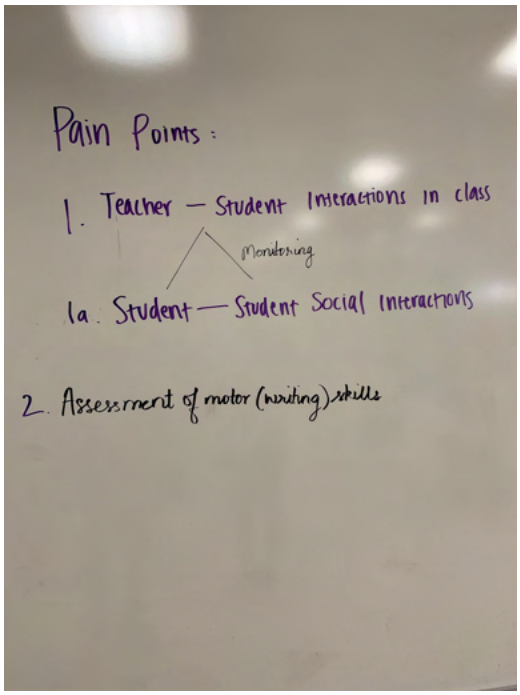

Highlights rooms w/ most activity

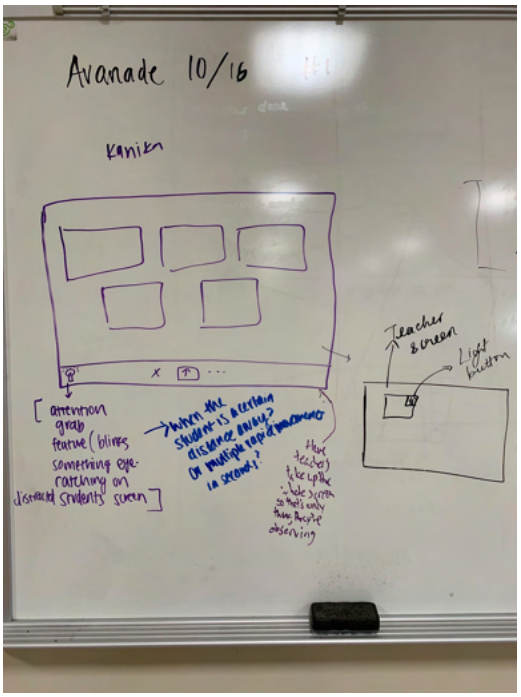
10/05 Sketches:

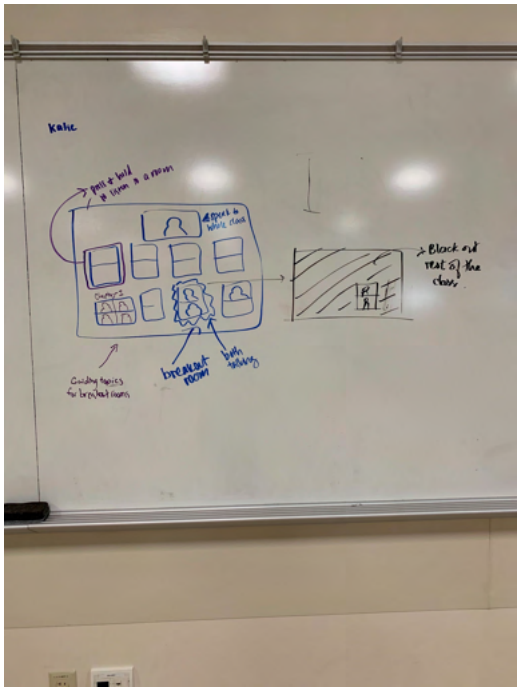


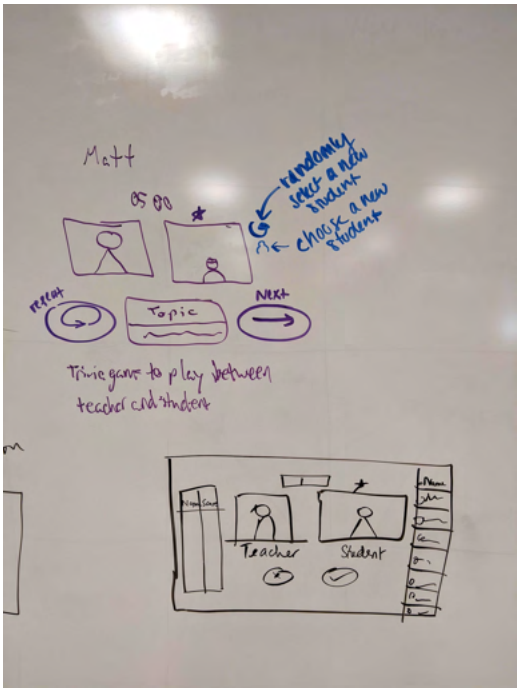


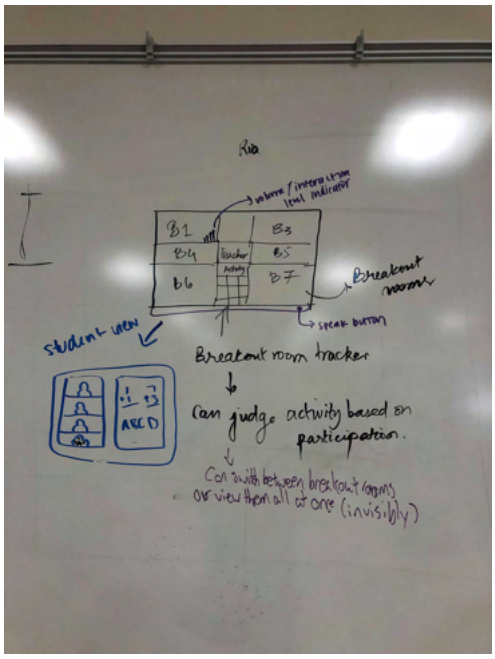
10/16 Sketches:

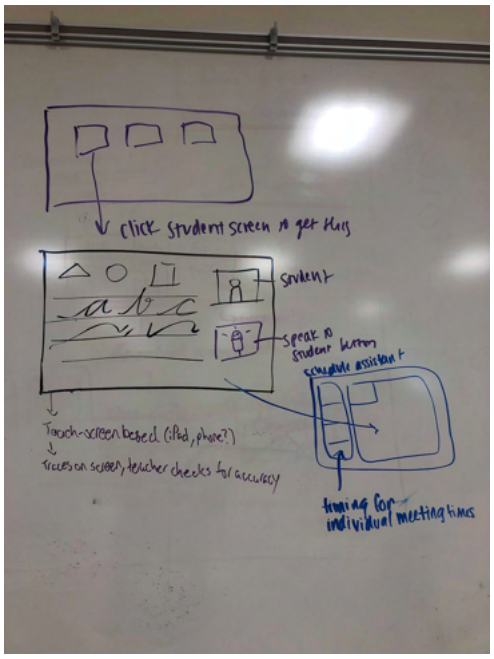


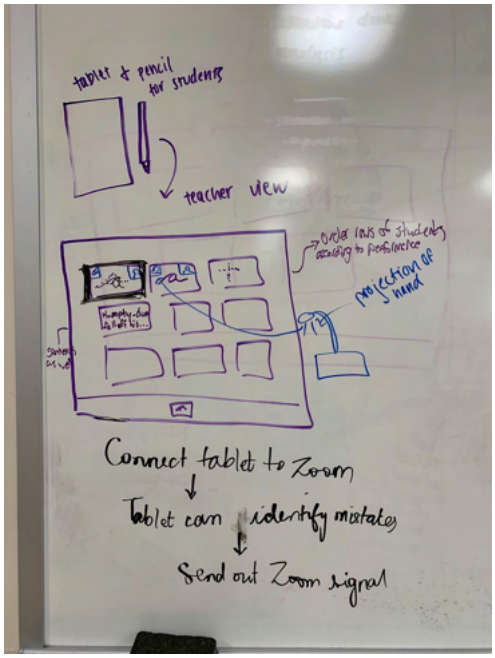


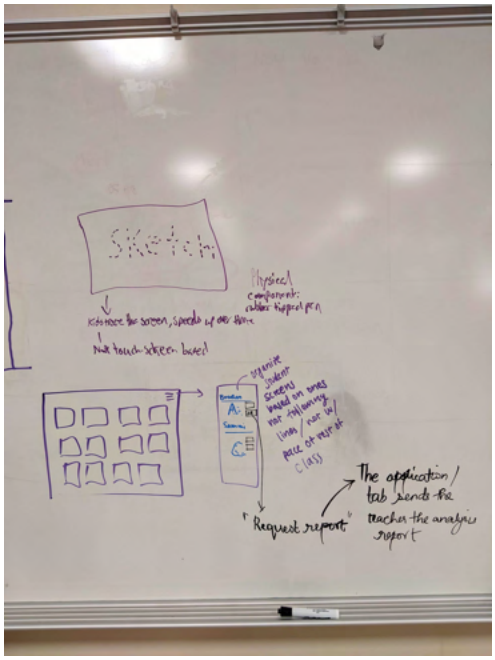


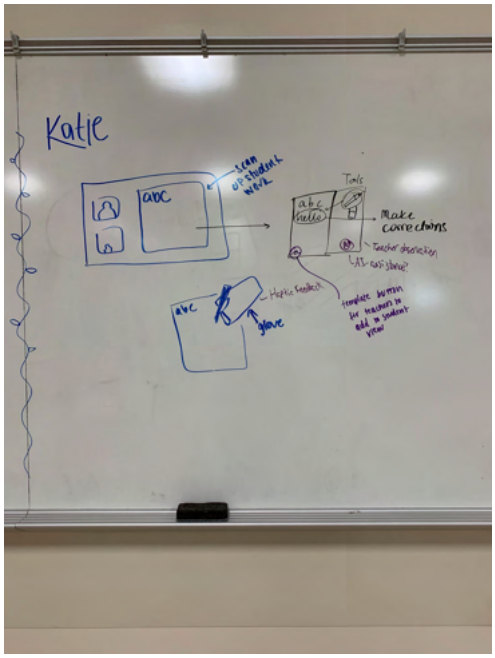



Rio
B1
B3
B4
B5
B6
B7
Breakout room
speak button
student view
Breakout room tracker
can judge activity based on participation.
ABCD

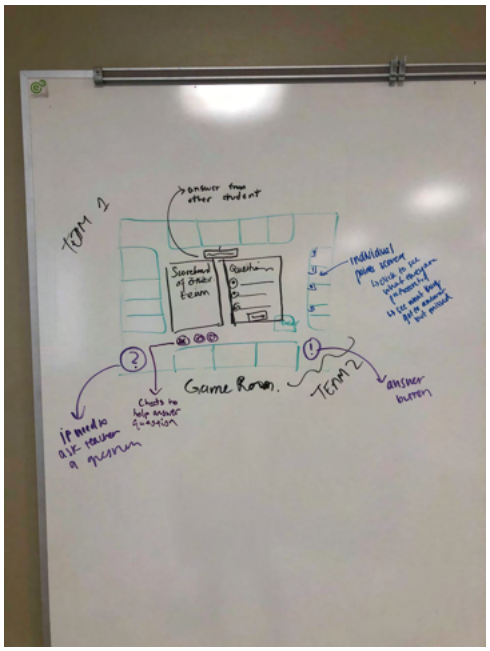

click student screen to get this
student
speak to student button
Touch-screen based (iPad, phone?)
traces on screen, teacher checks for accuracy
timing for individual meeting times

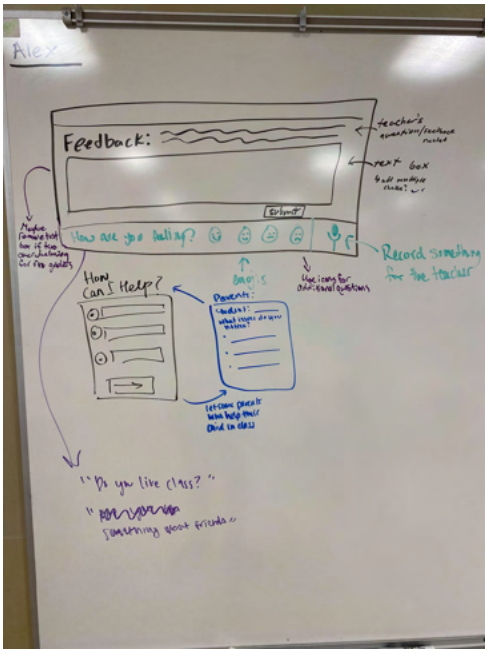

tablet & pencil for students
teacher view
Connect tablet to Zoom
Tablet can identify mistakes
Send out Zoom signal

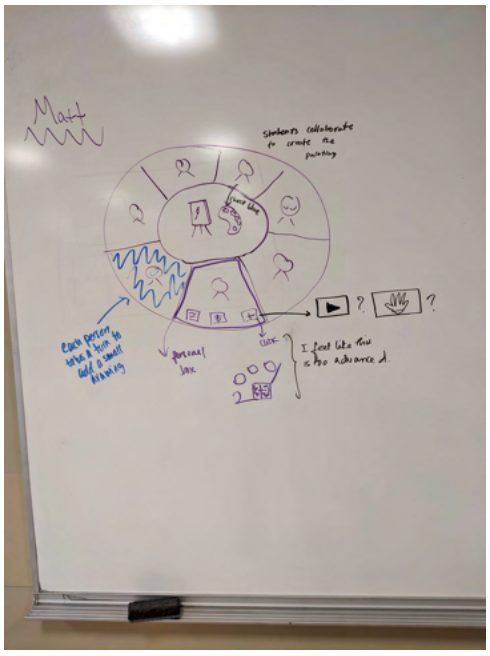

Sketch
The application / tab sends the teacher the analysis report
Request report


Katie
Tools
Make corrections

10/23 Sketches:







A-4 Research Report

Our research report can be found at the following link:

https://docs.google.com/document/d/1ApwUF8uFoLC7-uqswROyZYR2fSKvEY9_Qk_SzvboAFI/edit?usp=sharing