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## Project Preproposal

### Project Goal and Objectives

#### Motivation

Two developing trends in education are the reverse classroom and blended learning. In a reverse classroom environment the teacher sits in the back of the room and uses technology (ie computers, educational software, and projection equipment) to instruct lessons. Blended learning is centered on the idea that cognitive overload occurs when instructional presentations are too long. To overcome the challenge of cognitive overload, teachers can break a lesson into a variety of manageable tasks. For example, a lesson on math can include a pre-quiz, one video, a short demonstration, and a set of practice problems. Addressing these two trends, this project is motivated by a desire to create an innovative educational application that empowers blended learning and is useful in a reverse classroom environment. At the same time, this project provides an opportunity to learn about modern trends in software design.

#### Significance

A collaborative whiteboard management system provides an opportunity for teachers and students to track their graphical data entries and communicate over the web or side by side in a classroom. A whiteboard experience escapes normal typeface and provides a platform well suited for manual scientific and mathematical calculations. Computers do not readily interpret handwriting, so a whiteboard experience is ideal for human to human interaction. Without the free-writing experience of a whiteboard, students and teachers alike may be challenged by entering mathematical formulas in standard font typefaces.

#### Objectives

The primary objective of this project is to capture canvas drawings into image format and store them in a database or file system. Then, provide an interface where users across a variety of web browsers (especially mobile) can retrieve their data, make changes, resubmit, and generally organize progress. Teachers and students can share problem sets and work together either in a computer lab or across the internet. Teachers monitor and manage their groups while individuals can share outside of a group. Anyone can be a teacher; they simply need students to join a group.

#### System Features

An HTML5 canvas will serve as a virtual whiteboard. Students and teachers can create user accounts. Teachers can create groups and enroll students. Students can enroll in groups, share notes with other students, or simply maintain a personal collection of notes. Canvas can generate PNG graphics.

### Related Work

An online learning environment is exemplified in Learn to Be, an online tutoring environment. A good example of collaborative canvas can be found at AWW: A Web Whiteboard. Khan Academy inspired the idea that anyone can be a teacher as long as they have students who can learn from them. There are numerous related and more advanced projects on the market. While it is beyond the scope and timeframe of our project, related applications usually feature real-time communication executed in online chat, video conferencing, voice over IP, and dynamic graphics like a whiteboard that updates for more than one person simultaneously.

### Backup Project

If this project is not approved, our backup concept is a group communication and planning software. We could utilize a web service like Google Maps and we can develop custom web services that manage data input and output. We can use SMTP for email communication. Some features include groups and online membership as well as calendar planning and time availability charts. In an educational environment, this type of service is useful for scheduling field trips or providing activity reports for club pages or news pages.

### Challenges

* Mixing .NET with JavaScript to handle canvas upload and download as PNG format
* Storage, retrieval, and isolation of file system data
* Developing logic for sharing and management between teachers and students
* Adapting a web application to display appropriately for a variety of mobile devices, especially Android
* Understanding basic Android development concepts
* Incorporating a sufficient amount of web services to satisfy course requirements
* Keeping requirements simple enough to fit inside of project timeframe

### Bibliography

AWW: A Web Whiteboard

<http://awwapp.com/>

Blended Learning and the Reverse Classroom

<http://reverseclassroom.blogspot.com/>

Khan Academy

<https://www.khanacademy.org/>

Learn to Be

<http://www.learntobe.org/>

### References

#### Libraries

[doodle-js](https://github.com/lamberta/doodle-js)

[KineticJS](http://kineticjs.com/)

#### Proprietary Software

[Pusher](http://pusher.com/)

[Union Platform](http://www.google.com/url?q=http%3A%2F%2Fwww.unionplatform.com%2F%3Fpage_id%3D2762&sa=D&sntz=1&usg=AFQjCNHNCtnJX4I3ujvfUnqniwUkO7VzBA)

#### Related Tutorials

[Create a Drawing App with HTML5 Canvas and JavaScript](http://www.google.com/url?q=http%3A%2F%2Fwww.williammalone.com%2Farticles%2Fcreate-html5-canvas-javascript-drawing-app%2F&sa=D&sntz=1&usg=AFQjCNFw_r9DuRhYRCxfscd7YPahQZn_7g)

[Canvas Tutorial - Mozilla Developer Network](http://www.google.com/url?q=https%3A%2F%2Fdeveloper.mozilla.org%2Fen-US%2Fdocs%2FHTML%2FCanvas%2FTutorial%3Fredirectlocale%3Den-US%26redirectslug%3DCanvas_tutorial&sa=D&sntz=1&usg=AFQjCNFN2XpcXyN1FACH_gtaqNr8JBA-kg)

[HTML5 Canvas Tutorials](http://www.google.com/url?q=http%3A%2F%2Fwww.html5canvastutorials.com%2F&sa=D&sntz=1&usg=AFQjCNH4biRdcxs03an7dPO1tgq-BKlUsw)

[KineticJS – HTML5 Canvas Drawing Made Easy](http://thechangelog.com/kineticjs-html5-canvas-drawing-made-easy/)

[Real-time data exchange in HTML5 with WebSockets](http://www.google.com/url?q=http%3A%2F%2Fwww.adobe.com%2Fdevnet%2Fhtml5%2Farticles%2Freal-time-data-exchange-in-html5-with-websockets.html&sa=D&sntz=1&usg=AFQjCNG3vVxgvKwRBJlViiysgSDriQUYOQ)