**Sockets**

A key part of my project is collaborative connectivity. This will require some form of networking between a client’s browser, a server, and to potentially an unlimited number of other clients. To do this I will have to use sockets, and have decided to use <https://socket.io/>. This makes it easy and efficient to have real time communication between the whiteboard and server.

Socket.io allowed real time, bidirectional event-based communication between a client a server. It uses node.js as the server. It makes a webstocket connection but if it cannot, it will use a HTTP long poll. It provides a reliable connection despite any firewalls, proxies, or load balances as it starts with HTTP long requests, and then will try to use websockets to get a faster connection.

**React**

Another important part of my project will be the UI. My goal is to make it minimalistic and stylistic. To do this in a feasible way, as well as a considerably less bloated and complicated way, I have chosen React to assist. React is a JavaScript library which makes it much easier to build UI’s and reuse components. It will allow me to make the front-end much quicker, as well as to a higher standard.

React is a component-based method of creation UI’s allowing me to easily reuse components I make keeping for a consistent theme as well as make the whiteboard have mobile support. Whilst mobile support is not, currently, an aim of mine React makes it much more feasible.

**Node.js**

For the backend code, I have decided to use node.js. Node.js is a popular server-side technology that uses JavaScript. This is rather than something like PHP. Node.js generally is much faster than PHP and as I’m going to be using a lots of client-server networking node.js is more appropriate.

The alternative, PHP, from research does not seem compatible, or at the very least well documented about its usage which means it would be much harder to code networking features which wouldn’t be the right choice.

**Student Engagement, Visual Learning and Technology: Can Interactive Whiteboards Help?**

In this study from 2002 by William Beeland, he explores what students and teachers think of using an interactive whiteboard. It aimed to see if using an interactive whiteboard was something both students and teachers would find useful and productive in a learning environment to justify the cost of getting them installed at his school[1]. Whilst this study only covers teachers having the interactive whiteboard with students just viewing it – this is still relevant as this is a reasonable application of how my whiteboard could be used. In a survey of 197 students and 10 teachers[1] the results were positive above the board, all averaging above 2.5 (in the 3-4 region).

Some of the most relevant questions were “I enjoy learning with a whiteboard”[1], which received a average rating of 3.8. This suggests whiteboards make a standard lesson more interesting, which can have a positive effect on a student trying to learn.

“I concentrate better in class when a whiteboard is used to deliver instruction.”[1] which received 3.4. While it’s only 3.4 (out of 5, assuming 2.5 is no change) it suggests that more people than usual might be engaged in a lesson – which is a huge positive.

“I enjoy using the whiteboard.”[1] which received 3.4. Considering the survey was made in 2002, so the technology of the whiteboard won’t of been too advanced, with the technology of today more tools could be added to improve the enjoyability such as the ability to add images and networking so students can share each other’s whiteboard.

**THE EFFECTS OF INTERACTIVE WHITEBOARDS (IWBs) ON STUDENT PERFORMANCE AND LEARNING: A LITERATURE REVIEW**

Interactive whiteboards have had large push in the United Kingdom and United States. Especially in the United Kingdom as there was a £15 billion pound push to install them in all primary and secondary schools[2]. Evidence suggests that whiteboards have a positive effect on teaching and learning[3] but much of this evidence is anecdotal or based on case studies[2].

Whilst the £15 billion pound drive was to install wall mounted whiteboards – this technology can be repurposed for interactive whiteboards too allowing students, if the school has available, to access the whiteboard on laptops or tablets allowing for better interaction. It also eliminates the issue of not being able to see the whiteboard if its on the machine in front of you.