

E71 Pushing the Bounds of Virtual Education: The Creation of an Interactive, Virtual Forensic Serology Lab

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Learning Overview: The goals of this presentation are to: (1) familiarize attendees with an interactive, virtual forensic serology laboratory powered through Microsoft® PowerPoint®; and (2) demonstrate that effective virtual laboratories can be prepared at low cost and easy student access to replace and/or supplement in-person laboratories when necessary.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by offering a virtual option for forensic courses, whether due to willingly creating an online course, responding to an emergency situation requiring virtual coursework, or even accommodating a student who will be absent from class. Additionally, this interactive forensic serology laboratory could be used as part of a training tool for crime laboratories.

Virtual courses became the norm for many students in the spring and fall of 2020 due to the COVID-19 pandemic. Educators faced numerous challenges: maintaining rigor and student interest, preventing cheating, and even protecting their intellectual creations. Furthermore, resources were scarce, and time was limited. What would normally take months to prepare had to be prepared in a fraction of that time. This presentation will provide a thorough demonstration of the virtual forensic serology lab, including development, challenges, and student feedback, which was overwhelmingly positive.

The virtual lab included a combination of enhancement, presumptive, and confirmatory tests for blood and semen, which included some historical and current analyses common to the forensic community. Forensic serological tests for blood included luminol, fluorescein, combined Phenolphthalein Tetramethylbenzidine (P-TMB), Takayama, and ABACard® HemaTrace®. Forensic serological tests for semen included long wave Ultraviolet (UV), Alternate Light Source (UltraLite ALS®), acid phosphatase, ABACard®p30, and sperm search. Development via Microsoft® PowerPoint® relied on the use of detailed and extensive animations triggered by students clicking on equipment, reagents, and/or samples. Though participants needed to follow along in their lab manual for step-by-step instruction, on-screen prompts were also used to remind students to disinfect their benchtop and utensils, process controls, etc. Student access to the virtual lab was fairly simple: download and extract a ZIP file, then open the virtual lab in PowerPoint® Slide Show (.ppxs) mode. Failure to extract the ZIP file was the most common error and resulted in the inability to correctly access hidden files via embedded hyperlinks. The virtual lab was also compatible using both PC or MAC®, but was easier to access via PC than MAC® because all files were hidden on a PC except the .ppsx files. On a MAC®, all files intended to be hidden were visible to the student, and this led to confusion regarding which file(s) to open.

Though this virtual lab was prepared for the worst-case scenario, in-person labs were in fact carried out in fall 2020, and this virtual lab was therefore used as an effective supplement to the in-person lab, as well as a supplement to those that were enrolled in serology lecture only. Both undergraduate (22) and graduate students (21) enrolled in a forensic serology course at Virginia Commonwealth University had access to this virtual lab. Whether enrolled in an in-person forensic serology lab or lecture only (no lab), more than 90% of the surveyed students indicated that they found the virtual lab effective to further their understanding of body fluid analysis; the actual testing procedures; general precautions for contamination prevention; processing controls; and following a standard operating procedure. Additionally, those that were enrolled in the in-person lab indicated that the virtual lab was very similar to the hands-on lab. Based upon these results, it has been demonstrated that effective virtual laboratories can be prepared at low cost and easy student access to replace and/or supplement in-person laboratories when necessary; however, it is ideal to maintain the in-person experience.

Education, Virtual Lab, Serology