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Creating Standard Operating Procedure (SOP) Videos Using Multi-Angle SMOT's Cameras and an iPad: A Step-By-Step Guide

INTRODUCTION

Creating procedural videos through a first-person perspective is recommended for enhancing learning of complex tasks in the field of STEM (Fiorella, van Gog, Hoogerheide & Mayer, 2017). While the medical disciplines feature strongly in research for the use of videos to augment training in complex surgical procedures, there is less evidence for the direct development of bespoke videos for (bio) pharmaceutical science laboratory procedures and equipment protocol. Furthermore, there is little research to guide instructors in the step-by-step creation of videos, from recording to editing and delivery, especially for the industrial life sciences.

Here, an elegant model is presented providing a detailed outline of the steps taken to produce standard operating procedure (SOP) videos incorporating a first-person perspective (1st PP), using an iPad and multi-angle view Scotia Medical Observation and Training System (smots™) cameras, in the School of Pharmacy's 'Aseptic Training Suite' (UCC). This was a collaborative effort involving a pharmacy lecturer, a pharmacy student and two instructional designers from the iEd Hub, CoMH, (UCC).

METHODS

A lecturer and undergraduate pharmacy student acted as operators. Cameras were positioned to capture multiple angles as follows (Fig 1): (a) on a tripod to capture right-hand side, (b) within the isolator to capture an elevated view from the left-hand side, (c) fixed to the chest to capture 1st PP and (d) an iPad was used as a mobile camera for photography and for capturing 1st PP. The latter image also captures monitoring of the three smots cameras. Just one video production process is described here which acted as the standard for subsequent recordings - working within a negative pressure isolator in the School of Pharmacy's Aseptic Training Suite (Fig 2).

Limited directions were given to the operators relating to keeping hands within shot and using slow movements. Equipment and procedures were operated as standard, in deliberate stepwise stages and the operators spoke informally throughout the process. This sought to maximise Mayer's 'personalisation effect' and achieve ecological validity (Price, Jhangiani, Chiang, Leighton & Cuttler, 2022) for the video. Content was edited using Audacity, Adobe Lightroom and Adobe Premiere Pro (Fig 3). More detail of the methodology is summarised in Fig 4.

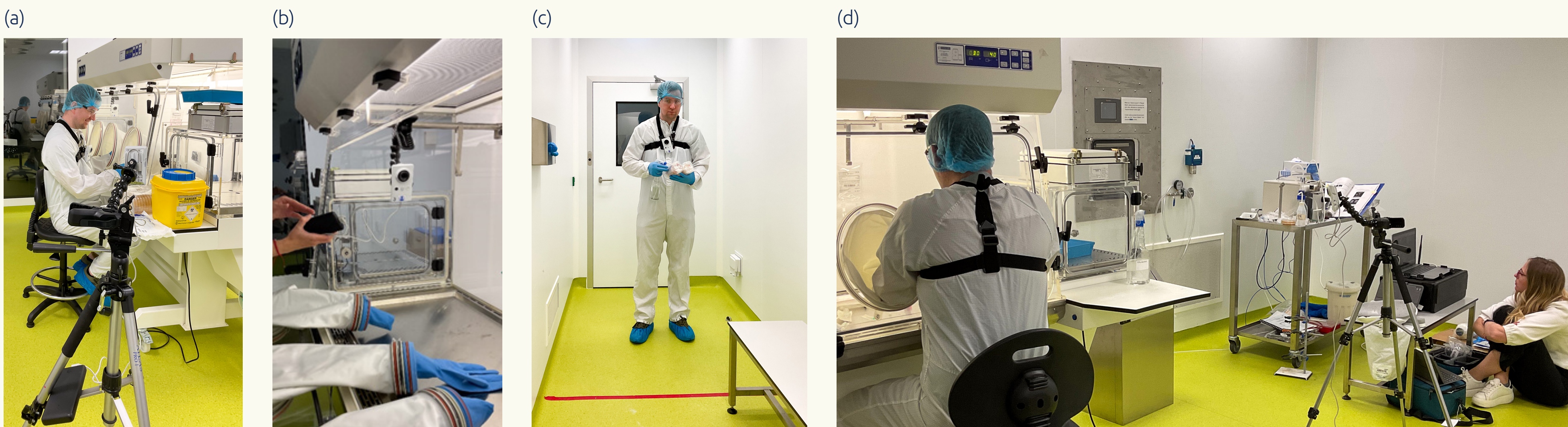


Fig 1. Camera Setup. (a) tripod camera right-hand side, (b) within the isolator to capture an elevated view from the left-hand side, (c) fixed to the chest to capture 1st PP and (d) an iPad was used as a mobile camera for photography and for capturing 1st PP.

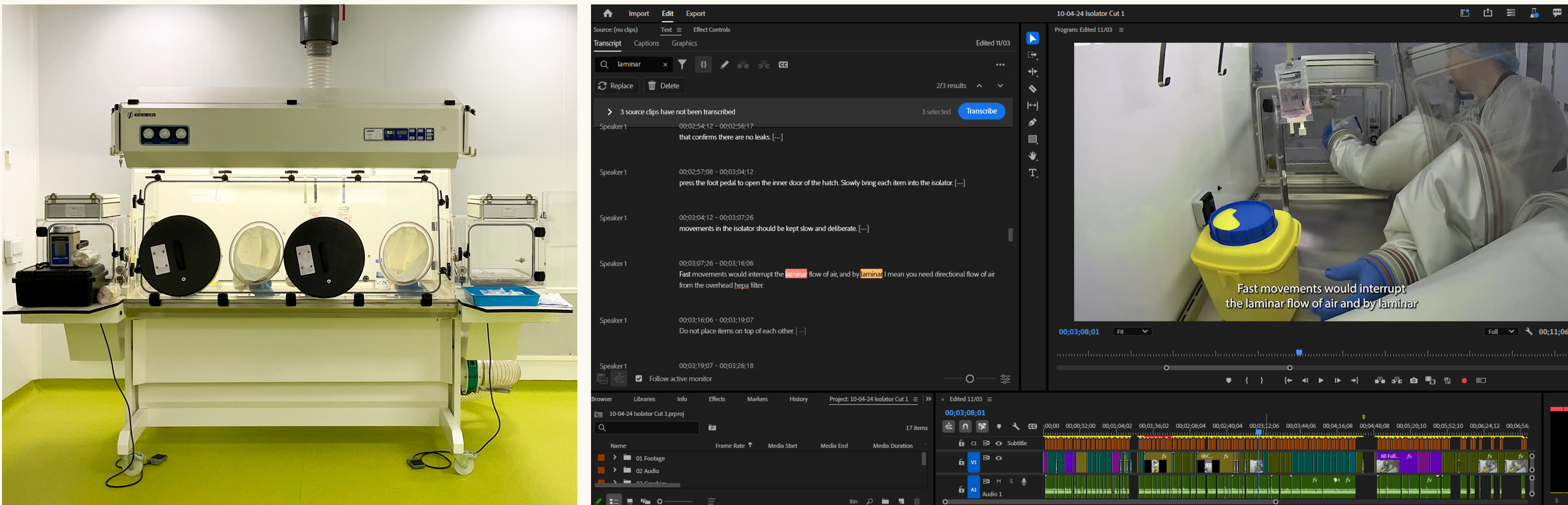


Fig 2. Negative Pressure Isolator, Aseptic Training Suite

Fig 3. Adobe Premiere Pro Interface. An automatic transcript on the left facilitated pinpoint video editing & captions. The different multi-angle video clips can be identified as different colours in the timeline with audio underneath.

OVERVIEW

AIM
Create a step-by-step guide on how to produce bespoke educational SOP videos suitable for the industrial life sciences, from recording to editing and delivery.

OBJECTIVES
Produce SOP videos incorporating a first-person perspective for (bio)pharmaceutical science laboratory procedures and equipment protocol.

CHALLENGES
Time, costs, hardware and software, lack of video shooting expertise, ecological validity, editing audio and video, file storage and management, implementation and delivery, collaboration.

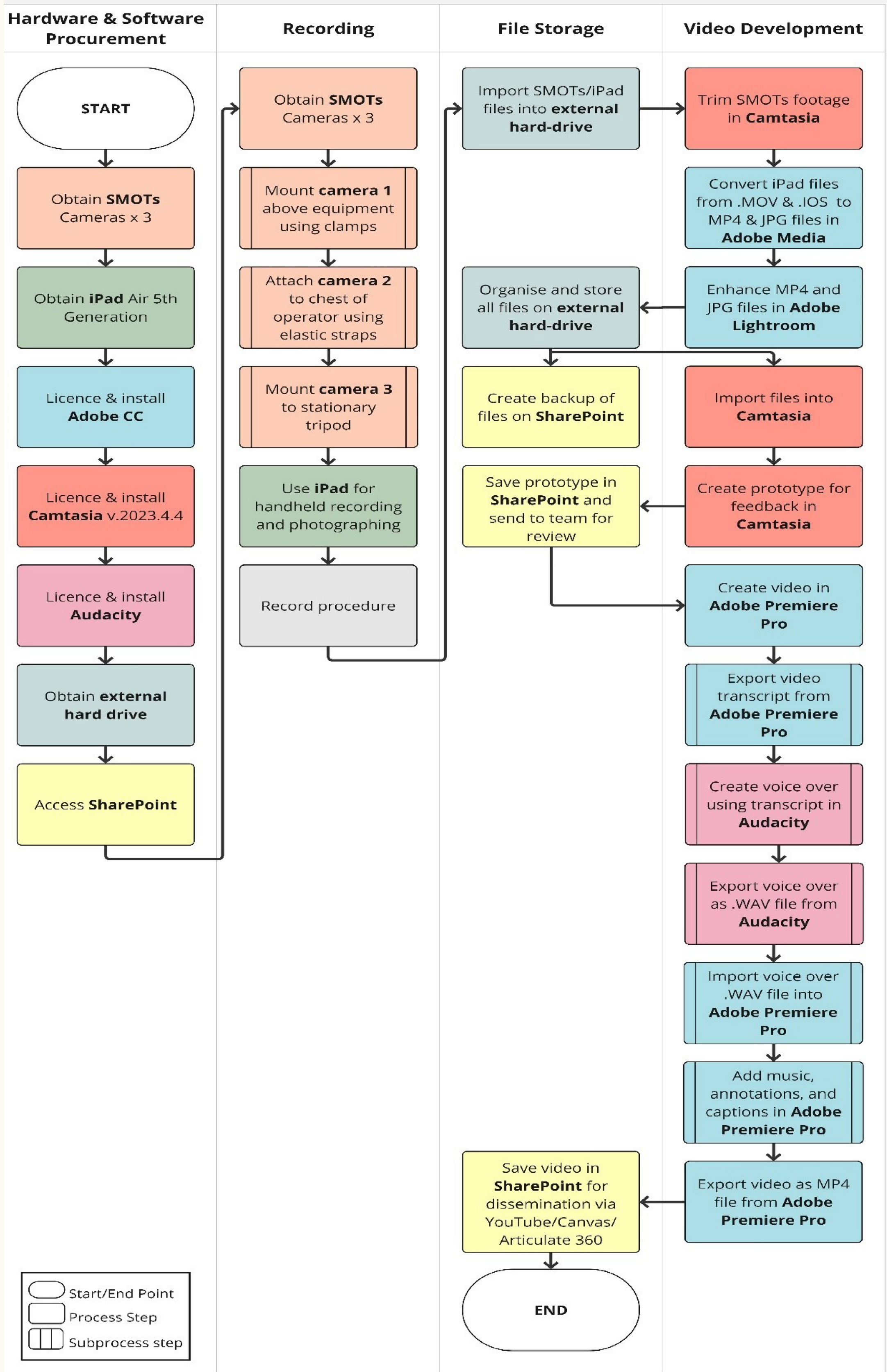


Fig 4. Workflow for the Video Production Process

RESULTS

Thirteen videos were shot over a 3-month period:

- 1) Cleanroom and Negative Pressure Isolator
- 2) Non-Viable Particle Counter: ApexPS NVP
- 3) Viable Particle Counter: Active Count 100
- 4) Freeze Drying
- 5) Dynamic Vapour Sorption (DVS)
- 6) Developability Classification System (DCS)
- 7) Differential Scanning Calorimetry (DSC) & Lyophilisation
- 8) Filter Integrity Tester
- 9) Friability
- 10) KAYE Thermal Mapping
- 11) Crimping Tool
- 12) Physical Properties Lab
- 13) Liquid Nitrogen

A step-by-step guide was written and accepted as a practitioner paper at the ILTA EdTech Conference 2024. A further series of recordings is planned for 2024. A sample of shots from the first video in 1st PP is shown in Fig 5 (a, b, c & d).

ACKNOWLEDGEMENTS

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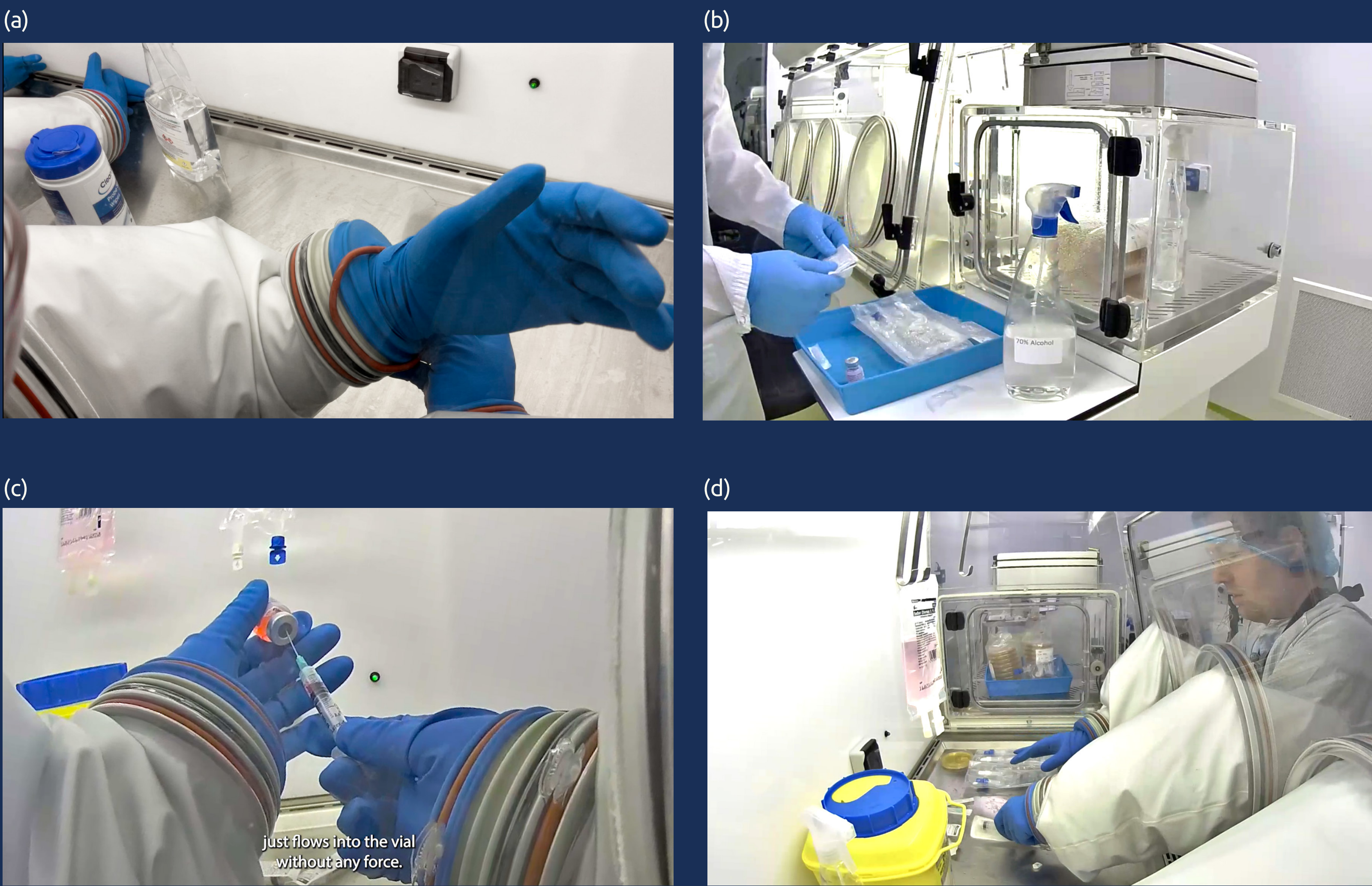


Fig 5. Multi-angle SOP Shots. (a) 1st PP placing O-rings on glove cuff, (b) spraying down items going into isolator, (c) 1st PP inserting needle into antibiotic, (d) arranging items in the isolator for exposure to the laminar airflow.

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