Practical Oversight Group Recommendations

Practical Oversight Group:

Caroline Bowsher, Siobhan Brennan, Maria Canal, Steve Ellis, Katie Finegan, Ingrid Gouldsborough, Ruth Grady, Rachel Heyes, Fran Hooley, Helen Jopling, Vitalia Kinakh, Anna Leicester, Ryan Metcalfe, Richard Prince, Holly Scotchburn, Elizabeth Sheader, Craig Smith, Tracey Speake and Sue Taylor.
Also thanks to Annie McLoughlin and AnnMarie Entwistle.

Overview

The FBMH Online/Blended Delivery Strategy aims to provide oversight to support colleagues in the changes required for delivery of teaching and learning in 2020-21. In line with this, the Practical Oversight group has been tasked with sharing the development of approaches and resources for the delivery of teaching in the area of Practical Skills.

Practical work is an essential element in the teaching of our Programmes and presents a particular challenge in the context of distance learning. This guide has been created to help anyone involved in the delivery of practical teaching. When planning your practical teaching for the next academic year, we would recommend following the steps below:

1. Start by considering, in conjunction with the relevant Practical and Programme Leads, whether a practical can be adapted into blended/online delivery (see point 1 below for further guidance).

2. Once it is decided that a practical goes ahead, then the next step is to consider the best approach to adapt it to a blended/online format. We have put together a series of principles and suggestions to help you with this process (see point 2 below for further guidance).

3. We highly recommend that you take advantage of the e-learning workshops and training available to staff and specifically, the online practical resources that we have collated and shared through the FBMH e-learning pages (see point 3 below for further guidance).

1. General considerations for Programme Leads when planning practical provision for the 2020-21 academic year.

The current Covid 19 situation and consequent social distancing requirements impose a limit on the number of face-to-face practicals that can be delivered. As a consequence, Programme Leads, Practical Leads and staff involved in the delivery of practicals must carefully assess what can be done face-to-face, what can be done online and also, if there are any practicals, or parts of them, that cannot realistically take place under the current situation.

Recommendation: All Programme and Practical Leads should critically evaluate each individual practical in light of the current situation and the Intended Learning Outcomes (ILOs) of the Programme, in order to decide if and how practicals need to take place. As a guide, we include a form for staff involved in the delivery of practicals to complete and feed back to Practical and Programme Leads (see Appendix A).

2. General guidance for Practical Leads when developing blended/online practicals.

We recommend the following principles when designing and adapting a blended/online practical:

a. Think carefully about the logistics: Will you be using a fully online or a blended approach?

- *If going fully online*: You have to think carefully about when and how your practical will be embedded in the practical unit/module and the time that students will need to complete the various components of the practical, including assessment.

- *If going for a blended approach*, combining face-to-face sessions with online session: You will need to carefully plan the logistics of the face-to-face sessions (see Appendix B for questions related to management of teaching lab space, social distancing regulations and use of personal protective equipment). In addition, you should ensure that students that are not on campus (e.g. international students that have not been able to travel to the UK, students that are shielding, etc.) are not disadvantaged by not experiencing the face-to-face content and can still achieve the Intended Learning Outcomes (ILOs) of the course.

b. Define your goals and ILOs, and use them as your guide: It is not possible to successfully transfer all of the components of a face-to-face practical directly into a blended or online format. Therefore, we recommend that you use a "backwards design". First, think carefully of the practical ILOs and how the practical activities you design will help achieve them. As a guidance, the six most common goals of online practicals are:

- *Deepening understanding of content:* Students can use a variety of online tools, tutorials, simulations, videos, annotated papers and data sources to deepen their understanding of content. We have created an Online Resources Database with over 200 online resources that you may incorporate into your new courses.

- *Building skill in experimental design:* Students can work with each other to develop experimental designs that you or your GTAs help them refine and troubleshoot. You could also combine experimental protocols with interspersed questions that explore the reasons behind specific steps, so that students gain deeper intuition into why certain procedures are performed. Instead of actually performing the experiment, students can critically discuss experimental methods and data interpretation.

- *Data collection:* This can be accomplished, for example, if students have remote access to lab equipment (ilabs) or if they carry out home-based experiments (see Appendix B).

- *Data analysis:* Students can do data analysis on datasets that are public or that you provide from previous years of the course, or they can analyse published data and critique its presentation. You can provide students with sample data, perhaps in the form in which it would have been collected and ask them to complete the analysis as if they had collected the data themselves. For cases where observations are part of the process, consider recording yourself or a GTA completing the lab and ask students to take the necessary measurements and observations from the video. The Journal of Visualized Experiments offers thousands of videos of experiments, including many designed for students.

- *Presentation of experiments and results:* An important skill to learn for a researcher is being able to communicate their scientific results to both a scientific and a general public audience. Students can learn to do this in a practical by presenting their work synchronously via Zoom, asynchronously via electronic posters, or in a variety of other ways (see Appendix B).

- *Learning laboratory techniques:* Consider asking your students to engage in online simulations or on-screen experiments that may cover at least portions of, if not the entirety of a protocol.

Many online resources are available, including many that are free (see Online Resources Database).

c. Think through how students will interact:

- *Should students work individually or in teams?* In a face-to-face environment, students would normally collaborate and work in teams during the lab session and then may work on their own to complete the coursework. As you transition to a socially-distanced or an online set-up, you should think carefully about whether student collaborations are essential. If they are, then you should facilitate them and create a space for students to work together, where they can communicate with each other (e.g. Zoom, Blackboard Collaborate) and share data (e.g. OneDrive). When creating groups of students that will work together, be aware of whether they are on campus or not, based in the UK or somewhere in a different time zone.

- *Will students work synchronously or asynchronously?* There are advantages and disadvantages to each of those options. Allowing students to work asynchronously gives them the autonomy of choosing when to do their work, but too much flexibility can be counterproductive, as students may feel that there is not enough guidance. In addition, many students work better under set schedules and deadlines. A good approach is to schedule the times for face-to-face or online lab sessions and also the times when you or GTAs are available for drop-in sessions (e.g. via Zoom), then allow students to work on their data analysis or poster presentation in their own time. It is also useful to give students an indication on how much time they should devote to each of the practical components (e.g. lab session, self-study, etc.). You still hold live sessions in Zoom, such as your pre-lab lectures or have lab sections scheduled according to your School's teaching timetable. Students can use Zoom break out rooms to explore the virtual tools or work through lab data exercises with a partner. Then, you and your GTAs can be there to give assistance by popping into a breakout room or being available for questions. Of course, still remember flexibility, as not all students might be able to make it to a scheduled session or have access. We recommend that you record any live Zoom sessions that you hold with your students, so that students that have not been able to attend (e.g. students with connectivity problems, students not on campus) can catch up.

- *How will you manage time and workload, both for teaching staff and students?* We recommend that you manage expectations from both teaching staff and students with regards to how to interact online and set clear contact hours. If possible, we recommend that you test your new practical before it is released to students, in order to check the duration of each component and ensure that the workload is manageable. It is also important that you ensure that the workload for teaching staff is also manageable, so think carefully about the type of assessments or coursework that staff will have to mark and how much staff time will be required for interactions with students (e.g. following discussion boards can take up a lot of time).

d. Give your practical a clear structure: We recommend that you organise your practical into three sessions: 1) a pre-lab activity, 2) followed by a "lab" or teaching session and 3) a final post-lab assessment. This will help you achieve your goals (see point b above); for example, the pre-lab session can be used to deepen understanding of content, the lab session can be used to learn laboratory techniques and the post-lab assessment can be used to test presentation skills and data interpretation. In addition, this structure will help you with a blended approach (e.g. the pre-lab and post-lab sessions can be done online, while the lab session is face-to-face), it can help you combine synchronous and asynchronous teaching (e.g. pre-lab and post-lab can be asynchronous, while the lab is synchronous) and it can also help you organise individual and team work (e.g. pre-lab and post-lab are taken individually, while the lab is based on team work).

e. Use ready-available resources: There are plenty of ready-made resources available that you can use for any of your three practical sessions, such as free virtual labs and simulations, free videos and tutorials, free access to databases and commercial online lab resources. We have put together an Online Resources Database with links to resources for teaching labs remotely, covering all sciences, from Chemistry and Physics, Microbiology and Biology, to Anatomy, Physiology and Pharmacology (see point 3 below for more information). Be clear in your expectations, and also flexible.

f. Set clear expectations for the work, but keep in mind that students may require more flexibility and understanding as everyone gets accustomed to new ways of doing things. To set clear expectations and help students navigate through the new blended/online practical, you should make sure that the practical has clear aims (see point b above), clear structure (see point d above), clear timetable and deadlines, clear assignments (summative and formative) and marking criteria.

g. Access to software. Identify which software you will be using in your practical and also which software your students might currently only have access to on campus-based computers (as opposed to their personal computers). To discuss your software needs ahead of developing your practical, please get in touch with the e-learning team at FBMHcontact@manchester.ac.uk

h. Ask students for feedback along the way. Check in with students to find out how these new activities and methods are working for them.

We have collated a list of frequently asked questions, with suggestions and tips on how to go about designing your new practical (see Appendix B).

3. Guide to resources, training and workshops available to staff to support the move to blended/online delivery.

As highlighted in the FBMH Online/Blended Delivery Strategy document, given that all first semester practicals taught in our Faculty will need to be adapted over the summer, there is an immediate need for staff to equip themselves with the skills and knowledge to get their course online. Nevertheless, the Faculty provides support at various levels:

- Online Resources Database: On this database, you will find over 200 online resources (many of which are free) organised by subject area, that you can use in your new online courses. As an example, we highlight below some useful resources that can be found on the database on several topics:
  - Biochemistry and Molecular Biology:
    - DNA extraction at home (http://video.pbs.org/video/2215641935/),
    - PCR interactive video (https://learn.genetics.utah.edu/content/labs/pcr/),
    - Virtual PCR simulator (http://virtual-pcr.ico2s.org/pcr/).
  - Microbiology:
    - General Microbiology Labs (http://www.uwyo.edu/molb2021/),
    - Public Health Image Library (https://phil.cdc.gov/),
    - Solve The Outbreak (https://www.cdc.gov/mobile/applications/sto/web-app.html).
  - Neuroscience:
    - HHMI Biointeractive Neuroscience Classroom Resources (https://www.biointeractive.org/classroom-resources?keyword=neuroscience&topics=All&resource_type=All&level=All&sort_bef_combine=search_api_relevance+DESC),
    - Allen Brain Map database (https://portal.brain-map.org/) and
    - Neuroanatomy Online (https://nba.uth.tmc.edu/neuroanatomy/).

- Training provided by the e-Learning Team: https://elearning.bmh.manchester.ac.uk/training/

- Digital Teaching Showcase and Workshops: https://elearning.bmh.manchester.ac.uk/training/digital-teaching-showcase/

- Training and workshops for staff teaching in the MBChB medicine degree course: https://sites.manchester.ac.uk/prime/core-workshops/

- Online teaching toolkit (Institute for Teaching and Learning): https://www.staffnet.manchester.ac.uk/umitl/teaching-toolkits/online-teaching/

- Programme bespoke workshops to support Programme teams in any aspect of reviewing, planning and designing overall programme level expectations of delivery and interaction with learners
- Teaching/unit/module team workshops to support developing appropriate approaches for online delivery and assessment
- How to guides and videos for staff and students
- Online drop-in support sessions.
- Online training sessions on core tools and the effective use of online environment.
- Resources to support inclusive curriculum.
- The BMH Pedagogy and Staff Development Programme (www.mystaffdevelopment.org) website will continue to provide access to an array of resources sharing and enabling excellent practice.
- TALON (Teaching and Learning Online Network) Yammer group provides a space to share skills and expertise in online learning; get help, advice and tips from colleagues across the University as well as updates on sector events and practice.
- Opportunities for mentoring/buddying and sharing of best practice from staff experienced in online teaching.

Appendix A: Practicals – Arrangements for delivery in 2020/21

Covid 19 and consequent social distancing requirements mean our capacity to deliver practical classes, as we have previously, is limited. Therefore, there is an urgency to revise how we deliver practicals.

Purpose
Towards this end, the form below is designed to help identify essential practical components which require students to attend on-campus practical classes and to collate information relating to practical delivery to enable a revision of practical classes concordant with the Intended Learning Outcomes (ILO's) and the restrictions placed upon us by the Covid 19 pandemic.

Who should complete this form?
ALL SBS, SMS and SHS Unit Coordinators whose courses contain practical components are requested to complete this form.
Please complete a separate form for each unit you coordinate.
Please address each section as fully as possible.

Who should I return the form to?
Please return your completed form to the relevant Programme Director and CC a copy to your Practical Unit Coordinator.

Points to consider when completing the form are:

- Could ILOs be satisfied in other ways?
- Are there ways of reducing the time required in on-campus laboratories?
- What alternatives to lab activities could you suggest for students who cannot be on campus (e.g. illness/self-isolation, travel bans)?
- Would students require any training or support to access online resources they might need to complete suggested activities and tasks?

Practicals – Arrangements for delivery in 2020/21

Unit:	
Name of practical:	
Practical Organizer:	
1.	What are the ILO's of the course/ unit? Please underline ILO's that CANNOT be achieved in an online/ distance format that need to take place in an on-campus laboratory?
2.	Of the ILO's which require laboratory access that could be covered later on in the year (semester 2) or in the next year of teaching?
3.	Are there any requirements from accrediting bodies which need to be taken into consideration?
4.	Please describe any compulsory preparatory activities to be completed by students prior to lab sessions
5.	Please list laboratory activities which can be completed within a one hour window

6.	Please list laboratory activities which can be completed within a two hour window
7.	Please list any activities in addition to those already listed which will be used to support your practical
8.	What software are you planning to use? **NB. It is strongly advised that you contact FBMH eLearning (FBMHcontact@manchester.ac.uk) to ensure that specific software can be fully supported**
9.	Will you require any training or support to put these activities in place?
10.	If yes, please list training and support required
11.	Any other information you deem relevant

Thank you for your time and effort.

Appendix B: FAQs

1. How do I ensure that all the students in my practical have access to a computer and good internet connection?

The provision of blended/online practical teaching requires students to have access to a computer and good internet connection. Students can apply for a laptop loan via helpmegetonline@manchester.ac.uk. The Emergency Hardship Fund has also been created to support defined projects that are of direct benefit to students and address the wider effects of Covid-19 on the student population.
Students with additional needs who are not already registered with the Disability Advisory and Support Services (DASS, DASS@manchester.ac.uk) should be encouraged to register in order to get further support.

2. For a blended approach, when planning for the face-to-face sessions:

2.1. How much lab space do I need and how much space is available?

This should be discussed with the Technical Manager for Undergraduate Teaching of the relevant building where the practical is scheduled to take place, with as much anticipation as possible (Stopford Building: Anthony Steel, Carys Bannister Building: Stephen Craig and Venus Muscat).

2.2. How can I ensure compliance with social distancing rules, both in the lab and during lab groups exchange time?

Please refer to the Teaching Labs Management guidance document (to follow).
Movement through Stopford and entry to teaching laboratories is subject to guidelines adopted by the Stopford Shared Teaching Labs (SSTL) Group. Students are not able to queue on corridors in Stopford so need to arrive only when their session starts and immediately enter labs on arrival.
Students will be positioned in the lab using 2m distancing wherever possible, 1m plus could be considered in a few exceptional instances (eg where extra PPE will be available for medical practicals).
The Technical Manager for Undergraduate Teaching determines the numbers permissible in laboratories.
Lab set-up will aim to minimise movement of students and staff during practicals. There will be clear signage to indicate one-way circulation, out-of-bounds areas and directions to toilets.

3. For a blended approach, when carrying out face-to-face sessions you will need to use

Personal Protective Equipment: Please refer to the PPE Guidelines Document (to follow).
The PPE required will depend on the type of practical. The Stopford Labs user groups has considered PPE use during undergraduate practical classes. In line with Good Laboratory Practice regulations and guidelines, all students will be required to wear appropriate PPE; lab coat, gloves and eye protection. Face masks may also be worn in line with government recommendations.

From PPE subgroup report "*In clinical practise the health and safety recommendations and guidance for individuals (NHS staff and care workers) working with patients is provided by Public Health England. This differs slightly from the recommendations when working in University's labs. Where possible we are planning skills based practicals as individual tasks for healthcare students, however, there are some essential clinical skills which require students to work with each other i.e. measuring blood pressure, pulses. A working party is currently putting together guidance and best practice for face to face research. To allow some of the clinical / medical practical's to take place safely we will be following this guidance along with the guidance and practices followed by the NHS with students wearing additional PPE such as clinical face masks.*"

4. Graduate Teaching Assistants (GTAs):

4.1. Are GTAs still going to be available for next academic year?

At present, we do not anticipate any changes in budgets for GTAs. However, if you wish to increase your use of GTAs you will need to justify this on academic grounds. We would also suggest that you review and formulate strong academic justifications for your current use of GTAs, in case GTA budgets come under pressure in the future.

4.2. Will GTAs need additional training?

Yes, GTAs will need training in use of any online teaching technology. They may also need to be granted appropriate levels of access to platforms such as Blackboard, or given licences for any software that you are planning on using.

5. What types of lab teaching sessions can I use in an online practical?

There are different approaches to online practical teaching:

- *Simulations*: These are techniques to replace and amplify real experiences with guided ones that evoke or replicate substantial aspects of the real world in a fully interactive fashion. The realistic scenarios allow for retraining and practice till one can master the procedure or skill.
- *Molecular modelling:* This can be used as an alternative to online simulations using software such as Chem3D or Jmol. The use and installation of this software, however, may require help from the e-learning team and/or the use of 3D glasses. Alternative solutions should be offered to DASS students.
- *Remote-access labs or iLabs*: They consist of accessing a laboratory or piece of equipment remotely in order to conduct lab experiments.
- *Livestream or pre-recorded experiments*: You can record a video of yourself or a GTA performing a particular experiment in a lab, to demonstrate a particular lab technique, and either share it life with the students or share it asynchronously.
- *Freely available datasets*: You can get students to analyse freely available datasets. This is particularly useful when, due to ethics, timing, expense or complexity reasons, it would not be possible to perform the experiments in a teaching lab setting.
- *Home experiments*: Students can be asked to perform some experiments at home. These experiments can be performed by either using common materials found in a house, or students can be asked to buy some of the components required for the experiment (provided they are low cost). Due to hygiene issues under the current pandemic, students should not be sent equipment to their homes by post.
- Examples of these different types of online practical approaches can be found on the Online Resource Database.

6. What types of online assessments can I use in a practical?

There are a wide range of online assessments that can be used online. You can use “traditional” assessments methods (e.g. submission of a lab report, multiple choice questions, short answer questions), or you can incorporate new forms of assessments (e.g. Zoom or video presentations, creation of blogs or wikis). A series of useful articles on assessment can be found here. For further guidance on assessments, please refer to the Assessments Guidelines Document (to follow).

7. How can I ensure that the new practical still complies with the relevant professional body?

Check with your Programme Director to find out if the new practical that you are planning will comply with the relevant professional body.

8. Can practicals involving the use of human volunteers still take place? If so, what ethical and health & safety considerations should be taken into account?

Check with your Practical Lead or Programme Director to find out the latest guidance on practical teaching involving human volunteers.