

# “Teach Us”, a Proposed New Tool for Online Education

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**Abstract** – *Current digital tools applicable for online education are either not tailored for communication between teacher and students or lack the possibility of a mutual eye contact and seamless integration of handwriting and third party applications. The proposed tool “Teach Us” aims to be a robust, relatively simple application dedicated to interactive communication between either a teacher and a single student, or a group of students at different locations. The proposed application facilitates the device camera (pc, pad, or mobile phone), and integrates this feed with any other figures, text, animations, and handwriting. The layered transparent design allows displaying the teacher behind the visual objects used for various explanations, realizing a more engaging teaching environment for the students compared to just watching the teacher in a separate window.*

**Keywords:** Online education, layered multimedia appearance, first person perspective, real-time interactive teaching.

## 1 Introduction

The use of video or streaming is an important part of teaching today, and will no doubt be even more so in the future. The use of video for conveying knowledge has proven an effective educational format [1, 2]. In [1] a comparison of the use of video to written material was conducted. Findings here suggest that the video group retained more knowledge and rated their educational format as more useful and appealing. Furthermore, real-time online collaboration has also been a successful option for involved communication and learning [3]. Several applications are presently available for online communication, e.g. [4], but they all lack the full functionality of the proposed application “Teach Us”. This application will facilitate a live video feed where students experience the teacher as an active player behind what appears to be a transparent digital blackboard or canvas. The layered transparent structure of the canvas will allow the teacher to include and move around any objects such as graphs, text, and handwriting.

There has already been attempts, both by others [5] and us [6] to present material in an analogue setting, where the presenter is standing behind a physical transparent glass board while talking and writing on the board. However, this approach is rather impractical, and does not facilitate a real time interactive collaboration. Obviously, behavior and body language, including gestures, tone, language, and volume of voice are important communication tools. Deprivation of some of these elements in a teacher-student setting will generally degrade the student’s engagement and understanding of the presented material. Several studies [7, 8, 9] have concluded that the impact of the teacher’s visual engagement with the presented material is indeed important for student awareness and understanding.

## 2 Teach Us

Existing online education applications typically display the tutor’s face in one window and the presented material in a PowerPoint style in a different window. Furthermore, most live streaming applications lack the ability of a flexible interaction between the teacher and the students, and feedback from the students are generally limited to oral or typewritten messages. “Teach Us” aims to remedy some of these shortcomings by integrating camera feeds from the teacher and the students along with handwriting, and third party applications on a transparent layered canvas. When the teacher is talking and writing, the students will experience the teacher behind the presented material looking at whatever object on the canvas she or he is presenting. Also, when the teacher looks into his or her own eyes on the screen, students will get the perception of mutual eye contact. Compared to traditional videos or live streaming where the presenters’ eye level is always below the camera level, this setup will provide a better feeling of a real-life presentation. In addition, since the canvas is transparent, the teacher’s body does not block any of the presented material.

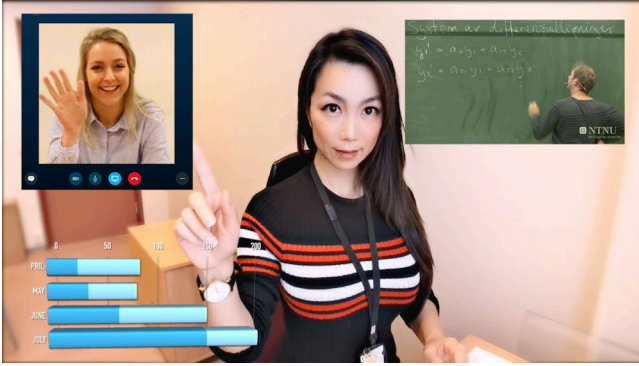


Figure 1 Illustration of the proposed concept where the teacher appears behind various software displays.

A student posing a question can have her or his camera feed integrated in the teacher's and the other student's canvases, and the teacher can temporarily give the student access to writing on the mutual canvas. This gives the impression of the teacher and student talking directly to each other, where both have the possibility of writing on the mutual digital canvas.

Real time handwriting is in fact crucial for teaching a number of subjects. Topics such as mathematics, physics, chemistry, and many other subjects, do indeed require real time handwriting for satisfactory communication.

Presently, and in the near future, digital screens supporting handwriting are becoming available at fair prices, allowing students to benefit from the full potential of "Teach Us". In addition, the digital technology has matured sufficiently for eliminating latency, facilitating a smooth experience of the application.

As discussed, contents from different software can be displayed on the layered transparent digital canvas. The CPU load on the computer does not increase significantly since components from different software are mirrored, and not built into the application.

Students using the application would just need to download the application on their digital device, and join a specific session. Also, a web-based version of "Teach Us" could be considered, with no need for downloading and installing any software. The planned development of the application will be non-commercial with an open source code, opening for an active development and maintenance of the code.

Parallel to the design and development of "Teach Us", the authors plan to conduct student surveys on the design and functionality of the application, aiming for a robust, relatively simple, and smart looking tool for online education.

### 3 Conclusions

The proposed application "Teach Us" is a digital tool for online interactive teaching where the teacher plays an active part in presenting the material. The application is based on an interactive layered transparent digital canvas, allowing camera feeds to appear behind third-party digital objects on the canvas. In addition, the possibility of handwriting on the digital canvas improves significantly the teaching quality for a number of subjects. The described first-person perspective of the presenter and the interactive design of the planned tool "Teach Us" are anticipated to improve students' learning experiences.

### 4 References

- [1] Armstrong, April W., Nayla Z. Idriss, and Randie H. Kim (2011) "Effects of video-based, online education on behavioral and knowledge outcomes in sunscreen use: a randomized controlled trial." *Patient education and counseling* 83.2: 273-277
- [2] Brame, Cynthia J. (2016) "Effective Educational Videos: Principles and Guidelines for Maximizing Student Learning from Video Content". *CBE Life Sciences Education* 15:es6
- [3] Khalil H., and Ebner M. (2017) "Using Electronic Communication Tools in Online Group Activities to Develop Collaborative Learning Skills" *Universal Journal of Educational Research* 5(4): 529-536
- [4] <https://www.blackboard.com/online-collaborative-learning/blackboard-collaborate.html>
- [5] Steve, B.(2018) [https://youtu.be/\\_BvAkyuWhOI](https://youtu.be/_BvAkyuWhOI)
- [6] Tonje, J.(2018) <https://youtu.be/c-t9vTgvLGY>
- [7] Fiorella L., Stull, A.T., Kuhlmann, S., and Mayer, R.E. (2018) "Instructor Presence in Video Lectures: The role of dynamic drawings, eye contact, and instructor visibility" *Journal of Educational Psychology*, no pagination specified
- [8] Florella, L. and Mayer, R.E. (2016) "Effects of observing the instructor draw diagrams on learning from multimedia messages" *Journal of Educational Psychology*, 108.4: 528-546
- [9] Beege, M., Schneider, S., Nebel, S., and Günter, D.R. (2017) "Look into my eyes! Exploring the effect of addressing in educational videos" *Learning and Instruction* 49: 113-120