



# Mathematical, Physical and Life Sciences Division Developing Learning and Teaching (DLT) Programme Handbook 2016-17

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## Introduction

The Developing Learning and Teaching (DLT) Programme has been designed for doctoral and postdoctoral researchers who are undertaking their first experience of teaching in higher education.

**The MPLS DLT programme takes place annually, for example, across two terms, during which time participants undertake some teaching and attend a taught course of interactive workshops. Participants also complete a series of activities related to their teaching and write about these in a reflective teaching portfolio, which is assessed.**

### The aims of DLT are to:

- Support you as a new teacher in higher education with your first teaching experiences;
- Develop your skills in choosing teaching strategies and designing lessons (with a focus on the single session);
- Help you to consider how your teaching strategies might affect your students' learning;
- Develop your capacity to describe your teaching context, your teaching values and your overall approach to teaching ('teaching philosophy');
- Develop your confidence and ability to evaluate your own teaching (through student evaluation and/or teaching observation);
- Enable you to use relevant educational literature to reflect upon and inform your teaching values, strategies and practices.

**The University of Oxford Developing Learning and Teaching programme is accredited by the Staff and Educational Development Association (SEDA).** This means that as well as being structured around typical experiences of teaching at the University of Oxford, your programme is also underpinned by the SEDA values. The SEDA values focus on your development as a teacher in higher education and on student learning in your subject area. Developing these values will help you with your teaching in any context, not just at Oxford. Section 6 of the **core DLT Handbook** outlines these values and how they are addressed in the DLT course. Please read this section of the handbook carefully as it will give you a good idea of what to expect in your taught course.

**If your submitted portfolio is passed by the examiners you will be gain the award SEDA PDF Supporting Learning. This is an award which is recognised throughout the UK, and is also mapped at Descriptor 1 to the UK Professional Standards Framework for Teaching and Supporting Learning in Higher Education.** You can find out more about the UKPSF here: <https://www.heacademy.ac.uk/recognition-accreditation/uk-professional-standards-framework-ukpsf> .

## Pre-requisites for the DLT Programme

To participate in the MPLS DLT Programme you must fulfil two pre-requisites:

### Attend Preparing for Learning and Teaching at Oxford

Preparing for Learning and Teaching at Oxford (PLTO) is a half- or full-day seminar/workshop(s) held in your department, faculty or division. It introduces you to the specific types of teaching that you may well undertake in your faculty, and usually involves an introduction to the undergraduate degree and, where applicable, taught masters programmes. Arrangements for PLTO vary across the Division so you should consult your department or the divisional training office if you are unsure how to register.

### Fulfil the Minimum Teaching Requirements in MPLS

Because there are broad disciplinary differences in teaching and learning, so that the experiences of an academic teaching (or a student studying) e.g. Medieval French Literature are quite different to those of an academics and students in say Materials Science, each Division imposes its own minimum requirements in addition to the generic ones described above. In MPLS, completion of the DLT programme requires that participants' experience:

**EITHER two different teaching settings (i.e. lab demonstrating, tutorials, lectures, class teaching, supervising undergraduate dissertations)**

**OR a more extended series in one setting (e.g. a series of tutorials or classes or lectures).**

Co-teaching is encouraged provided that participants are actively involved in and take responsibility for some part of the teaching. An example of co-teaching in MPLS is provided by the work of the Teaching Assistants in the Mathematical Institute.

The following examples indicate the scope of actual teaching experience required to complete the DLT programme and portfolio within MPLS:

- *Take a minimum of two tutorials and carry out associated marking/provision of feedback to students;*
- *Demonstrate a minimum of two lab sessions and carry out associated marking;*
- *Co-teach a set of eight classes with a more experienced teacher.*

Your departmental co-ordinator should be your first point of contact if you are looking for an opportunity to teach. If your area of expertise is also taught elsewhere (e.g. in the Medical Sciences Division) then you may also wish to make enquiries in another division. *NB: these experiences only fulfil the criteria for ONE of the required aspects of teaching.*

It is possible to use teaching experience from another higher education institution in the UK to fulfil the minimum teaching requirements. Teaching experience from outside the UK or with students at pre-university level cannot be counted towards the minimum requirements. However, you are encouraged to draw on teaching experience of this kind in your portfolio. For example, previous successful participants have compared and contrasted their overseas HE teaching experience with those in the UK or have compared pedagogical approaches and/or overall goals of HE.

## DLT Programme: Portfolio Assessment Criteria

There are seven assessment criteria associated with the final portfolio that must all be achieved in order to successfully pass the MPLS DLT Programme to gain the SEDA PDF Supporting Learning Award. Details of the criteria and how you might address each in your final portfolio are given below:

### Criterion 1: Teaching Practice

One of the key attributes of a good teacher is an ability to take a clear-eyed look at your own practice and to recognise what you are doing, what you are asking your students to do, and why. It is too often the case that we start teaching in a hurry, with little guidance or forethought, and as a result we adopt teaching strategies and approaches by default, usually based on our own (limited) past experiences, and without thinking about the impact our actions and choices might be having on students. Worse still, many academics approach teaching having thought only about what they are going to do, and not about how the activity will be experienced by their students.

In fact, when we engage in teaching, we are always making a series of sub-conscious and conscious decisions about what we should and can do, what we should ask our students to do, and what is important in the given teaching situation. This process of in-the-moment decision-making has been recognised and written about by several educationalists.

**A core part of your portfolio should therefore be a description, analysis and critical evaluation of a specific instance of your teaching. This could be a tutorial, a class, demonstrating in a lab., acting as a fieldwork guide, facilitating an online discussion or whatever teaching experience you think would be useful for you to analyse.**

Your teaching account should include a description of what actually happened and a critical analysis of how what you did and what you got your students to do (or tried to get your students to do) and how this reflects or aligns with your underlying beliefs about:

- What is important in/about your discipline;
- How people learn and how teaching can be used to help people learn; and
- What is unhelpful in learning situations.

You should also reflect on how you came to hold these beliefs, and whether you have evidence from your own experience, from the experience of others and/or from the educational literature to support them. Make a conscious effort in your account to identify moments where you could have done something other than what you did, analyse why you did what you did, and think about the consequences of both what actually happened and what might have happened. There are various ways in which you could produce such an account. One option is to write down what you are intending to do (and why) before the session, then immediately after the session to write down what actually transpired, then come back to it a few days later and try to analyse what happened and why. Another option is to use a purely reflective approach, where you keep something like a logbook of your teaching as you would keep a logbook of your research activities. **You may wish to use the questions on the next page to prompt your thinking.**

**Prompt questions to help critically analyse a specific example of an experience of teaching:**

- What is it that I want/wanted students to learn through this activity – i.e., what do/did I want them to be able to do/think following the activity that they may not have been able to do/think before?
  - Can I usefully analyse my aims using e.g. Bloom's taxonomy?
- Why do I think this is important?
  - Does it relate to developing e.g. discipline knowledge and skills, broader scientific understanding, or generic (transferrable) skills?
- Why do I prioritise in this way?
- What do I think my students need to do to learn to do or think this?
  - Why do I think this – is this what I did as a student? Is there any evidence in e.g. the educational literature to suggest this is effective practice for students?
- What do I think I need to do to help my students learn?
  - **In what ways do I take into consideration student diversity in my teaching practice?**
  - Why do I think this – is this how I was taught? Is there any evidence in e.g. the educational literature to suggest this is effective practice?
- What did I *actually* do?
  - Why did I do it that way? Were there alternatives? Did I make conscious or sub-conscious choices?
  - What were the consequences of what I did? How might things have gone differently if I had pursued a different course of action?
- What did my students actually do? Why was it necessary/important for them to do this?
- Could I tell whether my students were learning/making progress?
  - What evidence did I use to make this judgment?
- Did I really think they would/could learn during the activity/session, or did I expect them to do the learning somewhere else? If I didn't expect them to learn in the session,
  - What did I want the session to achieve?
  - Where did I expect them to do their learning?
- What was important for students to notice/understand during the session?
  - Why do I think it was important?
  - What did I do to draw attention to it?
- What did my students find easy?
- What did my students find confusing/challenging? Why? Do ideas such as threshold concepts or troublesome knowledge help me understand what was difficult?
- Can I analyse what happened in terms e.g. the cognitive apprenticeship model?
- Do these experiences back up or challenge my beliefs about how people learn, and what teachers have to do to teach effectively?

## Criterion 2: Review of Teaching

There are many ways in which you can gather evidence to use in reviewing and evaluating your teaching. As with feedback provision for students, feedback *to* teachers can come in many forms and from many sources. A key skills that we hope you will develop in the MPLS DLT Programme is the ability to decide what evidence you need, find effective ways to gather it and then respond to it constructively by thinking about implications for your future teaching.

### Gathering evidence by seeking feedback from peers/experienced colleagues

Observation is an excellent way to learn about and get feedback on teaching. Observation of others' teaching, and having your own teaching observed can help you to:

- think about how students learn in individual and group settings;
- discover new teaching strategies;
- question assumptions about approaches to teaching;
- gain experience of practices in a new institution, and/or revisit their own student experience in a new light;
- engage in conversations about teaching with others through discussions between the teacher and observer;
- learn how to both receive and give feedback about teaching.

All DLT participants are encouraged to observe others teaching and to have their own teaching observed. This experience can be undertaken with your mentor, with another more experienced colleague or with peers. Cross-disciplinary observation can be as useful as observation with colleagues who work in the same discipline area.

Observation is usually most informative when some thought is put into how the arrangement will be managed, and where the observer and teacher both have time to discuss the observation soon after the teaching has taken place. Some guidance is provided below; your department may also have guidelines for teaching observation.

### *Some brief notes on successful observation*

- Plan in advance where the observer will sit and whether you will introduce him/her to the students. You should make it clear to students that they are not being judged (and neither are you).
- Finding out what you do well is as useful as finding out what is not going so well. Ask for and give positive feedback.
- It is very easy for the observer to focus on the person in the teaching role, but it is usually helpful for the observer to focus on student behaviour and the interactions between student/teacher and student/student. This is partly because if the observer and person being observed share a disciplinary background the observer may easily understand aspects of the session which are not so clear to students. More importantly, interactions reveal an enormous amount about what is going on during a teaching and learning activity.
- There are many different approaches to teaching and for very valid reasons you and your observer may not always agree. This is why we suggest that the person being

observed specifically directs the focus of the observer, and that the observer notes for later discussion any strategies that he/she has never tried.

- It is best to have a discussion about the observation within 24 hours of the observation taking place, preferably immediately afterwards.

You might like to develop a set of observation questions based on your reading in the educational literature – for example, if you have been attracted by the cognitive apprenticeship model of teaching, you may wish your observer to indicate where they thought you were modelling, coaching, scaffolding or fading. To help you get started, a simple set of prompt questions is provided below.

### ***Sample observation questions***

#### ***Before the session: to be responded to by the person being observed in advance***

- What do you hope to achieve in this session?
- What do you expect students to gain from the session?
- Do you have any comments for the observer about how you expect the session to unfold?
  - e.g. have the students been studying this topic already? Have students been asked to prepare in advance of the class? Is this a group you know well?
- What specific aspects would you like to be observed or get feedback on?
  - e.g. are you trying out an approach for the first time? Would you like the observer to watch for something that you won't be able to easily observe? Is there a particular concept you really want student to grasp?

#### ***Immediately after the session: to be responded to by the observer and then used as a basis for a debrief discussion***

- What do you think the main 'take-aways' would have been for students in this session?
- In your opinion, are the students likely to have achieved what the teacher intended them to achieve?
  - If so, why? If not, why not?
  - Did the teacher do anything to gauge students' prior understanding/abilities?
  - Did you note any differences between students in the class?
  - Do you think the students were aware of what they had learned?
- Did the teacher or students in the session make connections with learning in previous or future sessions?
- What did the teacher do particularly well?
- What struck you most about the session?
- What did you notice about any feature of the session that the person being observed had asked you to give feedback on?
- Did you observe the teacher using a teaching strategy that is new to you? If so, what was it and what effect do you think it had on the students?
- What other feedback would you like to give?

***A pro-forma for teaching observation is provided in appendix 1, but you do not have to use these forms.***

### Gathering evaluation evidence from students

Your students are, of course, an extremely important source of evidence on which to evaluate your teaching. You might gather their views on their learning (and the effectiveness of your teaching), for example through surveys/questionnaires, informal discussions, focus groups, minute papers or a range of other processes. You may also gather evidence by using e.g. diagnostic tests that help you determine whether students have learned what you were intending they should learn (or indeed anything else). Some Departments and Colleges have standard student experience questionnaires that you may use, but it can be most helpful to design your own questions and methods of data gathering if you have specific questions about your practice that you would like to answer.

One of the quickest and easiest ways of getting targeted feedback on a particular session is the minute paper. In this technique, open-ended questions are distributed at a pre-determined point in a session (often at the end) and students are given a few minutes (usually 2-3) to write their responses. Some examples of possible open-ended questions are provided below and **further examples of how to collect student evaluations of your teaching are provided in appendix 2.**

#### *Sample minute paper questions*

What was the most important thing you learned in this session?

What would you have liked to spend more time on?

What are you most confused about?

What activity(ies) in this session were most helpful to your learning? Why?

What activity(ies) in this session were least helpful to your learning? Why?

### Self-evaluation

Many teachers find it extremely useful to keep a teaching logbook, analogous to a lab logbook, in which they record their teaching activities (plans, preparation, delivery, etc.), details of things they think went well or not so well, ideas as to why, and ideas they have relating to possible future activities. This type of logbook can be used to look back on how your thinking and practice has changed over time. Your own reflections on your teaching can thus supplement feedback you seek from your senior colleagues, your peers and your students.

**Examples of lecture and small group/tutorial checklists for self-evaluation are provided in appendices 3 and 4, respectively.**

### Criterion 3: Lesson Design

Effective learning is most likely when the teacher (and usually the student!) has some idea of what kind of learning a particular activity is intended to produce. The basic design process for learning activities therefore usually involves the following steps:

- Thinking about what you want your students to learn
- Thinking about what they already know or are capable of doing
- Designing resources, activities etc. that provide opportunities for your students to achieve the learning you have in mind
- Thinking about how you will know whether they've learned what you wanted them to learn (i.e. identifying what would constitute evidence for learning)
- Designing an activity or assessment task that will reveal to both you and your students whether or not they have achieved that learning (i.e. something that provides the evidence you seek).

This kind of process may be engaged in at the level of individual sessions, such as tutorials, classes, lectures or labs; at the level of sequences of sessions; or at the level of whole courses.

Whatever your involvement in teaching, it is likely that you will have the opportunity to plan some aspects of it. ***Although participants in the DLT programme are unlikely to have design/planning control over courses and syllabuses, and in many cases you may not have control over specific tasks or activities, you can always think through the task or topic you have been asked to teach and decide how to best help your students reach the desired learning outcomes.*** The design process is about making the choices you make explicit.

For example, those teaching traditional Oxford tutorials may make choices about what to set as essay topics, and about what to do in tutorials, and about what to focus on in giving feedback. Those teaching in classes may make decisions about what problems to go through, what to ask students to do, and what to do themselves. Those demonstrating in labs may make choices about the balance between instructing, guiding and letting students work things out for themselves. In other cases, you may have the opportunity to work with others (perhaps your mentor) to design a specific learning activity; for example, a new laboratory session, a lecture(s), a research project for an undergraduate etc.

Your portfolio **must** include the design of a lesson (e.g. class, tutorial, seminar, laboratory demonstration etc.) including both the rationale for the design choices made **and** consideration of how students will receive feedback on their learning. The questions below may help you to think about the structure of your lesson plan:

**Prompt questions to help critically analyse the design/planning of a teaching activity:**

- What are the key learning outcomes I intend – i.e., what do I want students to be able to do/think following the activity that they may not have been able to do/think before?
- Why do I think these intended outcomes are worth pursuing?
  - Did I consider the range of intentions students might have?
- What possible activities could be used to achieve these outcomes?
- What grounds did I have for choosing the activity I decided on?
  - Did I consider factors such as effectiveness, efficiency in term of time/resources, how engaging the activity will be for the student, how easy will it be for me or another to teach?
- **Have I considered student diversity in relation to my lesson plan?**
- Did I consider where this activity and intended learning fits in my students' general learning in the discipline/field? i.e.,
  - Did I think about what knowledge/skills the activity assumes have already been developed, and did I check whether this was a safe assumption?
  - Did I think about what knowledge/skills the activity gives students a chance to practice and further develop?
  - Did I think about what knowledge/skills the activity introduces?
  - Did I think about where students might use the knowledge/skills acquired in this activity in their future learning/disciplinary practice?
- What do students actually have to do to complete my planned activity?
  - How does this achieve my intended learning?
  - How will I/they know whether they're learning what I/they intended?
  - Have I designed feedback into my planned activity?
- **How will I design feedback opportunities for my students so they know how their learning is progressing? Written/oral feedback? Formal/informal feedback? Peer-feedback? (see page 13)**
- **In what ways is the rationale for my lesson design informed by research from the educational literature (e.g. in relation to constructive alignment; inclusive teaching practice etc.)**
- ***You may wish to use the template in appendix 5 for your lesson design (and incorporate this as an appendix in your portfolio) but you do not have to!***

## Feedback to students on their learning

When you are giving students feedback or assessing their progress in tutorials, in labs, in projects, or in any other teaching context, you may choose to use examples of the feedback you give and how it helps students learn/improve in your portfolio. In your lesson plan you must demonstrate how you provide feedback to your students on their work. You may wish to use the set of prompt questions below to help with this:

### Prompt questions to help critically analyse your judgment of progress and provision of feedback to students

- What was the task my students undertook?
- What would have constituted excellent/adequate/poor performance?
- What determines the distinguishing features of excellent performance – is it e.g. my beliefs about what is important in expert behaviour?
- Did I have explicit criteria in mind when assessing/providing feedback?
  - If so, what were they, and did my students have access to them in advance?
  - If not, would it have been helpful to draw some up?
  - Was I consistent in my judgments? How did I ensure this?
- What form did the feedback take, who gave it and when?
  - Why was this a useful form/source of feedback?
  - In what ways did I take into consideration the diversity of students when providing feedback?
- How did I expect my students to use the feedback they received?
  - Did it relate to a future learning activity?
- What signals did the feedback my students received send about the nature of the task they had/were engaged in?
  - What signals did it send about the nature of the discipline?
  - What signals did it send about what they have to do to learn/make progress?
- What did I do to check how my students understood the feedback they received?
- Looking back on the feedback I gave to my students, how did it compare to the descriptions of effective feedback given in the educational literature?

## Criterion 4: Student Diversity and Learning

**In at least one part of your portfolio you should identify an issue where student diversity has implications for learning and teaching.** For example (and these examples are not exhaustive), candidates might identify heterogeneous prior educational backgrounds or attainment, or issues related to gender, race, ethnicity, or disability.

You are expected to identify and explore the implications of the issue raised; and consider practical ways to respond in their teaching. In many instances there is no single ideal way to respond to a heterogeneous student body, and so candidates may wish to propose more than one practical response and/or to explore ways to engage students in dialogue about the issue.

Your approach to lesson design and feedback provision, for example, provides you with opportunities for you to explore the implications of student diversity on your teaching practice. Make sure you highlight where you have taken student diversity into consideration throughout your portfolio.

**A range of educational literature and resources on student diversity and inclusive teaching practices is available on the MPLS DLT WebLearn site.**

**You may find the following University online courses of interest: ‘Equality and Diversity’ and ‘Unconscious Bias’ (see <https://www.learning.ox.ac.uk/courses/> and search using the A-Z link).**

## Criterion 5: Teaching Values

You must articulate the values or rationale underpinning at least one area of your teaching practice. This might be achieved by: presenting a personal ‘teaching philosophy’ (which you will have had the opportunity to draft as part of the DLT Programme workshops); using educational literature to justify a teaching session design; evaluating different approaches to teaching using explicit criteria. These suggestions are however, not exhaustive.

The key requirement is that you analyse their practice in the light of your beliefs about what is important and effective in good learning and teaching in your disciplinary context, and that you recognise how those beliefs are formed through a combination of personal motivation, experience and educational theory.

**Prompt questions to help you to develop and articulate your own teaching values/philosophy and examples of teaching philosophy statements are provided in appendix 6.**

## Criterion 6: Educational Literature

There is a wide and varied literature available for teachers in higher education. Some of the published literature is aimed specifically at those new to teaching, while other material is specific to particular disciplines. Educational literature can provide the following:

- A shared language for discussing teaching: there are many helpful concepts in the educational literature which can help you to think about the different areas of your practice.
- Tools to think and practice with: reading about how others teach and trying out some strategies can help you to refine your own approach to teaching.
- A scholarly approach to teaching: researchers have explored many aspects of higher education, including teaching strategies, how students learn, course design, and so on.

You are not expected to become experts in educational literature but you are expected to incorporate relevant literature to support claims made in the portfolio. Demonstrations of how reading the literature has stimulated deeper thinking on issues relevant to teaching and learning are also encouraged. **You are expected to explicitly draw on your educational reading throughout your portfolio.**

**Suggestions for reading are provided in appendix 7.** Remember that you are not expected to read everything on the list, but rather to select some pieces which interest you. You are not limited to this reading list and can also read and include in your portfolio materials that you find for yourself.

### **Criterion 7: Your Development as a Teacher**

Your portfolio should contain an overview, or an introduction and conclusion which explains how your teaching practice and understanding of learning and teaching is evolving over time. This narrative of your development as a teacher might bring together any key ideas or issues which have arisen in different parts of the portfolio.

**It is also important that your portfolio should look forward and identify ideas for future development.** You might consider, for example, ideas for expanding your teaching experience; trying out new approaches; or finding out more about how other people teach in other institutions or subject areas.

## Mentoring

**You are strongly encouraged to find a mentor from within MPLS to support you during the DLT Programme.** Your mentor should be an experienced teacher at Oxford, although not necessarily working in exactly the same field as you. Teaching mentors can help in a number of ways. For example, they may be able to:

- Provide opportunity for you to observe their teaching;
- Observe your teaching;
- Discuss your portfolio ideas and plans, and offer feedback on some draft work;
- Help you to think through teaching dilemmas (e.g. how to plan your first teaching experiences, how to improve your approach in a certain area, how to deal with any problems you are having);
- Review a lesson plan, lecture material or your written feedback to students;
- Help you to plan ways in which to gather evidence for use in review/evaluation and future planning;
- Share their approaches to teaching and how they developed these over time.

The mentoring relationship is primarily about giving you an opportunity to think about your own approach to teaching and to discuss it with someone who shares a similar disciplinary background. You should think of your mentor as a 'critical friend' rather than as a 'teaching expert'. Teaching mentors will NOT do the following:

- Tell you how to teach (they may offer their opinion or their own approach, but you should use your judgement as to whether this is the right approach for you);
- Solve your problems (they are likely to help you talk through your options, but ultimately it's up to you to decide on any solution);
- Find teaching opportunities for you.

**It is up to you to contact your mentor and to discuss with him or her the support you need. Most mentors particularly enjoy working with DLT participants who are proactive and specific about the kind of help they would like.**

Remember that your teaching mentor will have many other time-pressures and may not always be able to fulfil your requests. In particular, make sure you ask in plenty of time if you would like them to observe your teaching or to offer feedback on your marking or lesson plans. Remember that if your mentor is not able to help out on any particular occasion, you could also ask one of your peers (e.g. another DPhil or postdoctoral researcher) to do the same for you – and you can offer to help your peers. Peer observation and feedback have been shown to be powerful even when one or both parties lack significant experience of teaching.

## Portfolio Requirements

The 2,500-5,000 word written portfolio (excluding appendices) is the document which is assessed for accreditation to gain the SEDA PDF Supporting Learning Award. It also provides an opportunity for you to integrate and further reflect on your experiences, beliefs and priorities in teaching in HE. Both for accreditation purposes and to make the most of the opportunity for reflection, it is important that the portfolio documents not only your teaching activities but also the ways in which, over time, you are developing your teaching practice and your ideas about teaching and learning.

The criteria for a successful portfolio are outlined in pages 5-14. You are expected to make use of educational literature throughout your portfolio in order to explain your approach and your reasoning. **A copy of the portfolio assessment sheet and explanatory notes is provided in appendix 8.**

The portfolio is not a document which proves that you are a good teacher. It is not like a cv or job application, for example, where the main concern is to show yourself in a good light. Therefore, you should focus primarily on documenting your teaching development. You don't need to worry about whether the teaching itself is always of an excellent standard. For example, it is very acceptable to use the portfolio to explore teaching situations which didn't go particularly well and which you would like to revise in the future. There is great value to be gained from reflecting on the teaching you have done and analysing the causes of any weaknesses or strengths.

## Portfolio Structure

You may choose how to structure your portfolio, provided you can fulfil all the assessment criteria (appendix 8). Some candidates approach the portfolio as an essay, for which they pose one or two teaching and learning questions (for example, how can I encourage all students to actively engage in lab work?) and then draw on their own experiences and educational literature to develop an answer. Many candidates write several smaller pieces and then tie them together with an introduction which gives an overview of their activity and development. The sample prompt questions given in each of the preceding sections can be used to help produce items for your portfolio. In addition, some ideas for pieces which can be included in the portfolio are given below.

You are encouraged to include appendices to your portfolio where these will help the reader to understand your portfolio writing. For example, when you are discussing your approach to giving written feedback, it is very helpful to provide cross-reference to an actual example in an appendix (ensuring appropriate permission has been gained and that it is suitably anonymised). To help decide what to include in an appendix, check to see whether or not you have referred to a particular document or piece of evidence in the main body of the portfolio and only include those things that you actually discuss.

## Portfolio Submission and Assessment

Portfolios are assessed each term, with the deadline for submission set at **12 noon on Monday of 1<sup>st</sup> week of each full term**. You may submit a portfolio at any time and it will be held until the next assessment period. Actual dates are available on the Developing Learning and Teaching web page (<http://www.learning.ox.ac.uk/support/teaching/programmes/dlt/>).

**Two printed and securely stapled copies of your portfolio, each including a cover sheet (see appendix 9) should be submitted to the Oxford Learning Institute:**

DLT Portfolio Administrator  
Oxford Learning Institute  
Littlegate House  
16/17 St Ebbe's Street  
Oxford OX1 1PT

**AND please also email an electronic copy to [claire.brewer@learning.ox.ac.uk](mailto:claire.brewer@learning.ox.ac.uk)**

We expect most participants to submit their portfolios at the beginning of the term following their completion of the DLT taught programme. For example, if your taught programme finishes in Hilary term, you should plan to submit your portfolio in the first week of Trinity term.

If you are unable to submit your portfolio for this initial submission deadline, you may submit it at a later date, provided that this is within three terms of your completion of the taught course. If you do not submit by this **LAST AVAILABLE DEADLINE**, then you will no longer be eligible to submit a portfolio. If you wish to make a request for an extension to this deadline due to extenuating circumstances, please contact Dr Anne Crook at the Oxford Learning Institute at the earliest possible time.

Portfolios are assessed by an academic in MPLS and a member of the Oxford Learning Institute. The process is normally completed by the end of each full term. Portfolios are either successful or are returned to the candidate with recommendations for improvement before resubmission.

**Further submission details, including downloadable cover sheets are available at: <http://www.learning.ox.ac.uk/support/teaching/programmes/dlt/>**

## Fail Portfolios

Portfolios which have failed are returned to the candidate with specific recommendations from the examiners for improvement before resubmission. You will also be offered one-to-one support from the programme leader to provide you with advice in redrafting your portfolio.

When you resubmit, you should attach a Resubmission Cover Sheet **in addition to** the main one. This form allows you to indicate the changes made in response to examiners' feedback on your earlier portfolio submission, enabling your new submission to be assessed fairly.

The Resubmission Cover Sheet may be downloaded from the Oxford Learning Institute website at <http://www.learning.ox.ac.uk/support/teaching/programmes/dlt/>

If your portfolio is submitted at the LAST AVAILABLE DEADLINE and it fails, then you will have one further opportunity to resubmit for the next deadline. If you miss this deadline then you will no longer be eligible to submit a portfolio.

### **How You Get Your Result and Certificate**

You will be contacted via email by the DLT administrator with the results of your portfolio assessment during the week indicated in the assessment timetable. If your portfolio is passed, you will also be sent a hard copy of your certificate which will show that you have achieved the SEDA PDF award Supporting Learning. The certificate will be sent to the address that you give on your portfolio coversheet, so please ensure that you use a contact address which will still be valid at this later date.

**A list of useful MPLS and Learning Institute contacts is provided in appendix 10.**

## Appendix 1: Teaching Observation Record<sup>1</sup>

To be completed by the observer

|                                    |  |                        |  |
|------------------------------------|--|------------------------|--|
| Observer:                          |  | Observed:              |  |
| Observation date:                  |  | Module:                |  |
| Length of session:                 |  | Length of observation: |  |
| Level of students:<br>(year group) |  | Number of Students:    |  |
| Topic:                             |  |                        |  |

### Nature of Session (please tick)

|                              |                          |                   |                          |                        |                          |
|------------------------------|--------------------------|-------------------|--------------------------|------------------------|--------------------------|
| Lecture                      | <input type="checkbox"/> | Practical session | <input type="checkbox"/> | Other (please specify) | <input type="checkbox"/> |
| Tutorial/small group session | <input type="checkbox"/> | Fieldwork         | <input type="checkbox"/> |                        | <input type="checkbox"/> |

### 1. What are the learning outcomes for this session?

|  |
|--|
| <br><br><br><br><br><br><br><br><br><br> |
|--|

### 2. Please summarise the session's overall quality in relation to the learning outcomes:

|  |
|--|
| <br><br><br><br><br><br><br><br><br><br> |
|--|

---

<sup>1</sup> Adapted with permission from the University of Reading

**3. Please comment on strengths and development needs, particularly in relation to the learning outcomes:**

**Strengths of the Session**

**Potential Areas for Development**

|  |  |
|--|--|
|  |  |
|--|--|

Name of Observer:

Date:

**Teaching Observation – Learning by being the Observer**  
**To be completed after observation of a colleague and subsequent feedback and discussion**

|                  |  |       |  |
|------------------|--|-------|--|
| Type of Session: |  | Date: |  |
|------------------|--|-------|--|

**1. What did you learn from the overall process of being an observer for your colleague?**

**2. What specifically did you learn from the way your colleague conducted their observed session?**

**3. Why do you think the issues you have noted in question 2 worked particularly well or alternatively, were not very successful?**

**4. Is there anything you will plan to do differently in future as a result of this observation?**

## Appendix 2: Student Evaluation of Your Teaching

|   |   |
|---|---|
| <p>Use 'Poll Everywhere'/online survey to collect quantitative feedback, e.g. using a 'Likert scale'</p>  | <p>Use 'stop, start, continue' approach: students write one comment on your teaching for each item (e.g. one thing to stop doing; one thing to start doing and one thing for you to continue doing)</p> |
| <p>Ask for qualitative comments, e.g. as part of an online survey</p>   | <p>Ask your students questions in a face-to-face situation (e.g. focus group)</p>   |
| <p>Ask students to prepare a 'One minute paper' on your session:</p> <p>Q1) the main point (s) they learned today</p> <p>Q2) the main thing they still don't understand</p>   | <p>You could take note of body language and behaviour in session: what does this tell you about your teaching/your students' learning?</p>  |
| <p>Students draw a mind map for the topic you have discussed in your teaching session and you could compare with one you have drawn</p>   | <p>Confidence log: students complete an anonymous survey indicating their level of confidence in mastering the material covered in your teaching</p>  |
| <p>Match between student expectations and your session. At the start, students note down questions for which they hope to have an answer by the end of your teaching session. A couple of times during the session, ask them to tick off any questions that have been addressed and add any new ones. At the end of the session ask students to let you have their lists. Let them know that you will pick up on unanswered questions in the next teaching session or you could post your responses via email/WebLearn.</p> | <p>Paper-based feedback form with tick boxes</p>  |

### Appendix 3: Self-Evaluation Checklist for Lecturing<sup>2</sup>

| Question   | Very well | Quite well | Not well | Action planning |
|--|-----------|------------|----------|-----------------|
| Did I plan the session well?   |           |            |          |                 |
| How well did I explain the connections between the topic of this lecture and previous lectures?  |           |            |          |                 |
| Did I introduce the session well?  |           |            |          |                 |
| Was the content ordered coherently?  |           |            |          |                 |
| What were the 3 most important things I wanted students to take away with them from this lecture (i.e. learning outcomes) and did I introduce and explain these clearly to the students? |           |            |          |                 |
| How well did they learn these things? How do I know?   |           |            |          |                 |
| How well did I estimate how much material I would get through in the time available?   |           |            |          |                 |
| Did I give the students some things to do as part of the lecture?  |           |            |          |                 |
| Did I manage to involve all of the students in doing things during the lecture?  |           |            |          |                 |
| Did my audio-visual aids help the students to make sense of the subject?   |           |            |          |                 |
| Did my handout materials work well with the students?  |           |            |          |                 |
| Did I engage the students by asking them questions during the lecture?   |           |            |          |                 |
| Did I succeed in getting the students to ask me questions?   |           |            |          |                 |
| How well did I answer the students' questions?   |           |            |          |                 |
| How well did I convey enthusiasm for my subject?   |           |            |          |                 |
| Did I include enough variety in my presentation?   |           |            |          |                 |
| How well did I keep students' interest?  |           |            |          |                 |
| Did I bring the session to a rounded and punctual close?   |           |            |          |                 |
| What was the best thing about this particular lecture?   |           |            |          |                 |
| What was the least satisfactory thing about this particular lecture?   |           |            |          |                 |
| What is the most important change I intend to make next time I give this lecture?  |           |            |          |                 |

<sup>2</sup> Adapted from Race, P. (2009) *In at the Deep End*. <http://phil-race.co.uk/wp-content/uploads/downloads/2013/05/In-at-the-Deep-End.pdf>

## Appendix 4: Self-Evaluation Checklist for Small Group/Tutorial Teaching<sup>3</sup>

| Question  | Very well | Quite well | Not well | Action planning |
|---|-----------|------------|----------|-----------------|
| Did I introduce and explain the intended learning outcomes clearly to the students?   |           |            |          |                 |
| Did the session work well in terms of these outcomes – did most of the students achieve the outcomes?   |           |            |          |                 |
| Did the activities I planned for the students work out well in practice?  |           |            |          |                 |
| Did I manage to involve all of the students in doing things during the session?   |           |            |          |                 |
| For tutorial sessions, did I manage to let students themselves play a full part in delivering their contributions?  |           |            |          |                 |
| Did I succeed in getting the students to work together in different combinations, so that they made the most of collaborative working, where appropriate? |           |            |          |                 |
| Did I manage not to intervene too readily if the session 'got stuck' temporarily?   |           |            |          |                 |
| How well was I able to use the session to address questions and problems raised by individual students?   |           |            |          |                 |
| Did I bring the session to a rounded and punctual close?  |           |            |          |                 |
| What was the best thing about this particular session?  |           |            |          |                 |
| What was the least satisfactory thing about this particular session?  |           |            |          |                 |
| What is the single most important thing I will do differently next time I run a similar session?  |           |            |          |                 |

<sup>3</sup> Adapted from Race, P. (2009) *In at the Deep End*. <http://phil-race.co.uk/wp-content/uploads/downloads/2013/05/In-at-the-Deep-End.pdf>

## Appendix 5: Session Plan Template & Reflective Rationale<sup>4</sup>

| 1. Teaching Context  |  |                       |  |
|--|--|-----------------------|--|
| Nature of session:<br>(e.g. lecture/ tutorial/<br>lab class etc.)                          |  | Session<br>location:  |  |
| Length of session:   |  | Session date:         |  |
| Session Topic:   |  |                       |  |
| Number of students<br>expected:  |  | Level of<br>students: |  |
| Student group<br>composition (e.g.<br>male/female;<br>international/home<br>students etc.) |  |                       |  |

| 2. What are the aims and intended learning outcomes (ILOs) for this session?                |                         |
|---|-------------------------|
| Session Aim(s) - a sentence making clear the broad statement of intent:                     |                         |
|   | •                       |
| Intended learning outcomes (ILO's) - by the end of this session students should be able to: |                         |
|   | • ILO1; ILO2; ILO3 etc. |

<sup>4</sup> Adapted, with permission, from the University of Reading

| Time | Teacher activity | Student activity | Session resources<br>(for teacher &<br>learners) | Which ILO<br>does this<br>align with? | How you will gauge<br>students' learning<br>and engagement in<br>this session |
|------|------------------|------------------|--|---------------------------------------|---|
|      |                  |                  |  |                                       |   |

**Reflection and Rationale: this should be included in the main portfolio text**

- 3. Provide an account of the session (what happened in practice) and a pedagogic rationale for the decisions behind your session design, making appropriate cross-reference to relevant educational literature.**
- 4. Indicate what you may/may not do differently in future and why**

## Appendix 6: Developing Your 'Teaching Philosophy'

The following questions may help you articulate what you value about teaching and the reasons that you teach the way you do:

1. Why do you (want to) teach? After all you could just concentrate on research/professional practice.
2. How do you think students benefit by learning about/in your discipline/area of expertise?
3. Does anyone else benefit? If so, how, and why is it important?
4. What's important in your scientific discipline/area: concepts, skills, technical ability, logic, curiosity, passion?
5. What do you think students need to do to learn about/in your scientific discipline/area?
6. What do you think teachers need to do to help students learn about/in your scientific discipline/area?
7. How did you come to believe these things?
8. What do you do in practice in your teaching sessions? Is this consistent with your teaching values/goals?

## Example Teaching Philosophy Statements

### Example 1: Biochemistry and Chemistry (University of Minnesota)

Most of my teaching involves instructing graduate students in the thermodynamics, statistical mechanics and spectroscopy of biological systems. Given the varied backgrounds of our students, this can sometimes be a challenging task. In our Physical Biochemistry course we have had students with no training in multivariate calculus or physical chemistry and others with undergraduate degrees in physics or mathematics. To each, I have tried to present the aspects of biochemistry missing in their undergraduate training. The goal of my lectures is generally to acquaint students with a physical description of biological systems using the quantitative language of mathematics. This approach is sometimes met with some resistance: often students pursuing degrees in biochemistry have chosen the field in part for its non-physical aspects. However, when I am most successful even these students come to appreciate the quantitative facets of problem they have studied in less mathematical ways in other classes. I try to convey the importance of a rigorous chemical view of the molecules in molecular biology, the avocation of almost all modern biochemists. The modern literature is rich in proposed biological mechanisms that demand the close scrutiny of thermodynamics; and some of them fail. I use some of these examples in my lectures to emphasize the relevance of thermodynamics to modern biology. Whenever possible, I try to present the intuitive non-mathematical description that accompanies the mathematical one. The goal is to reinforce this association so that it might be useful when the student re-encounters the problem later in his/her career.

It is my firm belief that physical concepts cannot be taught or learned merely through lectures and/or reading. These concepts demand the use of an entirely different part of the brain than language and therefore must be examined and practiced in non-verbal ways. For this reason, I use problem sets extensively in all of my teaching. Because I consider the problem-solving process so important, most of my grading is based on problem assignments. I find that by frequent assignment of problems I can assure that the students have thoroughly studied the concepts I've presented in my lectures. Often, I set up problem sets in my lectures and then, in the problem set, lead the student through a derivation or analysis in a step-by-step fashion. Many times the problem sets present new material that is never covered in class. This can often be a very time-consuming way for the students to learn, but I have been pleased to hear from many of them that they consider it time well spent. I also encourage the students to collaborate on the problems and often hold help sessions so that this process can occur with some guidance from either myself or a teaching assistant. This not only helps the students overcome some of the thorny concepts but also provides useful feedback to me to improve my lecture presentations and problem writing.

As course director of physical biochemistry, I have continually varied its structure and composition in an attempt to find the most effective format. The constant feature of the course has been its focus on fundamental principles in kinetics, statistical thermodynamics, spectroscopy (quantum mechanics) and diffraction theory. Many physical biochemistry courses around the country are taught as technique surveys. It has been the collective agreement of the primary instructors of our course that it is more important to expose our students to the underlying principles behind these techniques than it is to teach them the

details of the techniques themselves, which are often rapidly changing and may be very different by the time the student encounters them in their work.

Typical of most medical school courses, our physical biochemistry course has traditionally been taught by several instructors. This has both benefits and liabilities. The broad range of instructors' expertise improves the veracity of the lectures. However, the lack of continuity from topic to topic reduces the chances that the students will see the interconnections between subjects. In some years, I have attended most of the lectures and have tried to point out the places in one lecturer's presentation that relate to others'. Most recently, I have decided to drastically reduce the number of lecturers from a maximum of eight to four. This required that I present more lectures, but I was concerned that the course had become too fragmented. I have attempted to improve the communication between instructors so that we are all aware of the places in our lectures that interrelate. In the future, I plan to continue to keep the number of instructors small and work to further improve the continuity of the course.

Under many circumstances, I have been fortunate to work with a group small enough to engage in discussion. I am sure I am not alone to say that this is my favorite form of teaching. I enjoy the Socratic method, particularly when one or two students and I can work through a problem together. I also use this approach when training the undergraduate and graduate students in my laboratory. We spend a great deal of time at my white board discussing derivations, designing experiments, and analyzing data. In my opinion, this is the time when the most long-lasting learning takes place. When a student sees the way in which quantitative theory relates to his/her own work, the concepts become an integral part of how they perceive the world from that point forth. I consider this the most important contribution that I can make.

### **Example 2: Medical education: (anonymous)**

My role as an educator in graduate medical education has much in common with my hobby of raising orchids. I dabbled in both until greater "collections" befell me-- in one case, several dozen orchid plants bequeathed by an acquaintance, in the other, the opportunity to direct the residency program in Rehabilitation Medicine. Raising orchids means having the right media, creating the right growing conditions for individual plants, and vigilance against weeds and slugs. I keep records and set goals and evaluate my collection. There are many parallels in teaching and evaluating residents and in the administration of a residency training program.

Resident physicians have many demands on their time. I believe they will devote more energy to the learning process if they can see the benefits of devoting time to what I have to teach. In every encounter with a resident, I try to model inquisitiveness, politeness, team management, analytical thinking, and current knowledge. I set the stage for a collegial learning setting, and demonstrate the underlying structure I use to make decisions. As I probe learner knowledge, I allow a healthy level of anxiety into the situation by asking questions and letting my resident struggle a bit for the answer--they have to make a commitment. Then I want to know what process was used to arrive at the answer. Did they

use the literature, clinical experience, or ritual? Are they connecting their fund of knowledge with the clinical database? My goals in teaching are not limited to the knowledge domain. Resident physicians must learn team management skills as well. Exposing the underlying structure works when reviewing a patient interview, planning or critiquing a multidisciplinary team meeting, or making a clinical decision. This model easily leads to the important step of giving identified feedback. The learner must also give feedback to the teacher but usually the teacher needs to request it.

Resident physicians must assume substantial responsibility in the learning process. They must take an active approach to learning. I believe the successful learner evolves from just having a case repertoire to connecting their clinical experiences with literature knowledge. By the end of residency, successful learners can learn outside of the context of cases, as they strive to “master” a field.

As the director of the residency training program, my view of the learning process extends beyond my individual encounters with residents. Teachers with varied talents, diverse clinical settings, and organized didactics enter the equation. A training director can influence the educational process in many ways including organization, resident counselling, faculty development, and program evaluation and development. Teachers must have adequate skills, residents must know what is expected, the curriculum must be current, and the evaluation processes must be timely and fair. The educational process must not become subservient to the demands of clinical service. Having a vision of the program’s goals and objectives is key to avoiding this. To prevent myopic vision, it is helpful to consult frequently with graduates of the program and other program directors.

In summary, the learning process is enhanced by

- a collegial relationship between teacher and learner
- evident pride in scholarship by the teacher
- challenge of the learner’s knowledge
- elucidation of underlying structure by the teacher
- active connection between cases and literature by the learner
- and mutual feedback.

At a program level, the educational process is enhanced by vigilant planning and reassessment, fertilizing, shaping, and yes, weeding and slug-baiting. Visualize the greenhouse in continuous bloom...

### **Example 3: Biology (Australian National University)**

Science is about doing as much as knowing, and I want my students to engage with science by acting like scientists, that is, by applying what they are learning and by solving problems. This teaching philosophy was very nicely summed up in an essay I read recently: ‘To a scientist, cramming facts is what practising scales is to a pianist: there is no way around it, but it’s not enough’ [1].

Unfortunately, much science teaching focuses on content; a direction encouraged by textbooks, particularly in biology where the growth of knowledge is rapid. Successive editions include more and more information, leading to the view that an up-to-date education must include as much content as possible. Scientists have been criticised for not approaching teaching scientifically [2] in that many ignore the body of education literature showing that student learning is highly dependent on engagement and an understanding of students' prior knowledge. It has also been pointed out that students need problem solving, information retrieval and analytical skills more than ever in the present 'information society', and the focus on content is reducing both the time available and the emphasis on teaching these skills [3]. What is missing from the 'practising scales' approach seen in traditional lecture and lab-based science teaching is the opportunity for students to develop critical thinking, problem solving and analytical skills.

My concern with these issues has led to an interest in educational research, enabling me to develop new strategies for teaching students to develop these skills in molecular biology and biochemistry ... To provide opportunities for students to develop as scientific thinkers, over the last 10 years I have created a variety of resources that give students direct experience in problem solving.

[1] G. Schatz, (2005) 'Letter to a young scientist', *Jeff's View*, Elsevier

[2] Handelsman, J., Ebert-May, D., Beichner, R., Bruns, P., Chang, A., DeHaan, R., Gentile, J., Lauffer, S., Stewart, J., Tilghman, S. M. and Wood, W. B. (2004) Scientific teaching. *Science* 304, 521-522

[3] Bell, E (2001) The future of education in the molecular life sciences. *Nat Rev Mol Cell Biol* 3: 221-225

## Appendix 7: Educational Literature and Resources

The following is NOT intended to be an exhaustive list, but it does provide a starting point. **Links to many of these references are available on the MPLS DLT WebLearn site.**

The following list will help you find journals that carry articles you are interested in. As well as generic science education journals such as *Science Education* and *International Journal of Science Education*, most science disciplines have at least one journal that is dedicated to or frequently carries education articles, e.g. *Chemical Engineering Education* etc. Sad to say, most academics are completely unaware of the existence of these journals, and so are unable to avail themselves of the resources they offer. Dip your toe in these waters and you will find things that help you, provoke you, and give you pause for thought.

We strongly suggest that you do not limit yourself to reading materials based in your own discipline – some of the ideas discussed in relation to engineering education, for example, may help a biologist think about why teaching in his/her discipline is different or similar.

### General texts

Entwistle, N. 2009. *Teaching for Understanding at University*. Palgrave Macmillan.  
(Some thought-provoking stuff based on recent educational research, and written in a fairly personal, accessible way.)

Fry, H, S. Ketteridge and S. Marshall. 2003. *A Handbook for Teaching and Learning in Higher Education: Enhancing Academic Practice* (3<sup>rd</sup> ed.). London: Routledge.  
(A good introductory text with recommendations for further reading.)

Morss, K. and R. Murray. 2005. *Teaching at University: A guide for postgraduates and researchers*. London: Sage Publications.  
(Particularly helpful chapters on lectures and small group teaching, which the authors call ‘tutorials’ – don’t get caught out! The book also discusses teaching portfolios and you should remember that this is general advice, not specific to the Oxford DLT portfolio.)

Ramsden, P. 2003. *Learning to teach in higher education*. London: RoutledgeFalmer.  
(One of the classics, which you are likely to find useful as you progress to more substantial teaching role including some design responsibility.)

### Biological sciences

Bauer-Dantoin, A. 2009. The evolution of scientific teaching within the biological sciences, in *Exploring signature pedagogies: Approaches to teaching disciplinary habits of mind*. R.A.R. Gurung, N.L. Chick and A. Haynie (eds.) Sterling, Va: Stylus Publishing.  
(Suggests some key ways of thinking in biological sciences and how these can be used in teaching.)

Leamson, R. 1999. *Thinking about Teaching and Learning: Developing Habits of Learning with First Year College and University Students*. Sterling, Va: Stylus.  
(Leamson is a US Professor of Biology and in this book employs a biological concept of learning to explore his approach to teaching. It’s a very accessible read and Leamson shares a lot of his practical teaching activities and his rationale for them. Although it claims to be primarily about first year teaching, the principles and ideas he uses can be applied throughout higher education. Chapter 5, ‘Teaching and Pedagogy’ is particularly recommended.)

McCune, V., & Hounsell, D. (2005). The development of students' ways of thinking and practising in three final-year biology courses. *Higher Education*, 49(3), 255-289.

### Chemistry

Coll, R. K., & Treagust, D. F. (2001). Learners' mental models of chemical bonding. *Research in Science Education*, 31(3), 357-382.

Johnstone, A. H., Sleet, R. J., & Vianna, J. F. (1994). An information processing model of learning: Its application to an undergraduate laboratory course in chemistry. *Studies in Higher Education*, 19(1), 77-87.

Regis, A., PG Albertazzi & E Roletto. 1996. Concept maps in chemistry education. *Journal of Chemical Education* 73, no. 11: 1084.

### Computer Science

Booth, S. (2001). Learning computer science and engineering in context. *Computer Science Education*, 11(3), 169-188.

McConnell, J. J. (1996). Active learning and its use in computer science. *ACM SIGCUE Outlook*, 24(1-3), 52-54.

### Engineering

Baillie, C. and I. Moore (eds.) 2004. *Effective learning and teaching in engineering*. London: RoutledgeFalmer.

Feisel, L. D., & Rosa, A. J. (2005). The role of the laboratory in undergraduate engineering education. *Journal of Engineering Education*, 94(1), 121-130.

Felder, R. M., & Silverman, L. K. (1988). Learning and teaching styles in engineering education. *Engineering education*, 78(7), 674-681.

Felder, R. M., Woods, D. R., Stice, J. E., & Rugarcia, A. (2000). The future of engineering education II. Teaching methods that work. *Chemical Engineering Education*, 34(1), 26-39.

Higgins, J. S., Maitland, G. C., Perkins, J. D., and Richardson, S. M. 1989. Identifying and Solving Problems in Engineering Design. *Studies in Higher Education* 41: 2, 169-181.

### Maths

Dweck, Carol S. 2007. Is Math a Gift? Beliefs That Put Females at Risk. Ceci, Stephen J. (Ed); Williams, Wendy M. (Ed). *Why aren't more women in science: Top researchers debate the evidence* (pp. 47-55). Washington, DC, US: American Psychological Association, xx, 254 pp. doi: [10.1037/11546-004](https://doi.org/10.1037/11546-004)

Ernie, K et al. 2009. Mathematical reasoning: Challenging student's beliefs about mathematics, in *Exploring signature pedagogies: Approaches to teaching disciplinary habits of mind*. R.A.R. Gurung, N.L. Chick and A. Haynie (eds.) Sterling, Va: Stylus Publishing.

Henningsen, M., & Stein, M. K. (1997). Mathematical tasks and student cognition: Classroom-based factors that support and inhibit high-level mathematical thinking and reasoning. *Journal for Research in Mathematics Education*, 524-549.

Kahn, P. and J. Kyle (eds.) 2002. *Effective learning and teaching in mathematics and its applications*. London: Kogan Page.

McColm, Greg. 2007. A Metaphor for Mathematics Education in *Notices of the AMS* 54: 4, 499–502.

Schoenfeld, A. H. (1992). Learning to think mathematically: Problem solving, metacognition, and sense making in mathematics. *Handbook of research on mathematics teaching and learning*, 334-370.

## Physics

Crouch, C. H., & Mazur, E. (2001). Peer instruction: Ten years of experience and results. *American Journal of Physics*, 69, 970.

Crouch, C., Fagen, A. P., Callan, J. P., & Mazur, E. (2004). Classroom demonstrations: Learning tools or entertainment?. *American Journal of Physics*, 72, 835.

DiSessa, A. A. (1982). Unlearning Aristotelian physics: A study of knowledge-based learning. *Cognitive Science*, 6(1), 37-75.

Lattery, M. J. 2009. Signature pedagogies in introductory physics, in *Exploring signature pedagogies: Approaches to teaching disciplinary habits of mind*. R.A.R. Gurung, N.L. Chick and A. Haynie (eds.) Sterling, Va: Stylus Publishing.

Park, E. J., & Light, G. (2009). Identifying Atomic Structure as a Threshold Concept: Student mental models and troublesomeness. *International Journal of Science Education*, 31(2), 233-258.

Sin, C (2015) Student-centred learning and disciplinary enculturation: an exploration through physics. *Educational Studies*, 41(4), 351-368.

Trigwell, K., Prosser, M., & Waterhouse, F. (1999). Relations between teachers' approaches to teaching and students' approaches to learning. *Higher education*, 37(1), 57-70.

## Statistics

Conners, F. A., McCown, S. M., & Roskos-Ewoldsen, B. (1998). Unique challenges in teaching undergraduate statistics. *Teaching of Psychology*, 25(1), 40-42.

Garfield, J., & Ben-Zvi, D. (2007). How students learn statistics revisited: A current review of research on teaching and learning statistics. *International Statistical Review*, 75(3), 372-396.

Giraud, G. (1997). Cooperative learning and statistics instruction. *Journal of Statistics Education*, 5(3), 1.

## Laboratory teaching

Forster, F., D. Hounsell, and S. Thompson (eds). 1995. *Tutoring and Demonstrating: A Handbook*. Edinburgh: Centre for Teaching, Learning and Assessment, University of Edinburgh.  
(A thorough introductory handbook.)

Kirschner, P. A., Meester, A. M. 1988. The laboratory in higher science education: Problems, premises and objectives. *Higher Education* 17: 81-98.  
(Explores a range of reasons for using labs – thought provoking.)

### Lectures

Bligh, D. 2001. *What's the use of lectures?* (5<sup>th</sup> ed.). Exeter: Intellect.

(A well-known text which reviews the research on lectures. Not discipline specific.)

Brown, G. and M. Manogue. 2001. AMEE Medical Education Guide no. 22, Refreshing Lecturing: A guide for lecturers. *Medical Teacher* 23: 3, 231-244.

(A very accessible and thorough guide to lecturing. If you only read one item on lecturing, make it this one. There are some really helpful ideas on lecture preparation in particular, and it's a useful guide for all sciences, not just medical education.)

### Tutorial teaching in Oxford

Ashwin, P. 2005. Variation in Students' Experiences of the 'Oxford Tutorial'. *Higher Education* 50, 631-644.

(A discussion of the tutorial which explores different conceptions students might have about its purpose. The article includes a good overview of the tutorial (p.632-3)).

Ashwin, P. 2006. Variation in academics' accounts of tutorials. *Studies in Higher Education* 31:6, 651-665.

(This article explores the tutorial from the accounts of academics, using the same research approach as the 2005 article on students' experiences. The academics interviewed are drawn from across all divisions in the University.)

Palfreyman, David. (ed.) 2001. *The Oxford Tutorial: 'Thanks, you taught me how to think'*. Oxford: OxCheps:

[http://oxcheps.new.ox.ac.uk/Publications/Resources/OxCHEPS\\_OP1.doc](http://oxcheps.new.ox.ac.uk/Publications/Resources/OxCHEPS_OP1.doc)

### Cognitive apprenticeship model of teaching

Collins, A., J. Seely Brown and A. Holum. 1991. Learning Institute extract from 'Cognitive Apprenticeship: Making Thinking Visible'. *American Educator*.

(This article argues that we should think of the process of teaching as a form of apprenticeship in which some of the thinking processes need to be made visible to students. A thought-provoking piece with clear practical application in the classroom.)

### Teaching perspectives / theories of teaching

Fox, D. 1983. Personal theories of teaching. *Studies in Higher Education* 8: 2, 151-163.

Kugel, P. 1991. How professors develop as teachers. *Studies in Higher Education* 18:3, 315-329.

Pratt, D. 2002. Good Teaching: One size fits all? In *An Up-date on Teaching Theory*, Jovita Ross-Gordon (ed.), San Francisco: Jossey-Bass  
AND Learning Institute handout on Pratt's five teaching styles.

(A much more interesting read than the title suggests – great for thinking about your own philosophy of teaching or rationale for your actions.)

### Concept tests and peer learning in science

Mazur, E. 1999. Peer Instruction: A User's Manual. *American Journal of Physics* 67: 4, 359-360.

### **Case-based and problem-based approaches to teaching**

US National Centre for Case Study Teaching in Sciences website

<http://sciencecases.lib.buffalo.edu> This site has many case examples in a wide variety of science fields and you can use or adapt any which may be appropriate for your students.

Duch, B. J., Groh, S. E., & Allen, D. E. (Eds.). (2001). *The power of problem-based learning: a practical "how to" for teaching undergraduate courses in any discipline*. Stylus Publishing, LLC.

### **Spiral curriculum**

Harden, R.M. 1999. What is a spiral curriculum? *Medical Teacher* 21:2, 141-143.

## Appendix 8: DLT Portfolio Assessment Sheet and Notes

The DLT Programme is accredited by the Staff and Educational Development Association (SEDA). Successful achievement of all assessment criteria in your portfolio (see below) leads to the SEDA PDFSupporting Learning Award.

| Candidate name:   |      | Term of Assessment: |  |
|---|------|---------------------|--|
| Criteria  | Pass | Fail                |  |
| <b>1. Teaching Practice</b><br>Portfolio includes description, analysis and critical evaluation of the candidate's own teaching.  |      |                     |  |
| <b>2. Review of teaching</b><br>Portfolio includes a review of own teaching via student evaluation and/or teaching observation, including reflection on the implications of this evaluation.  |      |                     |  |
| <b>3. Lesson design</b><br>Portfolio includes the design of a lesson (e.g. class, lecture, tutorial, seminar, or lab demonstration), including a rationale for the design choices made, and attention to how students receive feedback on their learning. |      |                     |  |
| <b>4. Student diversity and learning</b><br>The portfolio identifies at least one example to demonstrate the candidate's awareness of student diversity and explores the implications for the candidate's teaching practice.                              |      |                     |  |
| <b>5. Teaching values</b><br>Description and analysis of teaching in the portfolio is explicitly connected to the candidate's developing teaching values ('teaching philosophy') within their disciplinary context.                                       |      |                     |  |
| <b>6. Educational literature</b><br>Portfolio makes appropriate use of relevant ideas from educational literature in critical analysis of teaching practices and values.  |      |                     |  |
| <b>7. Your development as a teacher</b><br>Portfolio explains how the candidate's own teaching practice and understanding of learning and teaching is evolving over time, and identifies ideas for future development.                                    |      |                     |  |

*Please tick the boxes that apply above and supply feedback below. Please note that candidates must pass all criteria to pass overall, and that excellent performance on one or more criteria does not mitigate failure to pass other criteria. If any areas of the portfolio are borderline/fail, please indicate where they fail to meet the criteria and how these issues might be addressed if the candidate wishes to resubmit. If all areas are passed, please include feedback comments to the candidate on particular strengths of the portfolio.*

Type feedback here

**Overall Assessment: PASS / RESUBMIT**

Assessor:

Date:

## Assessment Sheet Notes – explanation of criteria

### Criterion 1 – Teaching Practice

Portfolios must address actual teaching, using detailed description, analysis and critical evaluation of the candidate's own teaching in one or more of the following settings: tutorials, lectures, classes, labs, project supervision or other type of teaching. Documentary evidence should be used to support claims made in relation to practice wherever possible; and such evidence may be included in an appendix.

### Criterion 2 – Review of teaching

The portfolio must include a review of the candidate's own teaching via student evaluation and/or teaching observation by a peer or mentor, and include reflection/discussion of the outcome of this evaluation which indicates how the results might influence future teaching practice. Evidence may include mentor's reports, peer observation reports, student evaluations, completed minute papers, etc. and these may be included in appendices. Whilst observation of other teachers can form part of portfolio, please note that to satisfy this criterion it is not sufficient on its own.

### Criterion 3 – Lesson design

The evidence candidates use to meet this criterion may concern learning activities they have already delivered or potential future teaching plans. Material which can be included for this area includes: lesson plans, lab designs, lecture plans with handouts/ visual material, etc. An explanation of the pedagogic rationale for the design should be included and the role of feedback in student learning must be identified and critically discussed. Feedback to students may be addressed in the context of a single 'session' (e.g. a lecture/ class/ tutorial/ lab demonstration), or might take into account the student learning experience over a period of time.

### Criterion 4 – Student diversity and learning

In at least one part of their portfolio candidates should identify an issue where student diversity has implications for learning and teaching. For example (and these examples are not exhaustive), candidates might identify heterogeneous prior educational backgrounds or attainment, or issues related to gender, race, ethnicity, or disability. Candidates are expected to identify and explore the implications of the issue raised; and consider practical ways to respond in their teaching. In many instances there is no single ideal way to respond to a heterogeneous student body, and so candidates may wish to propose more than one practical response and/or to explore ways to engage students in dialogue about the issue.

### Criterion 5 – Teaching values

Candidates must articulate the values or rationale underpinning at least one area of their teaching practice. This might be achieved by: presenting a personal 'teaching philosophy'; using educational literature to justify a teaching session design; evaluating different approaches to teaching using explicit criteria. These suggestions are however, not exhaustive. The key requirement is that candidates analyse their practice in the light of their beliefs about what is important and effective in good learning and teaching in their disciplinary context, and that they recognise how those beliefs are formed through a combination of personal motivation, experience and educational theory.

**Criterion 6 – Educational literature**

Candidates are not expected to become experts in educational literature but are expected to incorporate relevant literature to support claims made in the portfolio. Demonstrations of how reading the literature has stimulated deeper thinking on issues relevant to teaching and learning are also encouraged. Lists of recommended reading are available for each division, and candidates may also refer to other educational resources not specified on the list.

**Criterion 7 – Your development as a teacher**

Your portfolio should contain an overview, or an introduction and conclusion which explains how your teaching practice and understanding of learning and teaching is evolving over time. This narrative of your development as a teacher might bring together any key ideas or issues which have arisen in different parts of the portfolio. It is also important that your portfolio should look forward and identify ideas for future development. You might consider, for example, ideas for expanding your teaching experience; trying out new approaches; or finding out more about how other people teach in other institutions or subject areas.

## Appendix 9: DLT Portfolio Coversheet<sup>5</sup>

A copy of this coversheet **must** be included with your submitted portfolio.

|   |         |   |                                |
|---|---------|---|--------------------------------|
| Candidate Name:   |         | College:  |                                |
| Department/Faculty:   |         |   |                                |
| Status in connection with the University of Oxford and its Colleges <b>Tick if applicable</b> | Student | Staff   | If staff, who do you work for? |
|   |         |   |                                |
| Contact email address:  |         |   |                                |
| Contact postal address:   |         |   |                                |
| Portfolio Title:  |         |   | Tick if a resubmission         |
| Portfolio word count, excluding bibliography and appendices [2,500-5,000]:                    |         | Term in which you completed your taught course: |                                |
|   |         | Term of submission:                             |                                |

### Permission to share portfolio

Please check boxes if you DO NOT give permission. **If you leave these check boxes blank we will assume you are willing to allow your work to be used as described.**

|   |  |
|---|--|
| I <b>do not</b> give permission to my division and the Oxford Learning Institute to share my portfolio with future portfolio writers  |  |
| I <b>do not</b> give permission for extracts from my portfolio to be used in teaching and learning workshops/seminars as examples of portfolio writing and/or teaching practice |  |

**Plagiarism:** In signing this cover sheet I declare that, apart from properly referenced quotations, this portfolio is my own work. It has not been submitted previously for any other assessed course.

|            |       |
|------------|-------|
| Signature: | Date: |
|------------|-------|

<sup>5</sup> An electronic file of this coversheet, suitable for completing in Word and pasting into portfolio documents, can be downloaded from <https://www.learning.ox.ac.uk/support/teaching/programmes/dlt/>

## Appendix 10: Contacts

Each department in the Mathematical, Physical and Life Sciences Division has a coordinator for teaching whom you should contact in the first instance if you would like to do some teaching.

### Divisional contacts for DLT

Divisional Training course enquiries: [skillscourses@mpls.ox.ac.uk](mailto:skillscourses@mpls.ox.ac.uk)

Researcher Training Adviser: [alison.trinder@mpls.ox.ac.uk](mailto:alison.trinder@mpls.ox.ac.uk)

### Oxford Learning Institute Contacts for the MPLS DLT Programme

Educational Development Consultant (Sciences): Dr Anne Crook  
[anne.crook@learning.ox.ac.uk](mailto:anne.crook@learning.ox.ac.uk)