

Project Abstract: Microsoft DicMath

In 2023 in France, there are 207 000 people suffering from visual impairment. Furthermore, it is statistically harder for a visually impaired student to reach high levels of scientific studies, not for lack of abilities, but because there are very few tools enabling them to write and share written mathematical content. Since we know that around 80% of the visually impaired are able use a computer in their daily lives, how can we improve the technology available to them to close this educational gap?

Our goal is to make scientific studies more accessible to the visually impaired, by creating a tool allowing them to write and share mathematical content so that it can be submitted and corrected like any other student homework.

To this end, we wanted to create a web application allowing a user to dictate, modify and export equations using only vocal commands and keyboard shortcuts. All equations can be broken down into rows and smaller blocks within each row, allowing a clear distinction in the written content. Any equation can be modified on demand, deleted, or downloaded in LaTeX format in a PDF file.

Although there were two teams working on the project, we could only rely on the five members of our group since we had to work in parallel with the other teams rather than in collaboration with them. To create our app, we used mostly free resources, such as:

- For the front end: HTML, CSS, JavaScript
- For the back end: Python, Flask, SQL
- Azure Speech cognitive tools, which allowed us to implement all our vocal commands.

We did not have to plan any expenses, provided we did not use the Azure Speech tools for an extended period of time.

We chose to use the Agile Method for our project, working in sprints of 2 to 3 weeks in between our meetings with our Microsoft handler, who then gave us the feedback we needed to keep improving. We also shared the code and all our progress on a GitHub repository to allow everyone to add to it at any time.

Our main constraints were the time which was given to us both for the sprints and for the global project, as well as the functionality, usability, and availability we wanted for our app.

In the end we were able to hand in a working app with all the main features we had agreed upon with our partner, and even added a few functions to further improve it. All the code is currently available on a public GitHub repository for anyone to use. We also added user guides to help set up, run and navigate the app.

If we had had more time, we would have further developed the modifying function, to manipulate each block, but we found it hard to do so while maintaining the usability of the app.

Thanks to very open and frequent communication with Mr. Troitin, we were able to discuss any issue or question we had while always keeping in mind the objectives of the project. However, a better in-group communication at times would have made our work easier.

We come away from this project with sharpened skills and pride in what we were able to create, and we hope that people will find use in it.