Lightboard

Scenario

Dr. Casey is updating her notes for her course Risk Factors and the Human Genome. She wants to create a video to explain methylation, a complex biological process through which the human body breaks down vitamins B12, B9, and B6. Previous students have struggled with the concept, and a video would allow students to review the process as needed for understanding. When she discusses the video with Paul in the video services office, he suggests a new device he calls a Lightboard.

"It's a device we built in-house that looks and functions like a whiteboard," Paul says. "You can shoot the video in half an hour, and editing is minimal."

The next day, Casey visits the studio to watch another faculty member use the new technology in a recording session. The device looks like a dry-erase board made of clear glass. The lecturer's face is visible through the glass as he writes on it with colorful markers. The camera is pointed toward a mirror showing the reflection of the Lightboard surface. Paul explains this will correct the "backward" orientation of the words he is writing.

Casey asks if she can include a PowerPoint image, a process-flow diagram that she uses to help students track the steps that occur in methylation. Paul agrees to merge the image via a separate video feed during the recording session so that in the final video the diagram will appear with the other notes and diagrams that Casey writes on the board.

That evening, Casey works out how she will use the Lightboard space during her five-minute lecture, and the next day, she returns to the studio, ready to record. As she talks about methylation, she draws arrows to key points in the process flow diagram. To one side, she writes bullet points about the gene mutations that can inhibit proper methylation. During a brief discussion of the formation of glutathione, she draws in the chemical formula to clarify a point. Throughout her lecture, her face remains visible, and her notes, which she makes in bright orange marker, are easy to read. Casey completes her explanation in a single take. As it requires only minor editing and the addition of titles, the finished video will be ready today.

1 What is it?

A number of colleges and universities are implementing **lecture-recording tools in their video studios that allow instructors to face the camera while also writing on a transparent surface.** These tools reverse the image so that in the recording, viewers see a presenter facing them and writing in a way that looks like it should be backwards but is in fact oriented properly. This setup allows instructors to illustrate lessons with a diagram or explain a formula without blocking the written content with their bodies and without turning their backs to their students. The first example of such a tool was built at Northwestern University, where it was given the name Lightboard. That device features a glass writing surface through which both the person and the text are captured on video. There is not yet a commercial option available, but other institutions are beginning to develop similar tools, often based on the Lightboard model but customized to the environment and needs of each institution.

2 How does it work?

In a video studio, the Lightboard is positioned between the lecturer and the camera. **The lecturer writes on the glass surface with fluorescent markers while the session is recorded**, ensuring both text and presenter remain visible throughout. A PowerPoint image can be merged to appear in the video as if it has been projected onto the writing surface. Because any written text will be backward in the direct camera view, the text orientation must be flipped, either by pointing the camera toward a mirror reflecting the Lightboard and the presenter or by digitally reversing the image. For the system to work well, some studios might require additional microphones and special lighting. The recordings tend to be brief—no more than 5–10 minutes each—and might take any of several forms, including a lecture, a lab demonstration, or a course review. For students, the setup could accommodate course presentations or project demos. The result is a quick, easy way to record a video that includes this real-time handwriting component.

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3 Who's doing it?

Northwestern University developed the Lightboard to facilitate quick production of teaching videos for faculty who teach technical courses where visual content, such as equations and diagrams, is a fundamental part of many explanations. Duke University recently installed a similar system, which was designed to be relatively portable so that it can be easily set in place for a shoot and returned to storage afterwards. The lighting has been simplified for easy setup, and the board itself is constructed to be lightweight without vibrating or buckling under the pressure of a marker. At Pennsylvania State University, an installation of Lightboard is controlled by a software application that reverses the handwriting for viewers. Technicians have also had success integrating these tools into the school's One Button Studio, a studio-control software application that offers a simple way for presenters to create videos in a studio session. The software add-on that reverses handwriting for Lightboard will eventually be included in an updated version of the One Button Studio app that Penn State offers for free.

4 Why is it significant?

Lightboard offers a way to create videos that complement flipped classrooms and other online or hybrid learning models. Lightboard videos can provide highly effective assistance for problem explanations, homework explication, and course review. Those who frequently explain or lecture using a board may find these tools a natural fit for presentation. As such, it can help overcome the reservations of instructors who are uneasy about video production. In addition, the technology presents new opportunities for creative use as presenters annotate images or video. Some presenters position a physical object behind the glass and write key points about it. These simple and elegant tools enable lecturers to face the camera while illustrating and annotating their talk, making the content both easier for the viewer to follow and more interesting to watch.

5 What are the downsides?

This technology is intended for studio use, and so is not constructed for ad hoc deployment in a classroom. Currently the system cannot be purchased as a turnkey product, although instructions for ordering and assembling a frame are listed on the lightboard.info site. Although the technology is meant to enable quick video production, some recordings might still require some postproduction video editing and encoding. Erasing the glass surface is more difficult than cleaning a whiteboard, making recovery from a writing error problematic. Once a presenter has filled the available board space, no further writing can be done in that recording session. These factors make it desirable for videos to be completed in a single take, obliging those using this technology to carefully plan their presentations.

6 Where is it going?

So far, this technology is in use at a relatively small number of colleges and universities, but **because the utility of the tool makes it so attractive, it is expected to see much wider use.** Initially, all units were custom built from raw materials, but prebuilt, boxed frames can now be found for incorporation into existing video studios. Expect to see an LED lighting system option that will attach to the board and an improved means for cleaning the surface. This technology is a natural adjunct to the movement toward a self-serve video suite, such as Penn State's One Button Studio. Such a deployment makes the device more readily available to students and suggests that it might become a staple for content that is hard to explain using typed text.

7 What are the implications for teaching and learning?

Lightboard and similar tools meet the student's need for clear and informative lecture capture while offering the instructor a quick and effective method of video production that includes visual aids. **The technology is especially valuable for instructors in science, math, or technology**, who often must work through formulae or explain complex processes using illustrations. The resulting lectures are easy to watch, the text or sketch stays visible as it is produced, and the lecturer's face remains a natural part of the presentation. Slide images are made more interesting and immediate by handwritten annotations added during a lecture or explanation. A quick video can help students having trouble with homework, providing an option for explanation that does not use valuable class time. Lightboard makes the provision of such teaching aids more viable by enabling high-quality video production that does not require multiple cameras or extensive postproduction editing.