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Abstract

Capiche! is an application that provides real-time feedback to teachers, while allowing everyone in the classroom both students and teachers to see how well the material is being absorbed all anonymously. The student interface will consist of three buttons- Capiche!, Ehh... ,and ...what? to allow to students to input their understanding from complete comprehension to no comprehension. The live update data of the entire classroom will then be displayed on everyone's phones and tablets. Furthermore, on the teacher's device the lecture audio will be recorded and synced with the data, so that the teacher can review the lecture after the delivery and pinpoint locations in the lecture where the students lost comprehension.

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Introduction

It's the middle of your Calculus III class and you're in deep taking notes on triple integrals when suddenly something doesn't click. You look around and everyone else is still furiously writing down notes. Questions start running through your head - are you supposed to know this? Was this covered in the reading you didn't get to? Are you the only one confused? The teacher stops and asks if anyone has any questions, but you don't know what exactly to ask. Before anyone mutters anything, the teacher then continues on in the lecture, and the confusion remains.

This is the problem. Students across campus are confused and never speak up to voice their lack of understanding. As well, when teachers make honest attempts to see if the students really understand, they're met with blank stares and no questions asked. With a more material to cover, the teacher continues with the lecture, yet the material is going unabsorbed and the true level of understanding the class holds is uncertain.

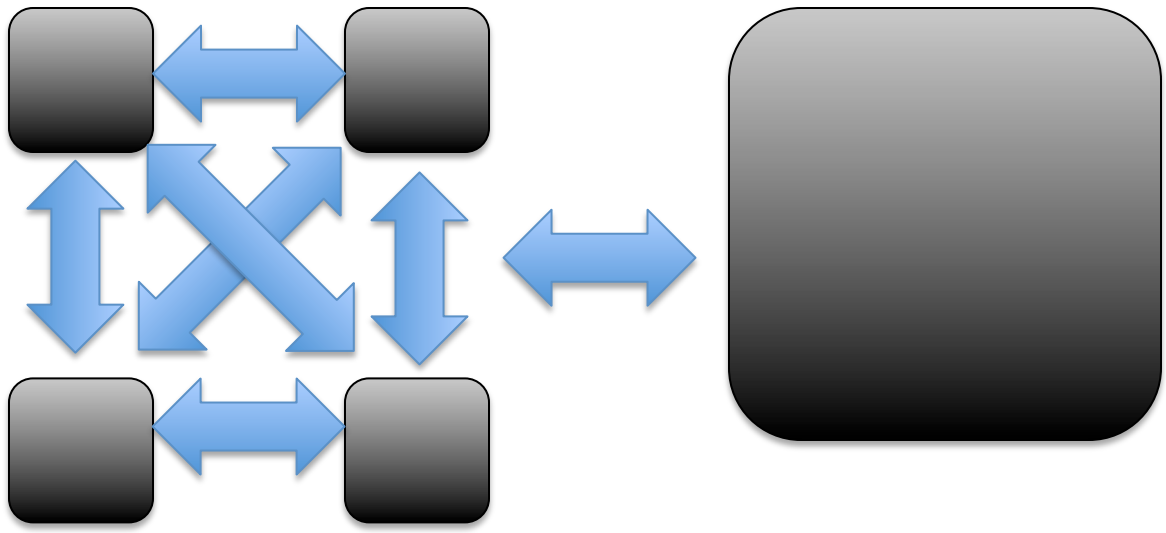
That is where Capiche! comes into play. Now, any stigma of being confused is instantly removed, allowing the teachers to voice their confusion without fear of judgement, and teachers can see real time exactly how well the students are getting the material. As well, lecture audio gets recorded, and at the end of the class the audio is synced up with a trending graph of all of the students inputs, so teachers can see exactly where the students got confused, press on the graph, and jump right to the point in the lecture to address how the material was being conveyed. Current attempts to solve this problem, such as Top Hat and iClicker do not allow for real-time updates, allowing no information on a second-to-second basis available for either students or teachers (See Appendix A).

Product Description

As described earlier, what's wrong with the present solution is the fact that is requires a poll to be initiated, and answers to be collected at a specified time. This addresses the problem of gauging everyone's opinions and testing their comprehension. However, in a lecture environment, especially one filled with complex mathematics, posting a mathematical poll may not be the most effective and won't really gauge student comprehension as well as directly asking the students themselves. That is the advantage of our application. With a live feed update, no time will ever have to be taken out of lecture to address the class, because information will be live updating constantly. As well, if the teachers desire, they can record their lecture audio and use the trending graph to pinpoint exactly where changes in comprehension took place.

Block Diagram and Specifications

This shows the upper level black box diagram, and specifications necessary for Capiche! to run. The section is divided into two parts, the main block diagram and the specifications needed on each iOS device.



Student Devices Instructor Device

Figure 1: Black Box Diagram

Table 1: Engineering Specifications

Engineering Specifications	Justification
Wifi Connectivity & Bluetooth Connectivity, Virtual Machine	In order to compensate for large class sizes, other connectivity types are not feasible.
Three input options	Capiche, Ehh.., and ...what?
Live output displayed on interface	The outputs of all of the students displayed live on the interface of the application.
Refresh Time < 5 second	The data needs to update as quickly as possible to maintain coherence to specific topics.
Sign-In page	To be able to sign in to a specific classroom session.
Application less than 50 MB	In order to take up the least amount of space on any individual's device
iOS 8.0+	To have the most current iOS with the newest features available
iPhone 4s or later iPad (3rd generation) or later iPad mini or later iPod touch (5th generation) or later	To use iBeacon, the technology incorporating both bluetooh and location services

Design

This section includes both the software and hardware design specifications.

Software

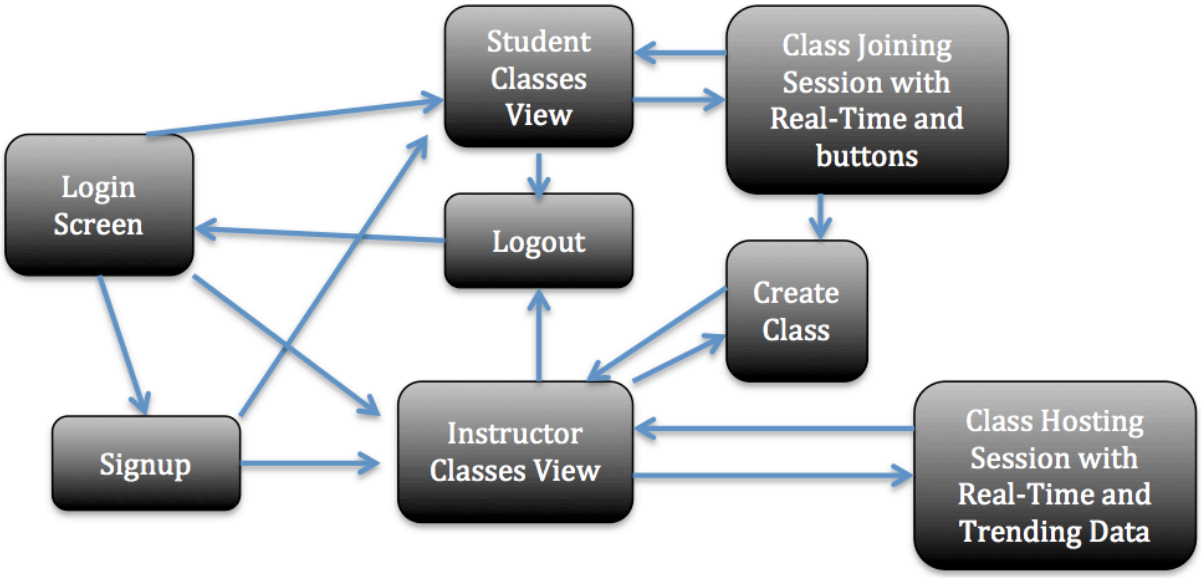


Figure 2: Software Flow Diagram

Depending on the user type designated at signup, the user is sent to either the student or instructor viewcontroller. For the student, once a signal is generated via iBeacon (low Bluetooth energy) by an instructor, they can join the class and then start sending input. For the instructor, once the class is created, they can start hosting the class, waiting on students to join. Once they see enough students join, they can start recording the lecture audio and viewing the data on a trending graph.

Screenshots

Figure 3: Main Student Interface

Figure 4: Real-Time Instructor Interface

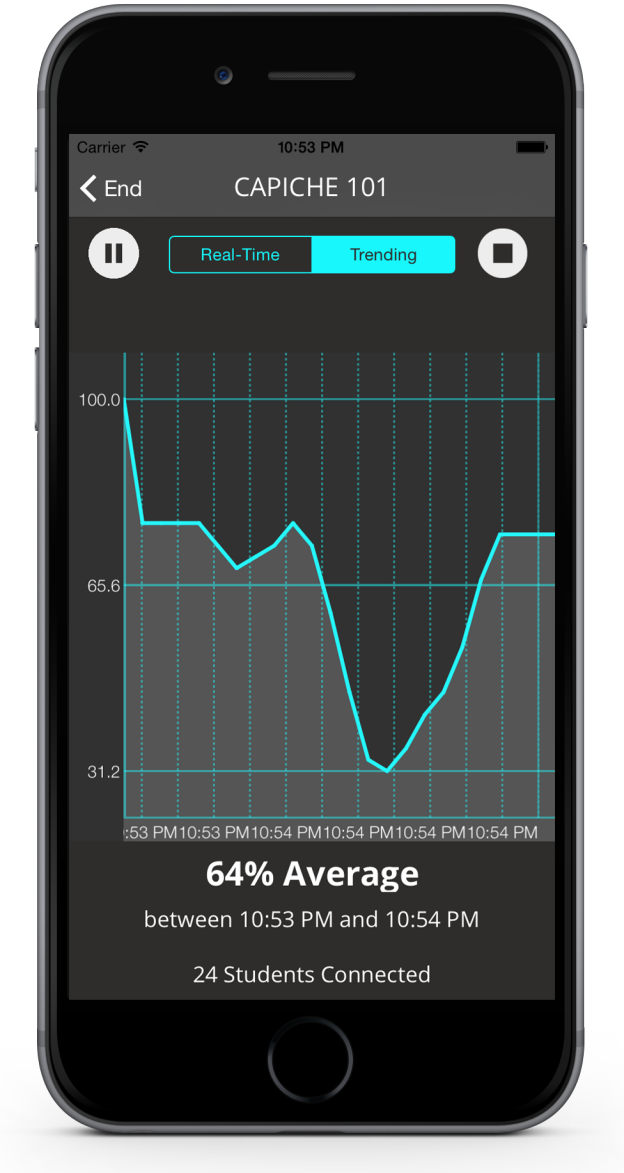


Figure 5: Instructor Trending Graph Interface

Hardware:

(See Table 3: Engineering Specifications)

Testing and Results

Four tests were necessary to get Capiche! up and running as desired. See the table below for details on the tests conducted and changes made.

Table 2: Testing and Modifications

Test Number	Location	Bug	Change(s) Made
1	Benson's CPE 329 Class	Students could not login in	Allowed students to choose school then changed the code to progress naturally to the finding class session screen
2	""	Created class sessions weren't visible to students	Fixed code, the session objectIDs were saving incorrectly. Changed how the class sessions were saved on the backend.
3	""	Individual Student Objects not being created	Fixed code to allow for individual student objects to be made so each student had his/her own respective input
4	""	N/A	N/A
5	Zhang's EE 228 Class	N/A	Changed selected button transparency and vibrancy

Feedback

Various feedback was collected from students to change/update the design. Across the board people loved it. Out of 21 total entries, 17 would recommend to a friend, and 14/21 would pay for the application, ranging from .99 to $5

Timestamp	Are you a student or instructor?	What class did you demo in?	If you're a student, what major are you?	Overall, what did you think?	How useful is Capiche! app in the context you used it?	Would you reccomend Capiche! to a friend?	What part of the app did you like the most?	What are your thoughts on the user interface/ user experience?	What was your least favorite part?	Absolutely anything else?	How much would you pay for Capiche per quarter?	Did you experience any bugs?	If answered yes above, please describe the bug/glitch.		Which TV show is the greatest of all time?
5/12/2015 8:57:22	Student	CPE 329	CPE	8	8	8	I like the idea/purpose of the app. It's very helpful, especially to those who have a hard time speaking up during class.	It's easy to use/understand after someone explains it. Not sure if I would have same experience if I just downloaded on my own. Other than that, the appearance/style is good as well as the flow of usage.			$6-$10	No			Grey's Anatomy
5/12/2015 8:57:35	Student	CPE 329	No	5	4	4		Easy to use. Interface is really simple to understand			$1-$5	Yes	My phone didn't connect, had to use a loaner phone		Friends
5/14/2015 9:58:20	Student	EE335	EE	4	3	3	User interface	East to use			0.99	No			House of Cards
5/14/2015 10:01:20	Student	EE 335	EE	5	4	5	Cool app, nice interface, easy to interact with	easy to use/understand, could add more features	no one asked questions when the teacher asked. Maybe add a feature that you can type a question and ask via capiche?	Chat room with teacher moderator? Questions via capiche Good stuff so far.	0.99	No			
5/14/2015 10:01:37	Student	Ee 335	Ee	10	7	8	How simple and easy it is Looks good too	I like the colors	N/a		5	No			Arrested developement
5/14/2015 10:01:51	Student	EE 335	EE	5	5	6	Great idea	Very easy to use	Some of the interface such as how the button pressing works		1.99	No			House of Cards
5/14/2015 10:03:46	Student	EE335	EE	9	5	7	I enjoyed the simplicity the most. It doesn't require much work at all to obtain the desired information regarding the status of the classroom. There isn't any unneeded information distracting the user.	The layout of the app is fantastic; very easy to use and clean.	Might encourage a student to not ask a question if the student sees that everyone but themselves is understanding the topic. Perhaps a way to ask anonymous questions??	I think this app would work best in a classroom with underclassman/freshman or large lecture halls. This will represent students who are not comfortable to ask questions. Most upperclassman in normal classroom settings are able to ask questions without a problem, and the class wouldn't be represented well by the app because participation would be lacking.	0	No			Breaking Bad
5/14/2015 10:04:39	Student	EE 335	EE	3	2	3	Easy Interface	Make it easy to use	Do not think that it is reasonable to expect everyone in the class to have the app. On top of that, I think it is even more unreasonable to expect everyone to actively participate.	I think the idea that this app is trying to solve is awesome. There exists a problem where students become lost during a lecture. However, I do not think that this app is the way to solve that problem. This app requires far too much user interaction and user dependence to be successful. Even if everyone were to use this app during class, I wouldn't think that the data would be very accurate. It is very easy to forget to press the button when you get lost. I commend this attempt but believe there is a better way to solve this.	0	No			Breaking Bad
				Scale for below questions on 1-5 scale for mobile ease of use	<<	<<					**"per Quarter" added to question**				
5/15/2015 9:58:06	Student	EE 228	EE	4	4	5	Simplicity	Make the buttons easier to see. Maybe make the circle a bit smaller and buttons a bit bigger.	The Bluetooth. Idk it eats battery. If you can do like a wifi and an instructor password thing it may be easier for people plus you wouldn't have to worry about signal strength.		1	No			Star Wars: The Clone Wars
5/15/2015 10:03:19	Student	EE 228	ee	4	5	5	Simplicity	it's hard to tell which button I've pressed		It's more of a tool for the teacher than for me, which is why I probably wouldn't pay much for it	0	Yes	The app has a really rough time finding your class without location permissions, which not everyone will allow		Doctor who
5/15/2015 10:34:44	Instructor	EE228		5	5	5	real-time feedback, audio recording	like it			1	No			
5/18/2015 11:31:37	Instructor	335		5	4	4					1	No			
5/20/2015 12:08:33	Student	EE 227	Computer Engineering	4	5	5	I liked seeing everyone's thoughts on whether they understood the lecture or not.	Easy to use, nice style of the graph	incomplete settings page. :p		2	No			Heroes
5/20/2015 12:32:00	Student	EE 228-01	Electrical Engineering	4	4	5	I liked being able to express and update my current understanding of the material with out slowing down the entire class. Also, I don't always have a specific question that can clear things up, sometimes I'm actually like "...what". So this app provides an anonymous alternative to stopping the professor during lecture to say "hey what's even going one here?" (Which can also be scary). I also really like the unique opportunity to see how other students are understanding the material. I definitely kept an eye on the graph during class to see what everyone was thinking.	I loved the pie chart ring shape with the buttons below. However, I would probably say to use a different color for "ehh...", (maybe a shade of yellow or orange?). The blue and the green are pretty close in color for me and probably mainly for the instructor who was looking at the graph from somewhat of a distance. I also would change how you indicate your current status. I would make the bar a solid color that you have selected because a few times I couldn't tell which one of the three I had as my status.	My least favorite part was that not enough people were updating their status. I would maybe make some way to remind students to try to constantly update how they feel about the material. For example, some people seemed to have selected "...what?" towards the beginning of lecture then they didn't change until 5 minutes left in class which probably gave the instructor false data. I do realize that maybe selecting your status every 30 seconds can be distracting but students should be aware of it during different topics in class.	I just wish more people in my class had the beta app so I could see a better sample, only 14 out of ~40+ students had the app during our trial run. I saw plenty of iPhone users not running the app, so maybe if instructors pushed for it more (maybe with incentives) it will stick better with my class. But other than that I love the original idea behind this app!!!	0.99	No	N/A		Game of Thrones
5/20/2015 19:46:06	Student	EE 228	EE	5	5	5	My favorite thing is knowing that the teacher can see where we lose him or her, the second best thing is knowing that the people around me are on the same page as me. This way I know I'm not the only one lost and am more comfortable asking questions.	Great I love seeing how many people are lost or the percent of the class	I don't want it to drain my battery through class		5	Yes	I guess if you aren't on bluetooth it crashes a bit		Friends
5/21/2015 9:26:45	Student	EE 228	EE	4	4	4	The fact that the teacher knows instantly if we understand or not.	I liked it.	It's distracting in a learning environment.		5	No			One Tree Hill

Figure 5: Feedback from Students (Page 1 of 2)

5/21/2015 14:46:32	Student	EE 228	EE	5	2	2	Let me voice my understanding. I'm not used to doing that, and I feel like that's good, as long as the instructor responds accordingly (which I did not see happening with this demo...)	Appealing and easy UI. However found it quite distracting in class due to the real time, animated response in the circle. Perhaps if you could have the choice to minimize it, so while the apps open, it's not a complete distraction.	Distracted me from lecture while I watched the wheel respond to the class's understanding. Felt chained to the app, i.e. I had to either be fully attentive to it, or not at all. Felt like a waste of battery to have open for a 50 minute lecture. (saw 10% go down from just one lecture) However the app seems to be relatively battery efficient.	All above in least favorite part. Great Idea! Just need the interactiveness reduced. We are supposed to pay attention to the lecture, not our phones. Also it's useless unless the teacher responds to the class's understanding.	0	No			Breaking Bad
6/4/2015 21:52:02	Student	PHIL 314	Math	5	5	5	I liked how simple it was, and how it updated really fast	Everything was great	N/A	I think that for the instructor, you should create a notification sound if around 50% or more of the class is on the "what?"/red option. (I'm saying this because my professor continued to lecture even though half of us were extremely confused)	0	No			Game of Thrones
6/7/2015 7:02:54	Instructor	Phil 314	N/A	5	5	5	The fact that an immediately informed about student tracking.	It is easy to use and read. Was definitely helpful.	Nothing really	A visual or vibration warning when the "I don't capiche" threshold hits a certain percentage (settable by the instructor)	5	No			Um...Toddlers and Tiaras ;) [Ha! Breaking Bad, of course!]

Figure 6: Feedback from Students (Page 2 of 2)

Future Work

Capiche! will eventually grow to be the world's biggest learning technology platform. In the near future, my team and I will be expanding to all available hardware platforms, and do further beta testing to ensure the best design. Then next we will have to devise a go to market strategy, launch and grow from there. All of next year our software developer Helen Hwang will be growing Capiche! on other platforms as her senior project at Cal Poly. As well, we have another member Monroe Charier who will hopefully be enlisting in the entrepreneurial senior project course at Cal Poly. Our team is four strong and growing. In the meantime I will be adding the ability of teachers to ask open ended or scripted questions, with students having either a multiple choice interface to answer or an anonymous text-based answer, that will include upvoting so other students who have the same question can upvote it, all of course anonymously. As well, I will be adding an alert sound if a certain percentage threshold of lack of comprehension is crossed, allowing teachers to immediately address any issues.

Analysis of Senior Project Design

1. Summary of Functional Requirements
    a. Describe the overall capabilities or functions of your project or design. Describe what your project does.
        i. Classroom Connection improves the process of learning by providing both students and teachers with data on how effective current teaching methods are. By live polling the students, data will be available at any moment to students and professors alike.
2. Primary Constraints

. Describe significant challenges or difficulties associated with your project or implementation. For example, what were limiting factors, or other issues that impacted your approach?

. The most significant challenge associated with this project is designing the application to fit seamlessly into lectures, so that the application is not slowing down the process of learning but rather speeding it up. As well, making the user interface user-friendly and very easy to use could pose difficult.

3. Economic

. What economic impacts result?

. The main economic impacts that would result are a small increase to teacher and student investment into the classroom. As well, if the application makes it to large scale, it would allow for more jobs and would then stimulate the economy. However, server space will be needed to host the mass amounts of data that will inherently arise.

4. If Manufactured on a Commercial Basis

. Since this application requires no additional hardware other than the smartphones and tablets to run them on, no additional manufacturing will be necessary.

5. Environmental

. The energy needed to maintain the amount of servers needed for widespread application will have to come from clean sources, ideally solar power. However, due to initial financial limitations, less clean sources of energy will need to be utilized to remain lucrative. These sources consist of nuclear power, coal, and thermal energy. The current methods for harvesting that energy come with negative environmental impacts, such as nuclear waste and greenhouse gases.

6. Manufacturability

. Since this application is completely software-based, no manufacturing will be necessary to ensure its success. The iTunes store provides the nesting grounds for its growth into the market.

7. Sustainability

. Describe any issues or challenges associated with maintaining the completed device, or system.

. Regular application updates and bugs will have to be addressed to solve any problems that may occur due to widespread usage of the application. As well, adaptation to new classroom types might also need to be addressed, i.e. if the application finds its way outside of a university setting and into businesses and other lecture environments.

a. Describe any upgrades that would improve the design of your project

. Having the application run without any sort of delay between loading screens or classroom sessions would be an optimum improvement to the design of the project.

b. Describe any issues or challenges associated with upgrading the design.

. Possible changes to the user-interface may pose difficulties to new users, and will thus have to be considered

8. Ethical

. Describe ethical implications relating to the design, manufacture, use, or misuse of the project. Analyze using one or more ethical frameworks in addition to the IEEE Code of Ethics.

. In regards to the IEEE Code of Ethics, this application must present the data as it is input, without any error, so we are honest and realistic in stating claims or estimates based on available data. As well, this application will help seek, accept, and offer honest criticism of technical work, to acknowledge and correct errors, and to credit properly the contributions of others. This will increase the teacher's accountability to teach at his/her best capacity, as well as the student's accountability to make a solid effort at trying to understand the material.

9. Health and Safety

. Describe any health and safety concerns associated with design, manufacture, or use of this project.

. The only risk that this application poses to health and safety is if one were to use the application while operating heavy machinery, then the safety of the user and others would be at jeopardy.

10. Social and Political

. Describe social and political issues associated with design, manufacture and use.

. The main social issue that could occur is the rejection of the information by the teacher, or complete apathy to this new information, which could cause further tension and problems. It would put more pressure on the professors to be very receptive to the students' needs, and would add another facet to be considered when considering the particular effectiveness of a certain teacher's teaching style. Another issue that could arise is the purposeful misrepresentation of the true comprehension level, i.e. someone could purposefully press the wrong input, perhaps due to outside factors such as his/her personal relation with the teacher. A political issue, although unlikely, that may arise is mandating a specific comprehension rate for teachers in order to determine their eligibility to teach.

11. Development

. Describe any new tools or techniques, used for either development or analysis that you learned independently during the course of your project.

. The main new tool learned will be the programming language Swift. Learning this language will open doors to developing other apps in the future. As well, hosting virtual servers will be a new skillset to be learned.

Appendix A: Market Research

Capiche! can easily bridge the gap between students and professors. Currently, when students have trouble with learning the material, they choose to go to office hours during the week at their own convenience. The problem with this is that professors don't have enough hours that can accommodate all the students and don't want to spend more hours. Also, students don't want to feel like they're making themselves look bad in front of professors asking questions that may be too simple or obvious. With this application, all the students and professors can feel like they're on the same page.

Market Size, Interests, and Competitors

The market that we are interested is our own classroom, namely electrical engineering lectures. However, our problem is not unique to just electrical engineering, or even just engineering. Many classrooms covering a range of complex topics (mathematics, science, liberal arts, etc.) can often encounter patches of very dense material that requires a lot from student and teacher alike. Campuses across the world could benefit from this application. Therefore our market is all university students who attend any higher-education campus. In the United States alone, this would be around 13 million people.

The main companies that play in our market comprise of mainly iClicker, Top Hat, and Poll Everywhere, applications in the iTunes store. However, all of these companies have against us is market penetration, not specific customer addressing. All of these companies and applications address their market in the form of question response, where professors/students pose questions and then poll answers, waiting for responses to come in. That is where our company comes into play. Where our market consists of the same customers, we address a separate customer need, that is representation and a voice in a classroom that may not account for it.

What our competitors like iClicker, Top Hat, and Poll Everywhere don't have is a live feedback system for both the students and faculty. The faculty can ask questions to students however much they want and get answers whenever, but Capiche! has no correlation to this. Instead, this application contains a live feedback system that will ask the students the same question for the duration of lecture and get live results every second. Both the students and teachers can view a bar graph/pie chart and decide their approach going forward, whether its a student asking the teacher to clarify or the teacher repeating the material to the class.

Table 3: Main Competitors

Competitor	Product	Cost for User
iClicker	Radio frequency device/Application that allows a student to anonymously respond to questions created by instructors.	$10/semester (Application) $45 (Hardware Device)
Top Hat	Application that can control classroom slides as well as can quiz/test students with multiple choice based questions, teachers can see output display of results anonymously.	$20/semester
Poll Everywhere	Application that can be used both in and outside of the classroom to create multiple-choice or open-answer polls.	$15/month

Table 1 above depicts Capiche!'s competition and cost estimate for a typical user. These applications are very similar in that they poll students anonymously with questions posed by the instructors. This is in no way what the purpose of Capiche! is. Also, the costs for this application is fairly high compared to what our estimate cost is planned to be. Planning to create our application and list it on the iTunes application store, we will sell to download our application for $5/quarter.

Capiche!'s Advantage and Market Cost

These main companies that play in our market are great for polling students for an in class quiz or attendance, but in no way give a live feedback system that continuously pools how students are feeling with the lecture. There is nowhere in the market that uses this sort of idea and Capiche! will be the first created in the market. That being said, Capiche!'s window of opportunity is somewhat small as many of our competitors can come up and produce this idea very quickly. With the money they have and the resources they can use, these companies can create a live feedback system within weeks. With an estimated time of ten weeks to complete this project, there is a high chance that Capiche! can be the first of its kind.

There needs to be much effort in order for Capiche! to enter the market. It will take a lot of advertising and word of mouth for it to become successful. We will first test it in nearby schools and poll both students and teachers to see how we should allocate our marketing resources, weather it would be towards engineering based schools or specific majors.

Market Goals and Plan Going Forward

The goals of the market research activity are to best gauge the market that we are interested in. By polling students and faculty of each of the different colleges on this campus, we can get a good idea of where Capiche! can be most effective. Our anticipation is that math and science based majors will be the primary target for our application. We will be asking them questions pertaining to their judgment of how well material is conveyed and received in classrooms.

The capabilities of Capiche! are to improve learning in classrooms everywhere and give a voice to students who have not been able to have one. The main goal is to decrease if not completely eliminate the amount of confusion in the classroom that inhibits learning.

We don't necessarily need to have any partners in making this product a success. As this is an original idea, once the application is created, we can advertise it and make it successful. Another reason we don't need partners is because there are no competitors that have our product yet so customers will have no other option but to use Capiche!. Although we don't need partners, there are some key potential customers that we must be in contact with. These include schools all around the nation as well as professors.

Appendix B: References

[1]"App Store Downloads on ITunes." *Apple.com*. N.p., 2014. Web. 27 Oct. 2014. <https://itunes.apple.com/us/genre/ios/id36?mt=8>.

The iTunes application store website was used to find how to list our application as well as how much the applications similar to our product generally cost to download. We also determined that we will code Classroom Connection using Swift.

[2]"Educator and Institutional Pricing Options." *TopHat*. Top Hat Monocle Inc., 2014. Web. 26 Oct. 2014. <https://www.tophat.com/signup>.

Top Hat's official website helped understand its purpose and the features they have compared to its other competitors. Also, this site gave us the cost of downloading the application for both students and faculty. As a competitor, we will list our download cost at a lower price to attract both students and teachers to Classroom Connection.

[3]"Fast Facts." *National Center for Education Statistics*. N.p., n.d. Web. 22 Oct. 2014. <http://nces.ed.gov/fastfacts/display.asp?id=98>.

Using this governmental domain site, we were able to find that currently 13 million people attend high level education campuses. This means that the market we're interested in consists of approximately 13 million people across the nation. That being said, our application can spread quickly and generate thousands of dollars with this amount of people.

[4]"iClicker Information." *Hawaii.edu*. N.p., n.d. Web. 26 Oct. 2014. <http://www.cis.hawaii.edu/guc/ars/student.html>.

The information on the iClicker was used to figure out the purpose of this device as well as compare it to other competitors including Classroom Connection. Using this website, we were able to figure out its advantages and disadvantages.

[5]"Los Angeles, CA (LAX-Los Angeles Intl.) to Chicago Vacation Package Deals | Expedia." *Expedia*. Expedia, 26 Oct. 2014. Web. 26 Oct. 2014. <http://www.expedia.com/packagesearch?submit=1&fromDate=09%2F15%2F2015&toDate=09%2F17%2F2015&destinationId=178248&ttla=CHI&originId=6000346&ftla=LAX&numberOfRooms=1&adultsPerRoom%5B1%5D=2#hotelName=&action=filterPackageSearch&sortOrder=0&startIndex=0&packageType=2&rfrr=SP.Tray.1.PS>.

The Expedia site helped calculate the cost of entering the market on the travel side. We set up an itinerary consisting of a two-night stay and round trip flights to Chicago, Illinois. Using this cost were able to estimate the amount it would take to travel to ten major cities across the country in order to advertise our product.

[6]"Poll Everywhere FAQ." *The University of North Carolina at Chapel Hill*. N.p., n.d. Web. 26 Oct. 2014. <http://help.unc.edu/help/poll-everywhere-faq/>.

The frequently asked questions on Poll Everywhere gave us insight of what the company does and how they are different from other competitors. Using this reference, we were also able to get a cost estimate of how much a student/teacher has to pay in order to use this application. We came to the conclusion that Poll Everywhere is one of our weaker competitors.

[7]"Purchase Clicker Tools - IClicker." *IClicker*. N.p., n.d. Web. 26 Oct. 2014. <http://www1.iclicker.com/purchase/>.

The iClicker website gave us an idea of how much it costs for a student to use this device. This is a more expensive approach and as a result, one of our weaker competitors. iClicker, more commonly, uses a hardware device. This can cost users approximately $45. With an application on the phone, all the student needs to do is purchase the application rather than buy any hardware.

[8]"Software Engineer III Salary | Salary.com." *Salary.com*. N.p., n.d. Web. 24 Oct. 2014. <http://www1.salary.com/Software-Engineer-III-salary.html>.

Using Salary.com, we were able to determine the average cost of a software engineer to create our website. We used the median salary to estimate how much it would cost for an engineer to work on the website for two and half days (this is the maximum amount of time it should take to create the website). Assuming the employee works full-time (8 hours per day, 5 days per week), we concluded it would cost approximately $900 to create our website.