Low Fidelity Prototype

Josh Scotland – Group Manager
Steph Dietzel – Writer
Yafate Yemuru - Designer
Khanh Tran – Usability Tester

Problem and Solution Overview

The Seattle K-12 school district is fighting an attendance crisis right now. The mayor of Seattle launched a campaign called "Be Here, Get There" to improve K-12 graduation rates. In order to help the school district battle the attendance issue, we propose to enhance the current high school attendance interface by adding tools and analytics that will help with classroom engagement. The primary tool will be a communication platform that allows teachers to send words of encouragement or reminders to students after class has ended. In addition, an analytics platform will allow the teacher to view per student engagement data and target the students most at risk of being truant.

Paper Prototype Description

Overview

The image below show the main interfaces for the Motivata web application. Starting with Figure 2, the teacher can see school news and log into the app. From here, the teacher can choose to see the students in a grid or list view (Figure 3 and 4). Anytime the teacher is confused, they have a help icon they can select in the title bar (Figure 9). The other interfaces show the send message page (Figure 7), the student comparison page (Figure 6), and the engagement tools page (Figure 8). For each of these pages, the title bar allows them to jump back to the home screen or view the current queue of messages they have (Figure 10).

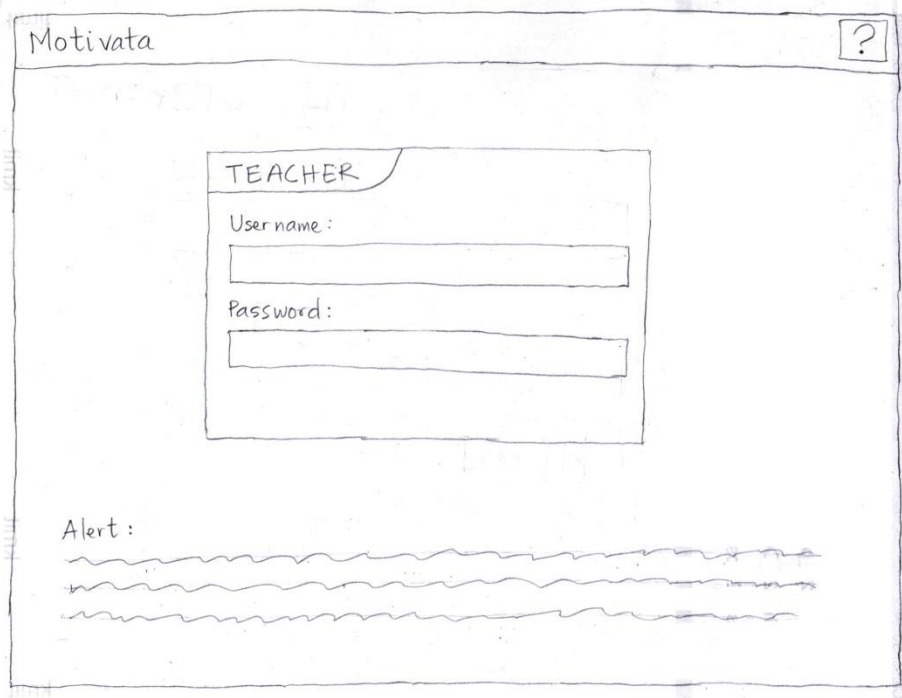**Figure 1: Overview of Motivata**
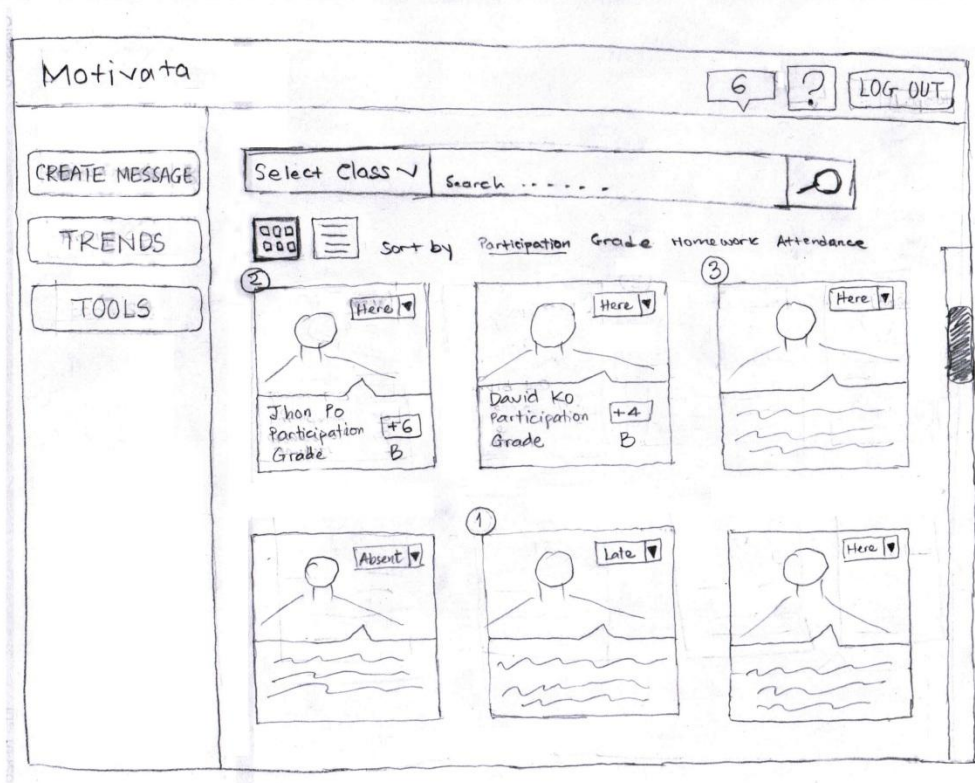
Figure 2: Log In and Alert Page
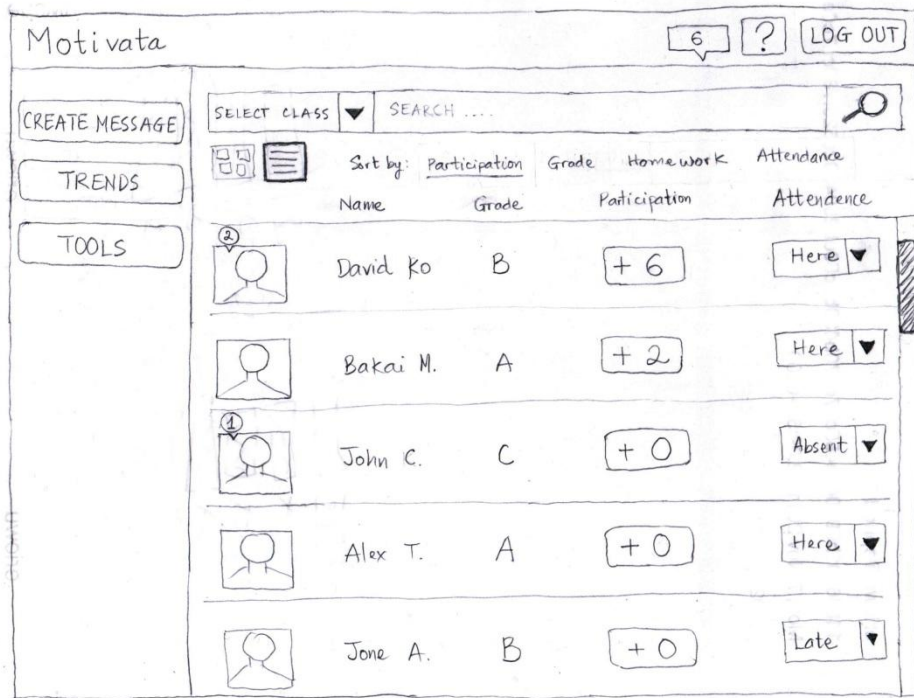

Figure 3: Student Selection Page

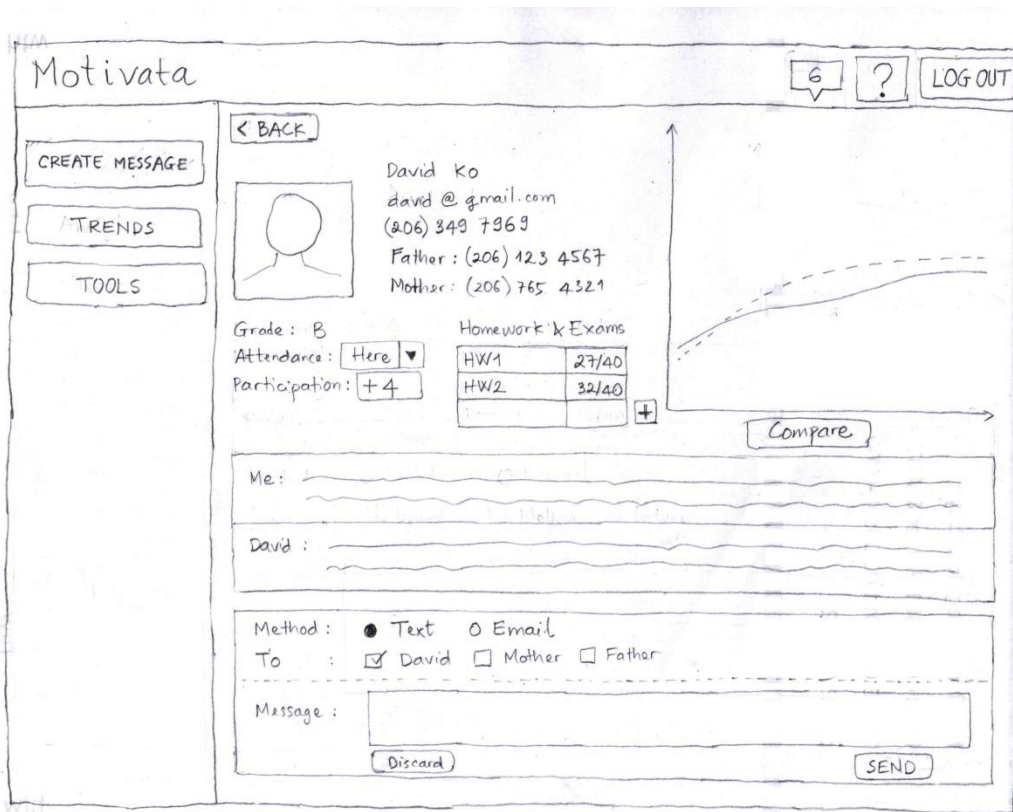**Figure 4: List View of Student Page**
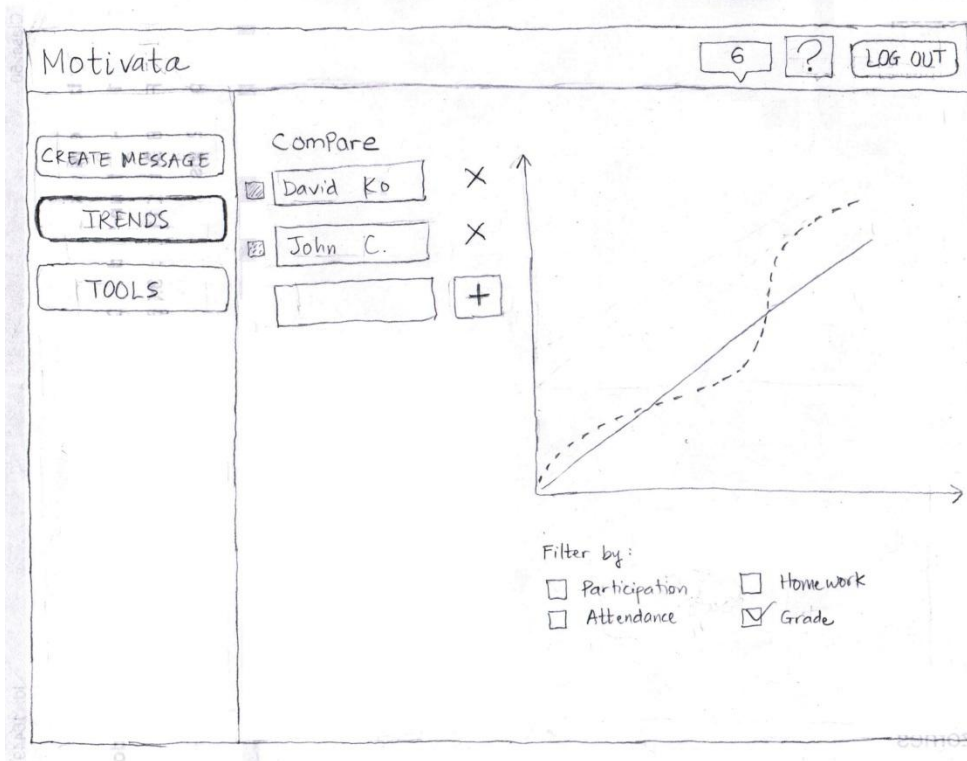

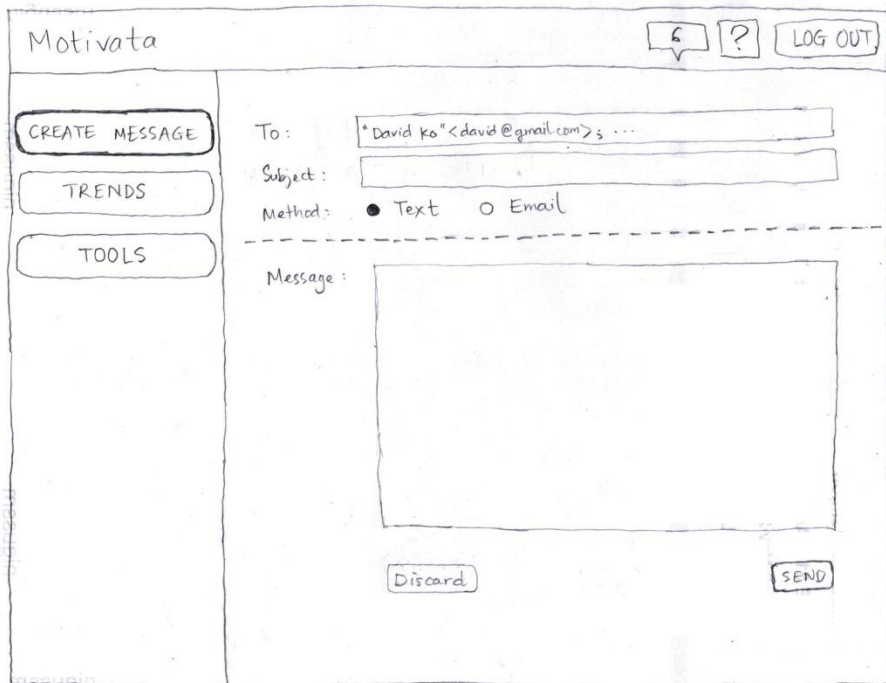**Figure 5: Student Profile Page**

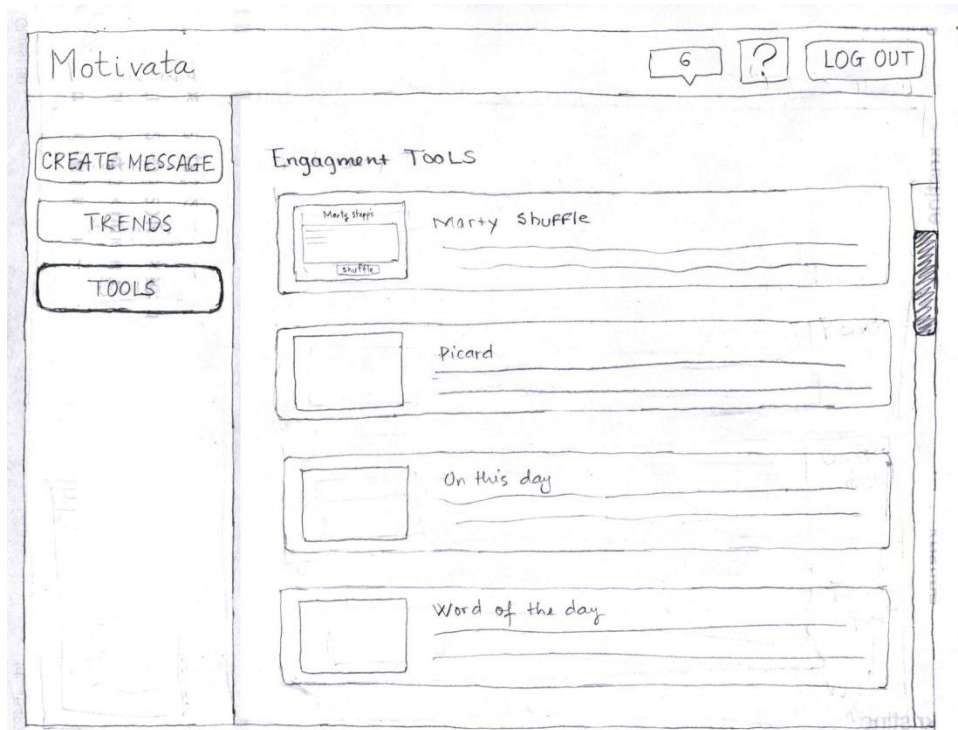**Figure 6: Trends Page**

Figure 7: Send Message Page

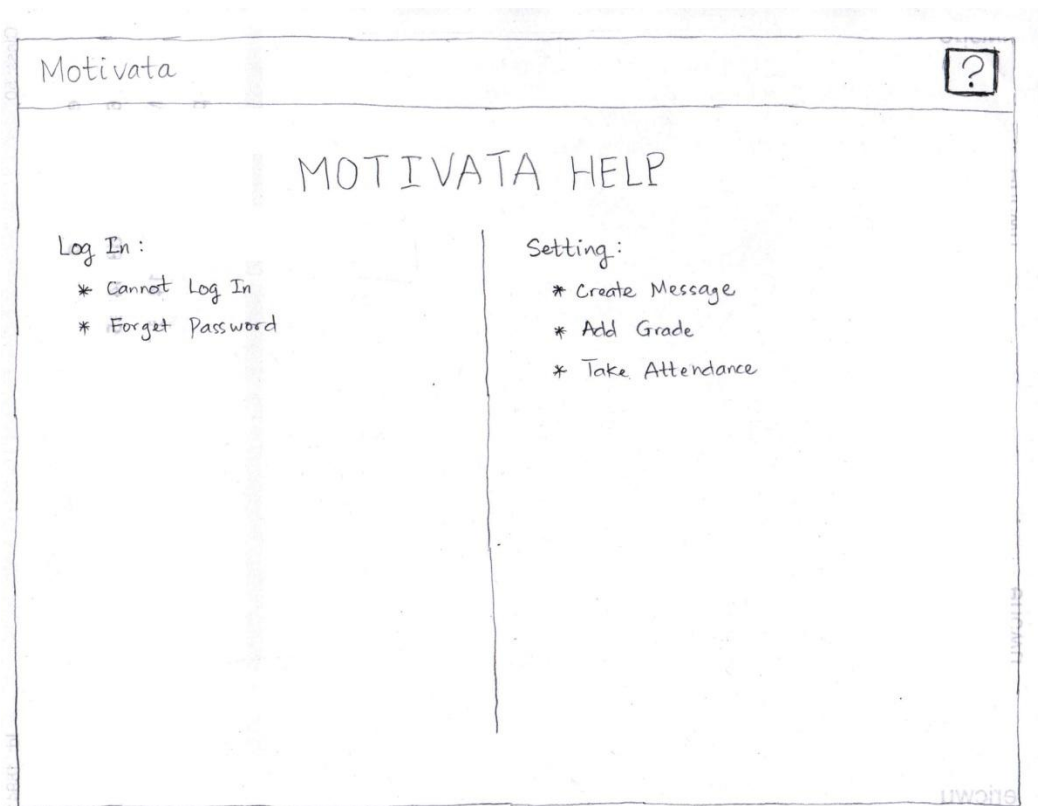**Figure 8: Engagement Tools Page**

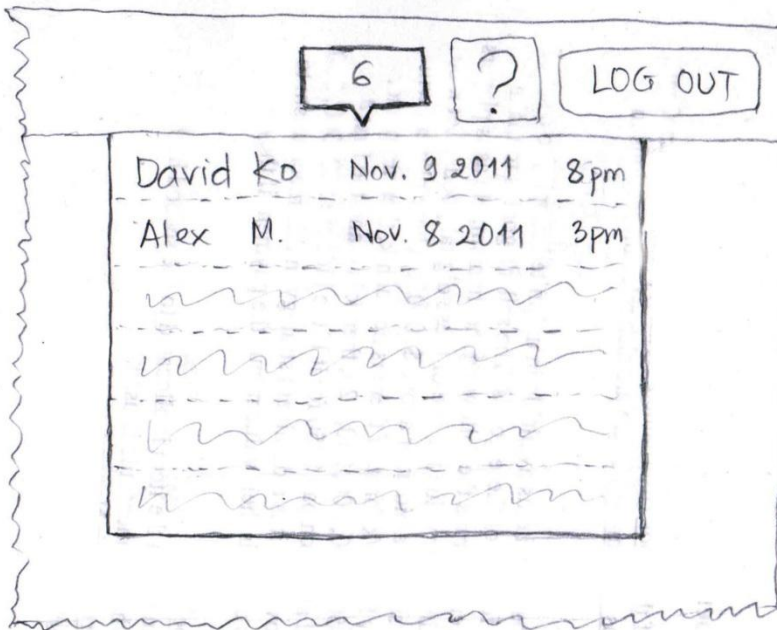**Figure 9: Help Page**

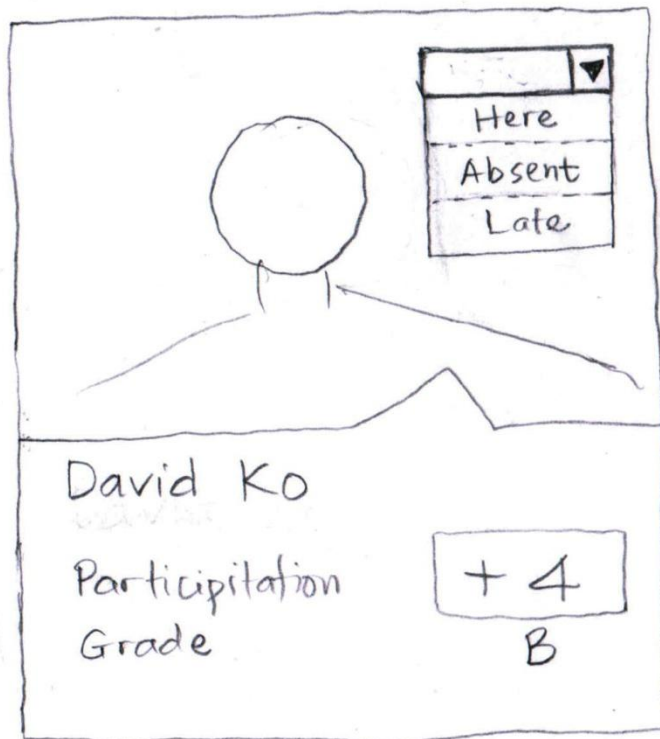**Figure 10: Messages Drop Down**

Figure 11: Attendance Selection

Testing Method

Participants

Our user study participants are male teachers at Roosevelt High School in STEM fields.

- Participant 1 is a robotics and computer science teacher. He knew all about the UW CSE department intro courses because he uses them in designing his own teaching plan.
- Participant 2 is a tech-savvy math teacher.
- Participant 3 is also a math teacher, but less of a technology enthusiast.

In an ideal world, we could have found more distribution across gender and teaching subjects of our participants. However, considering the busy lives of teachers in the Seattle district we feel lucky to have found three teachers who were willing to spend time on our study.

Environment

The user studies were conducted in the teachers' classrooms at Roosevelt. There were plenty of tables with space for the participant, facilitator, observer, and prototype operator to comfortably do the test. This was also the most convenient location for the teachers and they even showed us the current attendance software on their school computers.

Tasks

Set up: Assume it is early in the morning and you just walked in to your first class, Algebra I. You will be using a new classroom engagement tool called Motivata. Motivata is an application built to help the Seattle school district battle its attendance issue. We propose to enhance the current high school attendance interface by adding tools and analytics that will help with classroom engagement. The primary tool will be a communication platform that allows teachers to send words of encouragement or reminders to students after class has ended. In addition, an analytics platform will allow the teacher to view per student engagement data and target the students most at risk of being truant.

Task 1: Viewing Trends – Log on to Motivata and compare David's grade to the class average over the semester.

Task 2: Marking Absence – Once class starts, you notice that David is missing today. Make a note on Motivata that David did not attend class.

Task 3: Engagement Tools – It is now half way to the class and you notice your students are losing focus. Use Stepp's Shuffle to select a student to answer a math question.

Task 4: Communication – Class is now over and your students have left. Send an encouraging text message to the student that had the most participation in class.

Procedure

We had Yafate be the facilitator and Khanh be the computer. Josh and Steph were note takers.

We began the session by introducing ourselves, why we were there, and asking the teacher to read through the consent form (see Appendix). We told them upfront how much time they should expect the session to take to make sure we wouldn't have to rush.

Then Yafate read the task set up to get the teacher in the right frame of mind. Afterwards, we gave the teacher the tasks to complete, one at a time. If they fell silent, we would remind them to speak what they were thinking out loud. If the teacher tapped anything, Khanh would switch out paper interfaces.

After the session, we had the teacher speak about their thoughts on the interface. We also had them talk about the current software suite they use to manage the classroom and the benefits or cons of those suites. Of course, we provided gifts to thank our volunteers afterwards.

Test Measures

We watched closely to determine which pieces of our interface were most confusing to the teacher. This allowed us to find many issues that we hadn't thought of before. Having the teachers speak aloud about what they were thinking and what didn't make sense was a huge help. This allowed us to ask follow up questions afterwards.

Also, we used an additional task to make sure every feature was tested properly. This allowed us to pick up on a bunch more features that could be improved.

Testing Results

All the teachers were very excited to hear that we were working on an application to replace ESIS, the current attendance software used by the Seattle School district. Let's walk through the application interactions and the reactions and to each page.

Log In Page

All the teachers breezed through the login page.

Student Selection Page

The participants didn't like the grid view default because he had no need to see the students' faces after the first two weeks of class. They wanted the default page to be a non-scrolling view, since all participants thought scroll bars were extremely inconvenient. The second participant was very excited about the sort and search capabilities and had some very interesting suggestions:

- Consider being able to select individual periods, as well as all periods with the same subject
- He liked the pictures for learning names at the beginning of the year, but after that wanted a more condensed view, which could be an option for smaller icons or lists.
- Consider draggable tiles so teachers can arrange classes by their seating chart, which provides a quick, visual way to do attendance.

The attendance tracking on this page was met with general approval. Participant 1 would prefer a 1-click solution since he doesn't mark students late very often. Participant 2 was very enthusiastic, and commented how much better it was than ESIS. Participant 3 liked the feature, but pressed the "sort by attendance" option before marking, which indicates our "sort by" options look like modes to some teachers.

Student Profile Page

The teachers liked being able to view a single student's data all in one place. Participant 3 remarked, "this is definitely the best part." However, not all the information provided was relevant or clear. For example, the teachers don't need to see the student's address every time they view a profile. They would rather have the assignments listed out showing the student's grades. Participant 2 really wanted to see labels on the graph.

The communication aspect of this page was described as "really useful". Participant 2 described how he currently contacts failing students at mid-semester. He has to sort by grade in his gradebook program, look up their contact info in ESIS, and then send email using Outlook. He was very excited about being to accomplish that task in one place by combining the sorting and messaging capabilities.

Participant 1 also felt the program was great for communication, and suggested a configuration screen for students and parents so they could choose what contact info to give and select their preferences. He also brought up the possibility of including Facebook as a channel.

Trends Page

This page was confusing to most of the participants because there weren't enough labels. For example, the boxes to add a student or class to the graph were not labeled. In addition, the x and y axis on the chart had no labeling. Participants were very confused by the text boxes. When participant 3 got to the Trends page from the student page, he didn't interact further with it at all.

Once the participants did figure out how the page worked, they were skeptical about its usefulness. Participant 1 said he would never want to compare two students. Participant 2 was uncharacteristically unenthusiastic. Participant 3 said he already knows the students, and their grading trends in his class. He suggests an option to see the student's grades in other classes since he often tries to figure out if a bad grade is a fluke or if a student is having problems across the board.

Engagement Tools Page

After stumbling through the trends page, this page was self-explanatory for the first participant. He suggested a tool that would break the students into random groups of a given size. Participants 2 and 3 also liked it, but reminded us that the computers which projected on the front of the room were only allowed to run a limited set of programs.

Send Message Page

The feedback for this page was generally the same as the feedback for the communication on the Student Page. The participants used it easily and intuitively. The teachers really liked the communication aspect to the interface. The first participant provided great feedback on the different mediums students use to communicate, such as Facebook or Twitter. Knowing the parent's name was also an important aspect.

Participant 2 liked the autocomplete for recipients. He also suggested a drop down menu for selecting an entire class to receive a message.

Interface Revision Sketches

One of the major flaws we found from our user testing was that our trends page was not very comprehensive. Most, if not all, the teachers failed when trying to complete task three, which was to compare David's grade with the class average. As seen in Figure 12, the design just had empty text boxes and the teachers didn't know what to type in the boxes. When redesigning our interface, we took this into consideration and added labels to the fields teachers can enter in order to better interact with the graph. The redesign of the Trends Page is illustrated in Figure 13. Teachers were also confused on what the x and the y axis were supposed to be because in the original design, we didn't include any labels on the axis of the graphs. In Figure 13, you can see that we added a section to select the range (e.g. 1 day, 1 month, 3 months, etc.) that you want to tailor the trends.
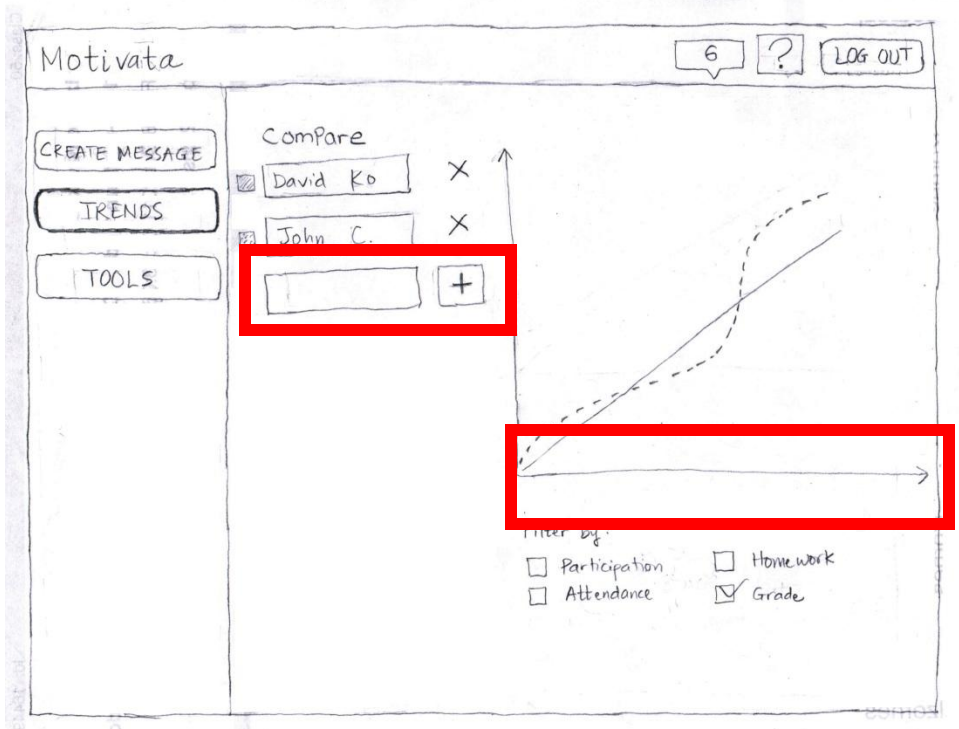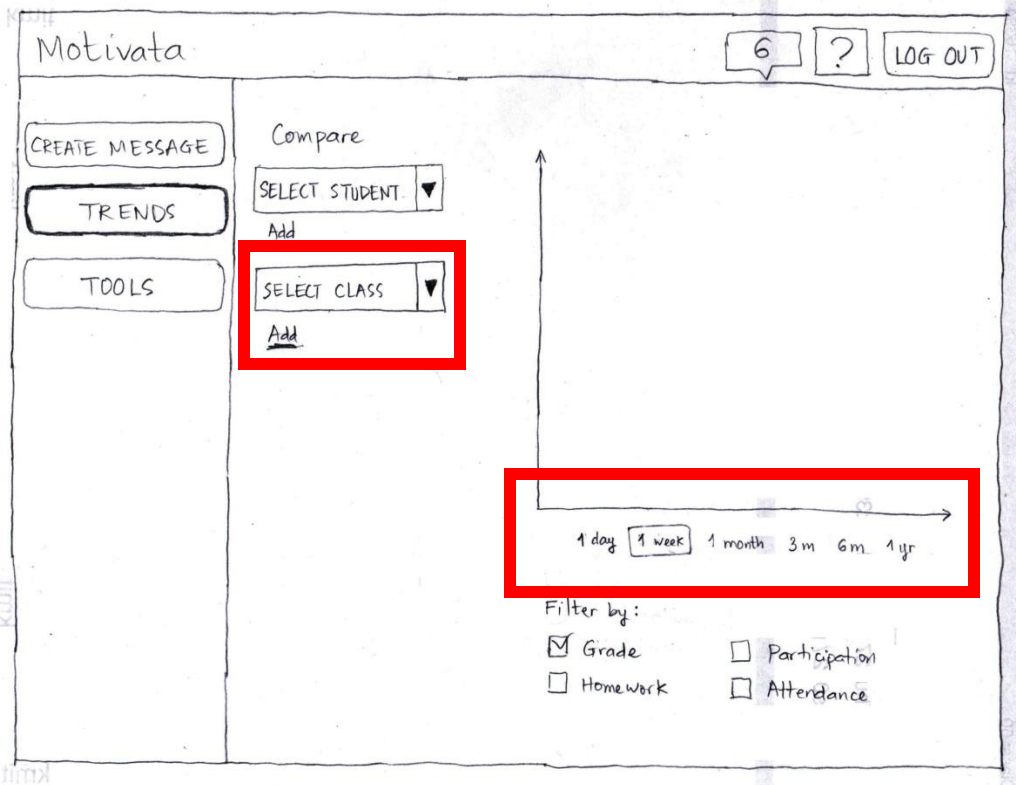
Figure 12: Old Trends Page

Figure 13: Trends Page Redesign

As seen in Figure 14, our original design had a grid view and list view that required users to scroll when taking attendance. Teachers pointed out that they would not want to scroll through a page when taking attendance. They wanted to be able to take attendance quickly and to have all students in one page. As illustrated in Figure 15, we redesigned the list view to be the default landing page and made additional enhancements to streamline this view. The list view is now a two column list of students. Considering a high school class has an average of 20-30 students in a class, the redesign will allow all students to appear in one page, making it simpler for teachers to take attendance quickly.
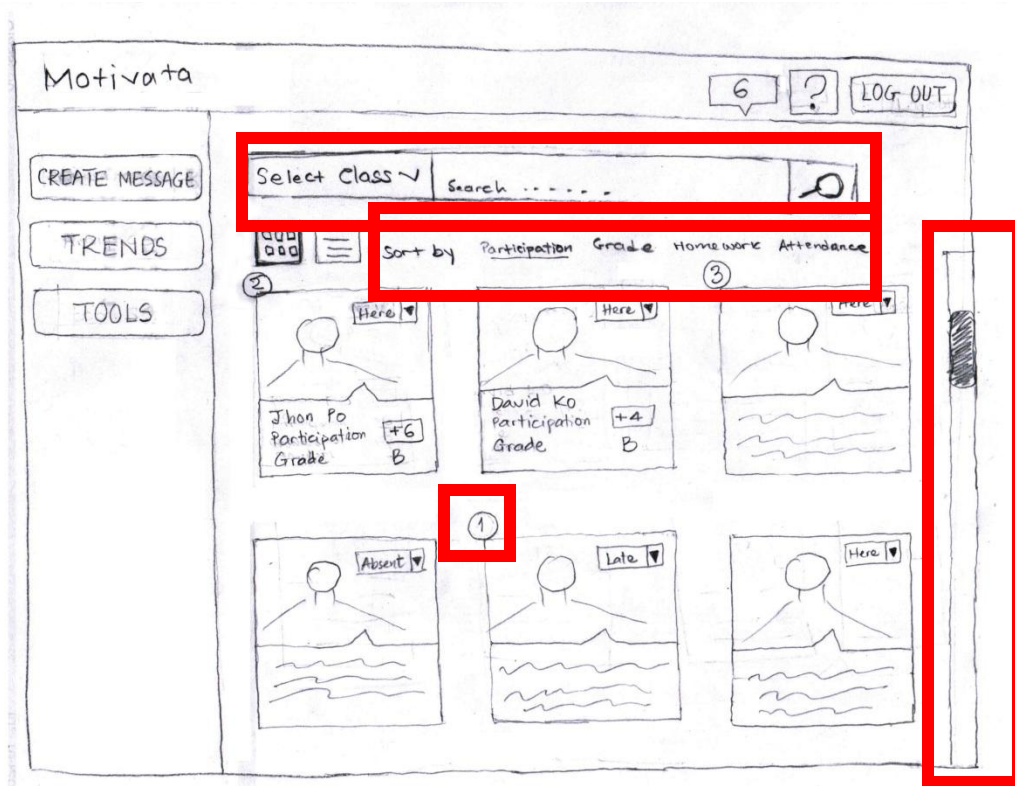

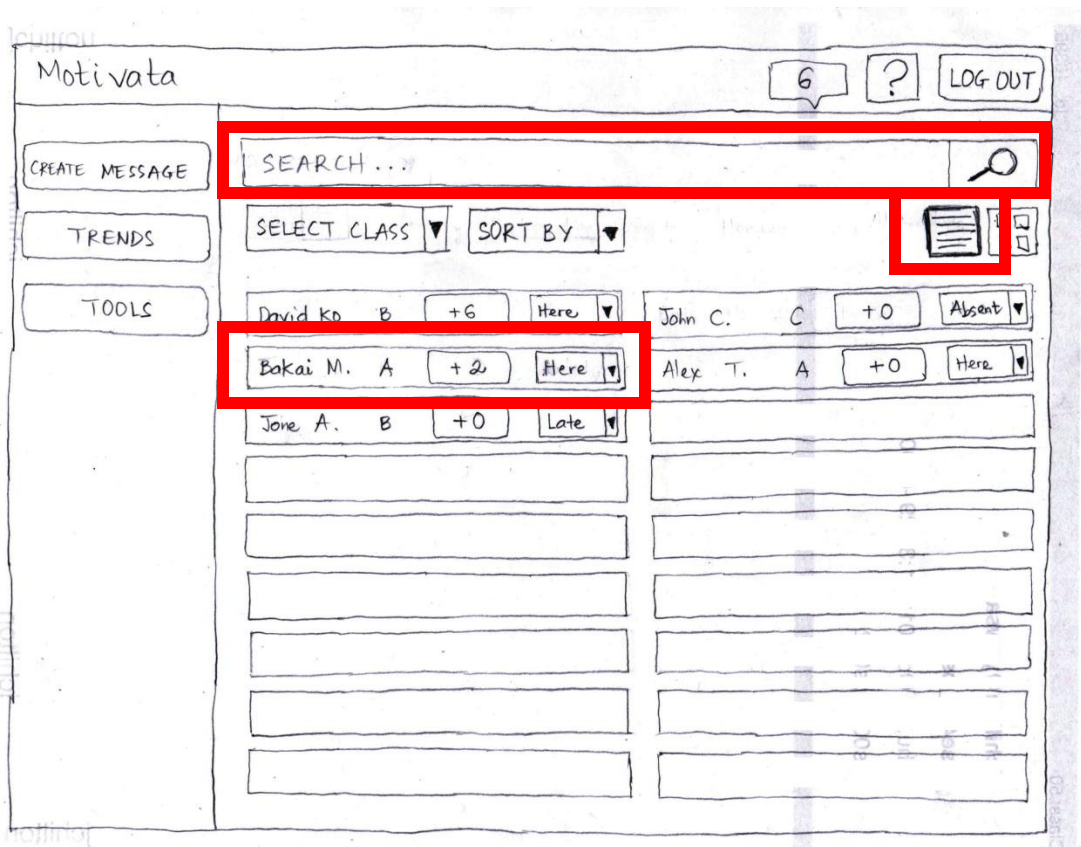Figure 14: Old Student Selection Page

Figure 15: Student Selection Page Redesign

Summary Discussion and Lessons Learned

One of the biggest takeaways from our sessions with the teachers is that the interface needs to be as simple and efficient as possible so that it doesn't hinder the teacher from teaching. All the teachers were pressed for time and if we could save even two minutes a day, then that would be really beneficial. Thus, we should focus on streamlining the entire application. It is also important to note that there is a learning curve for any new software. Once learned, our software should be blazingly efficient.

Another important result of our testing was the emphasis of communication over trends. Our participants loved being able to communicate with students, parents, and groups over multiple channels all from one convenient location. They felt that this feature was the most valuable piece of the application because it could significantly simplify their current communication process, especially when combined with the power of viewing grades and attendance without opening a separate program. The ease of communication could facilitate better communication overall, and lead to improved engagement.

Contrarily, the data analysis and trend visualization part of our application was not as relevant to the teachers' needs. The design was much less intuitive than we realized, so it was hard and time consuming to use. Most teachers already know their students well enough to be able to recall their trends without a computer. We need to revise this section to be more user friendly and provide relevant information.

Moving forward, we will be reevaluating out design with a focus on improving our communication interface to be as efficient and useful as possible, as well as incorporating changes to make trends easier to use on those occasions where teachers do want to use it and making the information in student view even more relevant. This focus uses participant feedback and suggestions to move our application to allow relevant grades, attendance, contact information and messaging all in one convenient, useable place.

Appendices

Introduction to Tasks

Hello [subject's name]. Thank you for participating in our user study. Before we begin, it is important to understand that the purpose of this study is to test our design, not our subjects. If you are unable to complete a task, it indicates a flaw in our design, not a failure on your part.

Today we are testing a design of a touch screen interface for a classroom engagement application. The design is still in the early stages of testing, so we are using a low fidelity prototype to test the user interface. We will be using paper interfaces that will simulate the current design of the interface.

Once the test has started, I will not be able to directly interact with you and will only be present to simulate interface responses. [note takers' names] will be observing your actions during the test, and will be available for extremely limited interaction. All questions are welcome, but answers will only be given to you if the information is deemed important for forward progression.

Please interact directly with the prototype as if it were a real machine. It is extremely important that we understand the processes and reasoning that drive your interaction with this prototype. We ask that as you participate in the test, you "think out loud." Read words aloud as you see them on the screen and if you stop speaking out loud, I will prompt you to do so. Once the test is over, we will discuss in greater depth your processes and reasoning to understand further your reactions.

Observation Notes

User Test 1:

Roosevelt High School
Robotics And ap computer science

More satisfying to be high school

ESIS
ugh
20 year old tech
Interfaces are primitive
Funky

Task 1
(Login page)
Why would I compare one student with another
I type in username...
Hit login
(Grid class view)
Select class, let's see
Trying to figure out icons (pictures)
Must be Individual students
I don't know what 6 means
I don't know 1 2 3
Looks like I can get list view
Select a class
Pick algebra
So now find where to compare John and David...
I don't know why I want to compare one student with another
I want to view the whole class
I don't know what sort by attendance means
The icon view doesn't provide good list
Want an overview
Supposed to compare one against the other...
Checkbox both students and then hit compare
(Student view)
Like the screen
Can see overview
Contact and stuff should not be here

I want to see their table with grades and overall grade
The most important is the homework
Need a room for title of the homework or exam
Letter grade, not points, would be useful
I don't know what the me means in the box
Go back and want to see them together
(List view)
Looking for a way to make a checkbox
Kinda need a way to select from the list the students to compare
(Hint given)
Ok looking st the sidebar
Pushes tools
(Engagement tools)
Don't understand
What is Marty doing here?
Using gradeit for ap computer class
I don't know what engagement means
So these could be things I use in class
Don't see compare
(Trends)
Now I see
I probably click to see a drop down to see names
How did it know the names?
How do I select and now I get a graph
So now I see the graph and would expect a key to know which one is who
I don't know which line corresponds to which
Use color

Task 2
(List view)
Assuming to log in and class started
Take attendance
The way I take attendance, it is much easier to take it on the paper
Rather than use a computer
I can just make a note then add it later

So crazy and hectic that must just be a look around

Want a list view for attendance

Want to see everyone on one screen

All I want to click and absent done

Unnecessary interaction for options

Just want the exceptions

Filled in means absent or present

Rules for late are considered absent if not in 10 min

Will go back and fix if student does come

Task 3

(List view)

Often times want to pick someone at random

Gave a student a task to make team sizes in java program

ESIS does have that somewhere but don't want to find

It would be nice if I could get a list of all students

Click tools

(Tools)

Back to this

Hit shuffle

Task 4

(List view)

On his way out would say good job

Don't have emails of parents or students to send info

Bringing on a new student to do that

Sent message to parents and students

If I hit create message don't know who sending to

Looking for a checkbox

(Create message)

Knew I was going to send a message to him?

Drop down and select list

List of 25 or 30 names so that I could select

Text message from the computer?

I don't know phone numbers nor should I

Assume that there is a backend that would push out the messages

Where do I get messages by students

Ah, the badges are the messages

Now I understand why there are those numbers

Lots of software takes a while to learn

Overall

Great to communicate

Currently have consent form that asks for email

Use a google form

Kids - it is easier to get info

That is worth one point which is a good motivator

Can't do the same thing with parents

Send messages to parents

Teachers like to call sometimes

I have email

Email is all in one place to have everything

Would be cool if it know their preferred channel

Could even be through Facebook

Configuration screen for students

ESIS scrolling lists are terrible

Need things at a whole level

The good thing of Esis is the whole class

Would like to see why a students are doing bad

Do I have to slow down?

Or should I help a few?

(Student page)

The graph is iffy

Look at David, he has an E

Why does not turn it in homework?

Is that he can't?

Graph: X axis is assignment, Y accesses is grades

Hard to get the overall dashboard - got communication; grades and stats

Um, after the first couple of weeks, don't need the faces

Attendance for today, but grade is overall?

Mixed message because we have today, and then overall

Homework can be different from exams
Need to see if he is a bad tester
Chronological is the most useful view for assignments
Extra credit, doing worksheets in class
Click between different screens for communication
What's his mothers name?

One program does haves seating charts with them
Loose in administration
It would be great to put all the 3 education software into one thing
One for attendance, one for grades, manual sending of data
Twice a semester need to copy the report to fix it
One dashboard

ESIS
Esis must access at school, want to do this at home
Horrible scrolling
Color code for absence
Gives 3 columns to see many students attendance
Print them out to mark them off with clipboard
Confirmation to save on changes
Different classes can't just print that
Doesn't let me get all classes at once

Easy grade pro
Excel looking
Roster for all students and assignment
Set up an assignment with name, max score
Extra credit option
This doesn't help cause just numbers
Can see grade distribution as a bar chart
Hard to delete
Have that for every class
Pretty crude

This guy is homeless and misses 1st period
Get to know their whole stories
Asks if it lets you publish

Grading rubrics
No details to get rubrics to put in
Use spreadsheets
Others are stuck

The source
Way more useful than grade it
Get overall data
Color coordinated
Shows what wasn't turned in
Can look for all classes

The school system is going to be trying out new grade books

User Test 2:
Math Teacher

Task 1 (We had him compare David to class average, not another student)

ESIS is awful
Logged in no problem
Assume david = david ko

Took time viewing application to get a sense of options

"Press here for attendance - cool"
Clicks and explores drop down attendance interface. Likes it.

Clicks on David.
"Huh"
Interested in graph -> wants axis labels, but "maybe i set that up somewhere before"
Clicks "Trends" (not "compare" on David's page)

checks grades checkbox.
Confused by test boxes. Doesn't know what to do with them.
We add in State and Class defaults, which were forgotten.
Still doesn't know exactly what to do with them.
"Maybe that's attendance?"
Clicks the plus box
Enters David in textbox.

"No option to choose range on axis??"

Task 2 Mark David absent

Likes the task. Thinks cool/useful.
Already explored.
Clicks drop down
Clicks absent
Takes a minute to explain ESIS usually assumes students are here, and they mark the absences. Realizes this is the same default and sounds reassured.

ESIS has a condensed list
He likes the pictures - easier for memory
Doesn't want to scroll too much to take attendance - Is there an option to change size of icons?
Can you arrange students by seating?

We show him list view
He think it makes sense - a quick way to find names.

Reallllllly likes search autocomplete on names.

Task 3
Likes the task. Is very entusiastic.

Looks at the sorting options.
Goes to tools
Marty Stepp's shuffle - "I'm curious"

Some bigger picture feedback:
consider access to computer in teaching situations.
computers at front of room (not teacher desk) are limited to applications it can run (for example, not ESIS, must use a teacher computer)

Task 4
Clicks create message
Love autocomplete again.
"This would be really useful"
Types and clicks send.

At the quarter mark, he contacts his failing students.
-Uses Gradebook program to sort and find failers
-Goes to ESIS to get contact info
-Sends email in outlook

Really likes the idea of doing that all in one place with sort by grade and send message.

Q: After login page, at home screen, what class does it show?
A: All, and there is a select class option

Select class should have periods. Period 1, Period 2, etc. But it would also be great to have both - sometimes deal with multiple periods of the same subject.

He would be suspicious if create message autocomplete did period 3 - would question if it was really getting sent. Prefers drop down in for that.

ESIS has period 1, sememester 1, quarter 1; period 1, semester 1, quarter 2; etc. Likes the simplicity of ours.

It seems way better than the current system. If we could even fix the attendance aspects of ESIS that would be great. ESIS is a drag to take attendance.

Used to use gradebook, but had to switch to match district. At one point had to do it on both.

Gradebook had draggable tiles for arranging students by seating assignment.

Loves the messaging!!

User Test 3:
Math Teacher

Task 1
Logs in fine
Clicks on David?
No
Sorts by attendance
Then clicks on David
Clicks down arrow
Marks absent.

No real problems completing task, but I wonder if he would click on each student individually to mark 5 absences, if we didn't point out after the task that it can also be done from the mail page.

"Unclear if I need to click attendance first"

"That's nice"

Task 2
REALLY LONG PAUSE
Unfortunately, he doesn't say anything about his thoughts during the pause

Clicks on Tools

Clicks on Shuffle

Usually, he uses a random number generator on his smartboard calculator.

Says we should consider security. Only certain computers can get to ESIS.
I suggest that a public view would be possible for the tools page, where no student info is needed.

Task 3 (send text message)

Clicks David
Checks email, writes, and sends

"That's nice, and trendier too!"

Task 4

Goes to David
clicks compare

(Did not interact with trends page after that)

He would already know David's trend, so it's not as useful.

Sometimes he want's to know student's grades in other classes to see if the grade in his class is an outlier or not.
A trend over the entire year is more useful
But he generally already knows.

List view could be good if internet is slow and pics can't load.

Student view is definitely the best part, and there's no current easy way to send email.
He likes the incrementing class participation.
Wouldn't really use tabs that much.