**Lab Demonstrating – hints, tips and guidance for ETP participants, 2018-19**

Laboratory classes are central to degrees in science, engineering and medicine. They help students develop their ability to work at higher levels of learning, and build the skills necessary to solve problems. The lab environment also allows students to make connections between what they have learnt previously and apply the theories and principles of their discipline while using more technical skills. Lab work presents students the opportunity to enact the persona and behaviours of someone working professionally in their field, and in many respects represents a transformational opportunity for students.

The aim of lab work is to move beyond learning material just for assessment, and to encourage students’ interest in their subject and to be more active in their learning, and of course to develop lab skills. In other words, you are helping the student move into the realms of deep learning rather than surface learning. As a demonstrator, you can further encourage students to integrate their learning with other aspects of their studies.

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|  | For more information on the differences between the critical examination of facts and ideas of deep learning and the rote learning associated with surface learning, see the [Higher Education Academy’s article compiled from Biggs (1999), Entwistle (1988) and Ramsden (1992)](http://www.heacademy.ac.uk/sites/default/files/learning-teaching-theory.pdf).  https://www.heacademy.ac.uk/system/files/learning-teaching-theory.pdf |

**Hints and tips for effective lab work with students**

* Ask questions that open up the subject, or other possibilities; lead students towards answering their own questions, where possible, through consideration of their actions;
* Use the lab to explicitly build on current knowledge and lead the student through chains of reasoning; do not simply answer student questions (unless the question really does warrant a simple answer, like ‘where do I…’);
* Be approachable – friendly, available, equitable and helpful – especially to those students who are new to working in a lab environment, e.g. Level 4 (first year) students;
* Be proactive as well as reactive – recognise those having difficulties. Encourage active participation by students and counter any “freeloaders” by encouraging all students to participate when you are working with groups;
* Draw comparisons and parallels between laboratory work and professional practice.

Checking on the progress of students in the lab environment is essential due to health and safety concerns. With safety as a primary concern the need for you to be alert to student activities, and prepared to intervene, is increased when compared to some other teaching situations.

* Make sure you are clear on your role in the lab environment, the protocol to be carried out, and what support you are being asked to provide;
* Clarify safety requirements and procedures and make sure there are no equipment issues; be proactive with students in ensuring equipment is used safely;
* Ensure you know any parameters for feedback you need to give, particularly if you are to be involved in assessing students’ work.

**Discussion questions**

What, in your view, is the purpose of lab work?

What sorts of problems have you encountered in lab work? What is in your power to change or influence?

What has motivated you to participate in lab work? What has made you feel included?

What has demotivated you, or made you feel excluded?

What kinds of help, or intervention, have you found helpful in your own lab work?

What sorts of attributes would a successful lab demonstrator have? Have you got those? How might you develop any you feel you might be lacking?

What do you think you need to be aware of in order to be a successful lab demonstrator?

What will you do if you encounter problems in the lab?

**Useful links and guidance**

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|  | **Learning and Teaching in Laboratories: an Engineering Subject Centre Guide by Clara Davies.**  This resource considers the practical challenges of designing laboratory learning within a modern engineering curriculum. It provides ideas and practical guidance for people new to teaching and for more experienced people looking to rethink or reinvigorate their approach.  <https://www.heacademy.ac.uk/system/files/learning-teaching-labs.pdf> |
|  | **Stanford Teaching Commons Laboratory Teaching Guidelines**  The laboratory is an exciting place where students investigate, analyse, and reflect. They test and apply theories and make abstract concepts concrete.  However, the process of investigation doesn’t always run smoothly, and students need guidelines to make sense of their results. This guide contains strategies for designing and supervising effective sessions.  <https://teachingcommons.stanford.edu/resources/teaching-resources/teaching-strategies/laboratory-teaching-guidelines> |
|  | **The Role of Computer Labs in Teaching and Learning Process in The Field of Mathematical Sciences**  This paper discusses the use of a computer lab among lecturers at the School of Mathematical Sciences, Faculty of Science and Technology, Universiti Kebangsaan Malaysia. The objective is to determine the role of the computer lab as a medium of teaching and learning process in mathematical sciences. The paper ends with some appropriate approaches to promote the use of computer labs in the teaching and learning process.  <https://www.sciencedirect.com/science/article/pii/S1877042811011621> |
|  | **Flinders University Science Demonstrators Handbook**  This handbook gives a useful overview of many aspects of science demonstrating in the laboratory, and the kinds of things you will need to consider. Some of it is specific to people actually working at Flinders (i.e. payroll advice, local emergency phone numbers), but the teaching and learning advice is quite universal, and applicable to anyone working in the lab environment.  <http://www.flinders.edu.au/Teaching_and_Learning_Files/Documents/demo.pdf> |