

# CS147 - Project 2 - Appendix

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<p><b>POV 1:</b></p> <p><b>We met:</b> Mrs. Woodward, a teacher who constantly updated her lectures to make them more relevant and engaging.</p> <p><b>We were amazed to find that:</b> Mrs. Woodward considered student attention important enough to explicitly ignore teaching for the first several minutes, but couldn't tell whether her attempts were effective.</p> <p><b>It would be game-changing to:</b> give teachers immediate feedback about how engaging they were being.</p>	<p><b>POV 2:</b></p> <p><b>We met:</b> Elizabeth, a student who complained about having multiple large tests/assignments on the same day, even though a tool exists for teachers to schedule around one another.</p> <p><b>We were amazed to find that:</b> even though a tool exists for teachers to schedule around each other, teachers find that the one extra step of using this tool is still too much extra effort beyond all of the other things that they have to do, or simply forget to use the tool.</p> <p><b>It would be game-changing to:</b> offload the task of to the students such that the students wouldn't have multiple large tests/assignments on the same day, and the teachers wouldn't have to do the additional task of scheduling around each other.</p>
<p><b>10-15 HMW's</b></p> <ol style="list-style-type: none"><li>1. <b>Amp up the good:</b> HMW supply engaging material for teachers to use?</li><li>2. <b>Remove the bad:</b> HMW have teachers not have to explicitly ignore teaching to be engaging?</li><li>3. <b>Explore the opposite:</b> HMW have teachers focus their attention on making their lectures more educational, and forget about having to make it engaging?</li><li>4. <b>Question an assumption:</b> HMW make lectures both engaging *and* educational?</li></ol>	<p><b>10-15 HMW's</b></p> <ol style="list-style-type: none"><li>1. <b>Amp up the good:</b> HMW convince the admin who already proposed a solution?</li><li>2. <b>Remove the bad:</b> HMW make adding/scheduling tests a super fast/easy experience? (bad = takes a long time and is difficult)</li><li>3. <b>Explore the opposite:</b> HMW make it the teacher's top concern to use the calendar (instead of the student)?</li><li>4. <b>Question an assumption:</b> HMW Does the teacher need to be the decision maker when assigning test dates?</li></ol>

5. **Go after adjectives:** HMW emphasize positive feedback instead of negative feedback? Turn negative feedback into positive feedback?
6. **ID unexpected resources:** HMW have the *students* be the ones who are making the class engaging?
7. **Create an analogy from need or context:** HMW help teachers plan their classes like a movie/play?
8. **Play POV against the challenge:** HMW make educational material BE the engaging material?
9. **Change a status quo:** HMW utilize hooks at various times during a class, not just the beginning?
10. **Break POV into pieces:** HMW free up the teacher's time? Engage the students? Convey the learning material?
11. HMW identify what is causing students to become distracted or bored and remove it.
12. HMW get students in on the process, to see what they feel is most engaging?
13. HMW help students connect what they are learning to things they are caring about (e.g. connect math to sports or video games), so that they care about the topic and teachers no longer had to worry about engagement
14. HMW make it easier to "put on a show" (like a drama production) that engages students reliably?
15. HMW allow teacher to communicate with other teachers about making good lectures (either in the school or across whole country), so that they can spread and take the best methods of engaging students from other teachers who have applied them with success.

5. **Go after adjectives:** HMW make using the calendar desirable instead of required?
6. **ID unexpected resources:** HMW get parents involved?
7. **Create an analogy from need or context:** HMW make scheduling tests more like making a reservation at restaurant?
8. **Play POV against the challenge:** HMW make scheduling tests something that teachers want to do?
9. **Change a status quo:** HMW make scheduling tests less frustrating?
10. **Break POV into pieces:** HMW give students a voice in scheduling? HMW prevent teachers feeling loss of control? HMW take into account each class' needs?
11. HMW draw the students' attention to the days when they *don't* have that many assignments?
12. HMW remove reliance on interteacher communication to solve test scheduling conflicts.
13. HMW help students prepare adequately, so that even if they have two tests in the same day, they have no problems
14. HMW Let students be the ones to flag test conflicts? Allow administrators to look over syllabi and find conflicts? Give teachers flexibility in teaching such that tests don't need to be on one particular day? (any of these groups could solve problem)

<p><b>Best HMW 1:</b></p> <p>HMW give the teacher positive feedback instead of negative feedback on how well they are lecturing, or turn negative feedback into positive feedback?</p>	<p><b>Best HMW 2:</b></p> <p>HMW have the <i>students</i> be the ones who are making the class engaging?</p>	<p><b>Best HMW 3:</b></p> <p>HMW give students a voice in scheduling exams and large assignments?</p>
<p><b>10-15 Solutions</b></p> <p><b>No constraints:</b></p> <ol style="list-style-type: none"> <li>1. "Likes" (akin to Facebook) at certain times/slides</li> <li>2. At the end of each class, they can weigh in on their favorite part?</li> <li>3. Upvote activities/assignments at the end of a week.</li> <li>4. Survey for top 5 test performers/improvers on what class material helped.</li> <li>5. Constant "iClicker-esque" voting on whether the lecture is moving too fast or too slow</li> <li>6. Anonymous "I don't understand" messages to teacher, resulting in many "I don't understand's" when the lecture is really dense</li> <li>7. Pass the lecture: teachers can swipe the presentation to students who understand (Quiz?)</li> <li>8. Not just quantity but *quality*, EXTENT to</li> </ol>	<p><b>10-15 Solutions</b></p> <p><b>No constraints:</b></p> <ol style="list-style-type: none"> <li>1. App where students give feedback to teacher (either on iPads or just smartphones) - slowly decays in attention, so need be involved somehow</li> <li>2. App could monitor other apps - so if anyone was texting during class, it could identify that fact and list it as "distraction"</li> <li>3. Let students share interesting articles/discoveries instantly with their class</li> <li>4. Creation tool that scaffolds lessons on a topic of a student's choice that they can present/share</li> <li>5. Students pinging an app, encouraging the teacher when the teacher is being engaging</li> <li>6. Submit youtube videos that are sort of related but mostly fun.</li> </ol>	<p><b>10-15 Solutions</b></p> <p><b>No constraints:</b></p> <ol style="list-style-type: none"> <li>1. Let students mark when their classes have tests, so that other teachers can look there if they care. (this way, teachers don't need to put their tests in the calendar, only students do. Teachers could then look at the data).</li> <li>2. Students somehow demand dates for tests (forcing teachers to pick dates), so that they know ahead that there will be a conflict and can complain to teachers.</li> <li>3. Let students pick ALL the dates for tests online - the teacher picks all the tests they have to do, but students have to balance the dates themselves.</li> <li>4. Students vote for the days that work best for them for each of their classes</li> <li>5. Heat-map of what days the students in</li> </ol>

<p>which student is not understanding</p> <ol style="list-style-type: none"> <li>9. Monopoly money type thing, playing how much money you don't understand</li> <li>10. Like a TV remote, saying whether you're going to fast or too slow, and whether they understand or not</li> <li>11. Do we want <i>binary</i>, or do we want a scale of how much students understand?</li> <li>12. Are students more engaged with binary or scale?</li> <li>13. Stewardess button (ability to cancel if you start to understand).</li> <li>14. Ability to fuel participation, Reward students who vote often on the remote</li> <li>15. If pause, play button flashes and students have to press when they understand.</li> </ol> <p><b>Requires at least a million dollars:</b></p> <ol style="list-style-type: none"> <li>16. Give the teacher a hundred dollar bill every time that they keep the students' attention for more than a minute</li> </ol> <p><b>Must include magic:</b></p> <ol style="list-style-type: none"> <li>17. Read students' minds every time the students think of a compliment, or something's going well in class</li> </ol>	<ol style="list-style-type: none"> <li>7. Create a board game or a different game based on learning the material</li> <li>8. Have small groups come up with engaging class days, with a plan that has to be approved by the teacher.</li> <li>9. Tailored news feed that students can tag interesting articles and share with their teacher (so that the teacher can incorporate that into a lesson)</li> <li>10. App that pulls tweets from students favorite celebs that teachers can use as writing samples</li> <li>11. Peer Instruction: app that pairs up students who understand with those that don't</li> </ol> <p><b>Requires at least a million dollars:</b></p> <ol style="list-style-type: none"> <li>12. Pay each student to film themselves doing a 10 minute lecture about 1 specific topic, and make them submit it multiple times until it's voted both engaging and educational. Then aggregate all of it to create a complete set of videos on every topic for every class.</li> </ol> <p><b>Must include magic:</b></p> <ol style="list-style-type: none"> <li>13. Slow-time such that there is enough time in a class for every student to share everything that they're</li> </ol>	<p>the class have the most exams/assignments scheduled for</p> <ol style="list-style-type: none"> <li>6. Allow students to petition a test date and present a case for conflicting events (not just other tests)</li> <li>7. Gauge how busy people are feeling, so that they have the option to start something or take something earlier/later</li> <li>8. Students can take a late day on an exam if necessary?</li> </ol> <p><b>Requires at least a million dollars:</b></p> <ol style="list-style-type: none"> <li>9. Offer huge cash rewards/prizes for teachers that finish their scheduling first</li> </ol> <p><b>Must include magic:</b></p> <ol style="list-style-type: none"> <li>10. Magic script that partitions out the length of teachers' yearly plan so that no tests fall on the same day</li> <li>11. If a student has 2-3 tests on the same day, they get a 5% boost on each test (mandated by administration).</li> <li>12. Extra credit for submitting an assignment in on time? (How they're doing 107 this year)</li> </ol>
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	<p>thinking</p> <p>14. Somehow let students show off cool things they have done, or things they think are cool, that are related to the topic.</p> <p>15. To encourage engagement outside of class as well as inside, let them show off cool projects they do related to the class, but outside. Motivates other students as well as rewarding students who do engage with the material beyond requirements.</p> <p>16. Otherwise use student interaction to socially motivate students to be interested and involved</p> <p><b>“Get you fired idea”:</b></p> <p>17. Let the popular kids in the school show off cool things they do related to the topics, using the fact that other students want to be like the popular kids.</p>	
<p><b>Best Solution 1:</b></p> <p>Read students’ minds every time the students think of a compliment, or think something’s going well in class</p>	<p><b>Best Solution 2:</b></p> <p>Peer Instruction: app that pairs up students who understand with those that don’t</p>	<p><b>Best Solution 3:</b></p> <p>Heat-map of what days the students in the class have the most exams/assignments scheduled for</p>

**(we cut this a lot, this is a more detailed description of our needfinding this week)**

Initial POV

Our initial point of view coming into this week was:

We met: Students who, as one teacher we interviewed said, “played school well”

We were amazed to find that: Though these students were capable of learning quickly and were given opportunities to take these topics further than required, the great majority of them never did so. As soon as grades or other tangible privileges were no longer at stake, their interest and motivation died immediately. As a result, they learned less than they might have.

It would be game-changing to: Create a system where intellectual curiosity was fostered, or at least always rewarded in some way. That way, good students would get more out of their education without competing with more troubled students, as would be the case if grading scales were made to keep these fast-learning students motivated.

This POV was inspired by or inferred from sentiments expressed multiple times in our needfinding interviews last week, from the perspective of both students and teachers:

The students were more concise than teachers, but both had said they generally didn’t work much beyond what was required in class or by parents. Their stated reason was just that they weren’t interested, and would only do non-interesting things if it was for a grade. This was especially clear when we asked a specific question along the lines of “what was your favorite experience that combined educational and interesting content?” He\*\* responded “I think a project is either education or interesting”, specifically saying he thought academics and fun were mutual exclusive.

From the teachers’ part, Mrs. Quatrocci and Mr. Wong mentioned that one of the largest challenges was holding students’ attention. This isn’t particularly surprising. But even among their best students, few kids were interested in learning beyond getting a good grade or satisfying their parents’ expectations. Specifically, Mrs. Quatrocci (!!!! spell!) told us about how, in recent years, she has made a special effort to try to provide exceptional students with opportunities to use their abilities. Due to large funding constraints and a very diverse class, she couldn’t develop a plan for every subgroup, including these exceptional students (it was actually really depressing). So instead, she offered them an opportunity or privilege, of going outside of class and work on a loosely specified independent project. This has worked better at increasing intellectual curiosity among good students, though still only some of the eligible students take her up on it.

Our group speculated that the extra privilege of getting to leave class had increased students’ desire or willingness to explore further academic topics. We wondered if we could push this further, somehow giving students an indirect incentive to pursue further topics, and get a greater increase in student curiosity. This led to developing this POV. Even though we eventually

decided against this POV, you can see this insight expressed in our appendix, in some of the HMW or solution ideas.

### Additional Needfinding Results

We did four additional needfinding interviews to try to further refine this POV. In the process, we de-focused from fast-learning students specifically, and focused in on how teachers try to make content engaging in class. We interviewed Luke, Elizabeth, Ms. Giraudo, and Mr. Downs. The results are summarized here, though much more detailed notes, and the teachers' audio (illegal to record students), can be found in the appendix.

A quick summary of the educationally relevant points, some of which we did not. Though several of these were stories, the main new points are just summarized here:

- At Bellarmine, Luke and Ms. Giraudo both said they liked iPads for distributing and keeping track of assignments. -Luke said he loved Canvas. He could go to one place on his iPad and find all his assignments, rather than digging through multiple different binders for a syllabus.
- Ms. Giraudo said her largest time sink was still grading, as she was an english teacher.
- Though iPads made handing out or last-second revising assignments much easier.
- Lukes said he never gave teachers feedback, even when it might have been useful. He said he'd just "push through" these classes and that it wasn't his place to question the teacher. Though he did give feedback when prompted by the teacher at the end of the year, and though it was useful.
- Mr. Downs was down on iPads. He believed they isolated students, telling about how he returned from sabbatical and the halls were eerily quite with students on their iPads playing games.
- Mr. Downs wanted "tech to monitor tech" so that he could know if students were getting off track on their iPad
- Elizabeth (East Coast) enjoyed more interesting projects, like a fashion show they had using primarily duct tape.
- She didn't have problems with tech at school, contra Mr. Downs, though she did say it was distracting at home.
- She had problems with teachers scheduling tests on the same days, despite school efforts to avoid this.

In addition to these points, our important previous points were confirmed: that students needed grades for motivation not interest, that fun and academics were mutually exclusive, and that it was hard to tell when students were engaged. But when asked more specifically about our POV, the teachers didn't really expect to be able to change that outcome much. As Mr. Downs said "how can we compete things designed to be fun?" This made us somewhat less optimistic about our POV. It targeted a very hard and very broad a problem: how to develop intrinsic motivation. Instead, we decided to focus in on particular aspects of engagement and move our focus down to medium-level students (who based on our interviews, seemed easier to positively affect), leading to two new specific problems, that were large pain points but had been shown to be solvable:

(from Elizabeth, Luke, and Ms. Giraudo, the Kim brothers) Adequately planning ahead for assignments, target towards less good students, who were less engaged when behind or confused in class

(from Luke, Mr. Downs, Mr. Wong, and Mrs. Quatrocci) Helping teachers, who try hard to engage students, figure out what worked and what didn't.

## **Interview summaries**

Ms. Giraudo

- likes kids is reason for teaching
- very busy all the time
- so much time grading (check grammar)
- iPad (good, bad, evil) all on "canvas" on iPad
- a little more classroom management video, (Watching football on iPad sometimes, is bad. Only some caught probably)
- easy to pass out stuff
- ipads don't necessarily communicate with each other well
- do projects on iPad, some projects created for iPad (wiki, etc)
- kids love google docs
- still some old-fashion things like posters, but most on iPad
- communication teacher to student, both increase and decrease.
- kids interact less because focused on iPad, so less communication.
- but more communication on assignments.
- adults worse than kids with iPad distraction!
- at least one kid who doesn't turn in work, but is always on iPad.
- use "canvas" a lot for lesson plans, is nice because can transfer certain content or all content (specific assignments or whole folder of assignments)
- disconnect with app is that not specializable - no change from default 5-day school week
- grading grading grading, 8-10 hrs outside of school grading
- hard to make because english class, but potentially could have mini-lessons that are more self-contained

Luke

- Lukes like iPad a lot, to have option to take notes on either paper or iPad
- like when teachers try to engage students in class
- like outline on board/ agenda. Helps know what comes up next, how to structure notes, etc
- some teachers really dislike iPads
- maps are cool and useful to learn stuff
- if want to give feedback, don't really give it. "Just push through it". Has no way to submit feedback. Even if could feedback, probably wouldn't. Doesn't feel right correcting teacher
- good to have feedback with sort of outline, asking if liked specific thing. Things I like and things I didn't like. Most teachers don't do this, but he liked it.
- students wouldn't give positive feedback much either



- If not following lecture, will ask student next to him. Potentially teacher.
- would be nice to have assignments all in one place, e.g. canvas
- likes when classes put everything in canvas, easier to see where to plan, only have to look in one place, etc

#### Mr. Downs

- ethics/theology teacher
- school was rough last year, emotionally for some kids
- somewhat more critical of iPad
- left for one summer, then came back and everyone had iPads. Was eerie walking into school, and nobody talking during passing periods. Everyone was playing video games.
- has been bad for conversations, "stop googling and talk to me"
- young people less comfortable with solitude
- less contemplation
- strict and explicit norms for iPads. Default norms changed
- new rule, no video games in academic buildings
- in class research good, but quality of research lower. People just use first google result. Bad.
- not a lecture teacher
- kids can submit homework easier, lighter backpack.
- flipped classroom good
- sometimes helps connect, but often isolates people more
- few teachers teach with iPad. Would be cool if could teach from iPad, and teacher just float around classroom helping students.
- potential for devices to cultivate connection, but right now doing opposite
- would really like tech to help regulate tech, help cultivate focus (not just internal focus, but also just more brute-force checking of students to make sure they not wondering too far off topic).
- e.g. students in class can get easily far off topic, especially if allowed access to internet for a different purpose
- would be good if some way for teachers to easily see that getting off topic

#### Elizabeth

Class/lesson that she enjoyed the most

- wearable art fashion show (duct tape base with stuff stuck on to represent their town) - "it was unique and different, and it was probably the coolest experience I have had at my school"
- "it's more like real world because you had to connect the two"

#### Favorite teacher

- "she made it not as scary"
- very comforting, there for extra help, spoke slowly, watch videos in spanish and read real books (not just scripted textbook material) - "it was more real"

-She does this for everyone, she has an open lunch discussion, and you can just talk in spanish for fun.

Use of tech at school/at home

-Required device at her school

-Bring your own device or the school will provide one for you to use in school and at home

-They digitized every book that they use, so they can access everything at home

-Use this portal everyday out of class everyday

-Use of tech in at least one class every day

Difference between tech use at home and at school

-When I'm at school I don't go on Facebook or Instagram unlike home

Most frustrating experience:

-When multiple teachers all give tests on the same day, she got overwhelmed. There existed a calendar, but the teachers didn't use it.