Did you know that the MSLC offers a new virtual tutoring platform called MC\textsuperscript{2} (Mathematics Classroom Collaborator)? Of the 117 students who took part in the recent MSLC survey, 54.7% said that they had never even heard of it. The purpose of this article is to promote MC\textsuperscript{2} and explain how it works.

According to a study by Helvie-Mason (2012), 81.1% of post-secondary students wished that their professors offered more virtual communication options, and 83.8% would use app-based mobile communication if it was offered. Similarly, students at UTSC would like to be able to receive assistance from MSLC TA’s after hours. Developing a real-time, chatroom with mathematical expressions functionality for novice users (i.e., non-TeX users) was not an easy task. Another critical requirement was that the software work on a variety of different platforms (tablets, smartphones, and laptop computers), which may run on a variety of different operating systems, such as Windows, MacOS, iOS, and Android. To ensure that students would have easy access to the software without having to pre-install anything, a browser-based architecture was appropriate. Possible input methods could include keyboard, mouse, stylus, touch screen, and camera. A web-based application would also lower the barrier to entry for first-time users.

On the surface, MC\textsuperscript{2} presents itself as a familiar texting application, with the addition of mathematical capabilities. We have numbered its functions from (1) to (6) in Figure 1 below.

Figure 1: Right Panel: MC\textsuperscript{2} Chat Screen (1) Text input field. (2) Insert TeX into text field (3) Input image from camera or gallery (4) Launch the mathematical expression editor. (5) Dialogue Pane: clicking on an image or mathematical expression launches the expression editor for annotation or modification. (6) Chat Option – tab to expand the options of the Online Users and Logout buttons. Left Panel: Initial Login Screen.
Text Field: In addition to typing regular texts, the text field supports the insertion of TeX.

TeX Editor: TeX input requires a number of symbols such as $, \backslash , \{ , \},_,$ and ^\textsuperscript{1}. On smartphone keyboards, these symbols are often difficult to access quickly. In MC\textsuperscript{2}, these symbols can be found under this button.

Image/Camera: The image button allows the user to upload an image. The user can write mathematical expressions on a piece of paper, or take a picture with their smart phone and upload it, which could be convenient for those accessing the application on a smartphone. Students can upload screenshots of questions from their homework assignments or online lecture notes.

Mathematical Editor: Complex mathematical expressions can be entered using the mathematical editor, where equations can be inputted using a diagrammatic equation editor for non-TeX users. The symbols can be selected, moved, and resized based on the diagram editor UI principles. Diagrams can be drawn and recognized using a baseline structured approach and converted to TeX, which can be displayed on the messenger tab.

Dialogue Pane: The dialogue pane is where the conversation is displayed in chronological order. It is nearly identical to the panes found in text messaging apps. Instructors can delete posted messages and users can copy messages and paste them into the TeX editor.

Chat Options: click to expand the chat options. There are two options: The Online User button and the Logout button. The Online User button displays the user names or the users that are currently in the chatroom.

There are three easy steps to use this great tool:

1. Check the virtual tutoring office hours offered at the MSLC via our website (https://www.utsc.utoronto.ca/mslc/virtual-tutoring)
2. Click the virtual tutoring icon on the right side.
3. Provide “username” as your “UTORid” (not a student number!) and click “Login”.

Now, you can ask questions directly to your virtual tutoring TA in the text message field, and if you are using a smart phone, you can take a picture of your questions and upload it (push the image icon at the bottom of the text message field. An instructional video about MC\textsuperscript{2} will be developed soon. We hope that you enjoy this service, and don’t forget to leave your comments in our next MSLC survey!

Reference:

Figure 2: MC\textsuperscript{2} Mathematical Editor – non-TeX users can click on math symbols or Greek letters from the menu and make a diagrammatic equation that can either be converted to TeX expressions and sent as a text file, or sent directly to the dialogue pane as an image file.