An investigation into pathology staff’s use and perceptions of online training videos in support of laboratory bench training.

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| Introduction |
| H.S. in partnership with UCL, supported the Government’s response to the pandemic through the creation of a purpose-built COVID-19 learning laboratory. The need for this laboratory resulted in large-scale swabs to be collected at a new group of sites, which would all need to be trained and competent in a matter of weeks. This presented the unique challenge of needing to train staff whilst the laboratory space they would be working in was still being built.

A training programme was developed consisting of instructional videos demonstrating both the use of a safety cabinet and the various stages of the COVID-19 test. Each topic had an online course available on our workplace Learning Management System “Sonic Learn”. Staff were required to complete these online courses before attending any “practice laboratories” within the hospital. After this, they then had a chance to undertake the procedure in a safe environment under direct supervision.

The majority of respondents found the videos to be most value as preparatory support prior to face-to-face training. In thematic analysis there was a clear opinion that the videos provided the participant with a process overview of the different processes and the process flow. Participants were asked to provide justification for their response, following up interview. This study offerred a wide range of findings. Some responses (questions and Likert style questions) were collected as direct open responses/questions and Likert style questions (indicating attitude).

| Method |
| Ethical approval was granted from the UCL Culture and Ethics Committee. Staff who had completed either the COVID-19 “Test” or “Safety Cabinet” courses were invited to participate in the study. Following informed consent, the participant was asked to complete an online questionnaire and participate in a semi-structured interview to gather their experiences and view of these courses. Additional user data was gathered from Sonic Learn to provide data for triangulation and evidence of the learners’ interactions with the course.

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| Results |
| A total of 38 staff completed the questionnaire and 30 staff took part in a follow-up interview. This study involved a wide range of findings. Some key points are noted below:

Results indicated that the videos were well received and considered to be easily accessible and ‘very helpful’ in being able to confidently perform the relevant tasks. The majority of respondents found the videos to be most helpful as a pre-learning exercise before practical training and those who already had some knowledge potential at risk of the amount of face-to-face training needed. However, it was equally felt that this could only ever support face-to-face training and not replace it.

ACCESSIBILITY: 100% of participants to the question confirmed they had no issues accessing the videos. This supported the choice of using Sonic Learn as the delivery method for this training.

LENGTH OF VIDEOS: The duration of the videos in this study ranged from 0 minutes 12 seconds to 6 minutes 4 seconds with an average length of 4 minutes 26 seconds. Participants overwhelmingly stated that the length of the videos was “just right”.

CONFIDENCE: Participants, in response to the question “how helpful did you find these videos” demonstrated a consistent opinion that they were very helpful.

RESOURCE: Participants were asked whether they thought completing the course reduced the amount of face-to-face training they needed to be competent. This was a crucial question as it relates back to the premise of this research project as to whether use of instructional videos can help ease the training burden within laboratories. Participants overwhelmingly stated that the reduced amount of face-to-face training needed was “very helpful”.

Participants were asked to provide justification for their responses, following thematic analysis there was a user opinion that the videos provided the most valuable support prior to face-to-face learning.

Interview comments supported the opinion that instructional videos were useful and placed at the start of the training pathway, especially for preparation for face to face training.

“Yeah, it really did. It gave me what I saw from the video beforehand, so I knew what to do.”

“Yeah, this is really true. I think people have the background knowledge already and they’re already used to it. It’s much easier just to go through the whole thing once and go through.”

Advice: It’s incredibly helpful for being shown something in a sincerer tone, to one to one is the best. Although having some sort of practice points prior to being shown in the video is important to be honest. In most laboratory staff are confident in their background knowledge to that background. Yeah. I think I think if people have got the background knowledge already they know what to do already. They don’t need a sort of a summary video, they already know what some of the different parts of the safety cabinet are.”

“It’s to complement the practical training and should be done before you have the practical training.”

| Theoretical Framework |
| The study used Mayer’s Cognitive Theory of Multimedia Learning which states that people learn better from a combination of words and pictures rather than words alone to provide a theoretical justification for the potential of instructional videos to support laboratory training. It also under the broad learning theory of cognition which considers information to be actively processed within the mind of the learner and behavior is modified by searching for relationships between information.

This theory embeds three assumptions as to how an individual receive and assimilate information: these are:

• Dual-Channel assumption (information processed via two channels, the visual (eyes)/cognitive, and the auditory (ears)/cognitive)

• Limited-Capacity assumption (can only process a limited amount of information at any one time in any channel).

• Split-Attention effect (contextual environments engage in active cognitive processes to create connections between the information they have received).

Understanding the principles of this learning theory is important when designing multimedia content and evaluating its effectiveness. All multimedia is of the same learning value, and it is possible to create poor multimedia content that does not result in any learning. The dual-channel assumption reminds designers that multimedia content can include both audio and visual elements and that it is best to include a combination of both information presented visually in a visual or audio format does not enable the learner to engage with the content effectively. However, the limited capacity assumption that learners are limited in the amount of information they can process at any given time implies it is possible to overload a learner by presenting too much information at once. A learner can either read the text or watch the procedure but cannot do both at the same time. This cognitive overload can result in reduced learning, and this situation is described as the ‘split attention effect’.

When considering how this theory of learning can be put in the context of laboratory training, it must be applied to the objective of the laboratory training competency. It is not proposed that a state of competence can be achieved through multimedia learning alone, even when considering advanced multimedia environments such as VR laboratories, but research has shown this to offer the best learning gains when used as part of a blended learning approach.

| Outcomes |
| Based on the conclusions drawn from the data above it was possible to propose a revised training and competency cycle including the use of instructional videos. This study has shown that the timing and placement of instructional videos within the training cycle is crucial, and I have shown that they are best used as a preparatory activity prior to undertaking practical training and has been supported through Hugill-Tandberg’s extended through multiple data sources. See fig 2 for the proposed updated training and competency cycle.

| Future Investigations |
| This study has clearly demonstrated the potential for research in the use of educational technology in laboratory training in the workplace and has highlighted a lack of research in the training of pathologists. There are elements within this study that have been noted as areas worth further investigation such as exploring multiple views of the videos, the use of captioning, and the time elapsed between watching the videos and undertaking the practical training.

This area of study can also move forward with an experimental design and use of experimental and control groups, one following the original training and competency cycle (fig 1) and the other following the updated cycle (fig 2). Both groups could be evaluated on time taken to achieve a set competence as determined by the local competency assessment. This study could be further enhanced by ensuring the same trainers work across both groups and interview to ascertain their views on how the two groups perform.

There is also the potential to carry out a similarly designed experiment looking at different types of technology such as virtual reality laboratory simulations.

I can also propose a set of design decisions that will inform creation of future laboratory instructional videos.

| REFERENCES |


8. One of the aims of this study is to evaluate the effectiveness of the proposed, and therefore support the use of multimedia in laboratory training.


