ONLINE FINAL YEAR RESEARCH/CAPSTONE PROJECTS

- Pre-Covid, recognising that <10% of students go onto careers in research, the demand from students for alternative formats of final year research projects and resource constraints, many UK Bioscience Schools/Faculties were broadening their portfolio of formats of final year/capstone project offered in line with the substantially revised Royal Society of Biology accreditation criteria https://www.rsb.org.uk/images/accreditation_home/RSB_Accreditation_Overall_Handbook.pdf;

- Impact of Covid- The implementation of these changes across the UK Biosciences is accelerating rapidly, with the increasing likelihood of Institutions having to deliver final year/capstone projects remotely or online in 2020-21, particularly in Semester 1;

- Replacement of laboratory based opportunities with solely (critical) reviews of the literature is not acceptable, less than 10% of students would select this option given the choice;

- SBMS currently offers 14 formats of Capstone project, many of which could be delivered solely or principally online as detailed below:

- All of these formats are acceptable to the RSoB for students on both accredited (standard BSc) and Advanced accreditation (MBiol or Placement year) degree programmes. Those indicated by * have been approved for use by the Institute of Biomedical Sciences (accredits programmes in Biomedical Sciences)

- A podcast describing these is available at: https://mymedia.leeds.ac.uk/Mediasite/Play/a3add1c5d3b34120ae9899c30bb67b6b1d

Laboratory-based*: Currently our critical review project students undertake a grant proposal as an extension exercise. Why not flip the concept. Lab students come up with a research question, design a study, test their hypothesis using simulations or re-analysis of existing data & when labs re-open, undertake a short proof of concept/pilot study;

Virtual fieldwork: using publically available webcams or video recordings of humans, animals or the environment to explore discipline-relevant research questions;

Bioinformatics/Big data*: Using bioinformatics tools to mine/interrogate (e.g. genomic) datasets. Analysis and interpretation of large publically available (e.g. health, environment) or school/faculty research (e.g. neuronal recordings) datasets;

Computational modelling/Simulations*: Investigate physiological, pharmacological or biochemical modulation of existing models or simulations of systems, organs or tissues (e.g. intact animals, heart, neurones). Could include the evaluation of the scientific accuracy, validity and educational benefits of simulations/models used for educational purposes or accuracy of automated data tracking/scoring systems (e.g. OptiMouse);

Systematic Reviews with/without meta-analysis*: a defined, systematic way of undertaking a comprehensive review of the literature, used a lot in clinical trials/health science but increasingly in animal experiments and education. Previous reviews include: Pharmacotherapies for gestational diabetes; Animal welfare factors influencing reproducibility and reliability of studies involving lab animals; E-learning and other resources as replacements for face 2 face undergraduate practical's in the Biosciences;

Surveys/Focus Groups*: Any topic/area, of students, staff or the public. Previous topics included: public attitudes/knowledge of antimicrobial resistance; attitudes to the use of animals in education; interaction between developers, clinicians and patients in the development of Digital Health Apps (the latter was innovative in its use of twitter to engage participants in the first instance;

Scientific writing: creation of web-content for SME's, see: https://badrilla.com/project-landing. Content behind each tab was written by a team of students;

Educational Development*: creation and evaluation of educational resources for use in undergraduate education. Ideal opportunity for student to re-purpose existing face 2 face practical into online version or create online problem solving or data handling/analysis exercise;

Science in Schools/Public Engagement: create an interactive science workshop for use in schools (primary & High) or a public engagement activity, (for the Faculty, Charity or other educational organisation), for virtual or face 2 face delivery to engage the public with science. If social distancing conditions are relaxed later in the year, deliver this activity if designed as face 2 face.

Professional Education: development of education and training resources for researchers e.g. The reproducibility Crisis https://www.youtube.com/watch?v=OwmDzLfg9es; podcasts on good practice in specific research methodologies/tools;

Infographics: creation of infographics which engage different audiences with the research or educational activities of a client (eg FBS research group). Could create multiple ones, each for a different audience (e.g. researchers, public, recruitment);

Commercial/Technical reports: using publically available information to write technical or commercial reports (e.g. impact of legislation, analysis of markets etc.) for SME's, spin-out companies or other clients;

Grant proposal: rather than grant proposal as extension exercise, it becomes the principle output. Sections within it are those in real grant applications to funding bodies e.g. BBSRC or MRC. "Pilot" data comes from previous studies in the supervisor's lab;

Critical literature reviews: hypothesis-driven critical reviews of the literature in areas relevant to the Faculty/School research.

In addition to addressing the issue of capstone delivery during the current social distancing constraints, online or predominantly online capstones are more inclusive for students with caring or other responsibilities that prevent them from participating in long duration laboratory-based activities.

All of the above formats, with the exception of critical reviews, are best delivered as team-based rather than individual projects, thereby providing a more real world experience, the development of additional employability skills. Team-based projects are less resource intensive and also reduce the total number of projects required.

A podcast describing these different types of project or capstone including the rationale is available at: https://mymedia.leeds.ac.uk/Mediasite/Play/a3add1c5d3b34120ae9899c30bb67b6b1d

For more information on any of the above, hints and tips for delivery, support for students or staff, email Dave Lewis (d.i.lewis@leeds.ac.uk)

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