

Mathematical, Physical and Life Sciences Division Developing Learning and Teaching Divisional Handbook 2015-16

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Introduction

The Oxford Developing Learning and Teaching programme offers a way to make the most of your first teaching experiences in UK higher education. If completed in full it leads to status as Associate Fellow of the Higher Education Academy (HEA), an accreditation that is recognised at universities across the UK (and increasingly, internationally).

The programme requires:

1. Experience of teaching (including providing feedback to students and receiving feedback on your teaching from students, peers and/or mentors);
2. Reading some relevant educational literature and participating in DLT workshops when available;
3. Reflection on and analysis of your teaching experiences in light of ideas from the literature;
4. Production of a portfolio of 2500–5000 words for assessment as an Associate Fellow of the HEA.

The individual elements are not intended to be completed in order, as this list might suggest. For example, you do not need to wait until after you have completed some teaching before starting to write a portfolio. Rather, these activities are most effective when undertaken in parallel.

Most participants complete the portfolio in which these activities are recorded in the course of one year. Please note that the Divisional workshop series *Teaching and Learning: Science not Magic* is offered in Hilary and possibly Trinity term.

Experience of core aspects of teaching

One of the goals of the DLT programme is that participants develop their capacity to learn from their experiences and put the insights they gain into practice in their future teaching. For this reason, actual experience of teaching forms an essential part of the programme. (It is also a requirement for HEA accreditation.) “Teaching” includes any of the following activities:

- a. Design/planning of learning activities;
- b. Specific instances of actual teaching (face-to-face or online);
- c. Providing students with feedback to enhance their learning, and/or assessing students’ progress;
- d. Review and evaluation of teaching, including use of findings for future planning.

These aspects of teaching are most often experienced as integrated or connected parts of a particular activity – for example, it is almost impossible to teach effectively if one has not thought about what one is doing in advance (and hence engaged in some sort of design/planning process); the face-to-face teaching involved in labs and tutorials frequently takes the form of providing cycles or iterations of feedback to students as they progress through a particular task or solve a particular problem; one way of evaluating whether teaching has been effective is through the performance of student in assessed activities; and effective planning usually depends on effective review and evaluation of past experiences.

More information on each of these activities and examples of what might be used in your portfolio are provided in the following pages.

Minimum teaching experience required 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 for HEA accreditation, thus you may draw on these experiences in completing your portfolio. Unfortunately, because the DLT programme is a UK higher education qualification, teaching experience from outside the UK, with students at pre-university level or in extra-curricular activities cannot be counted towards the minimum requirements. Nonetheless, you are encouraged to draw on such experiences in your portfolio. For example, good portfolios often compare and contrast teaching and learning in HE in the UK with HE in the candidate's home country, with sports coaching or even with teaching and learning music or other performance arts. Such comparisons can help illuminate variations in student approaches to learning, pedagogical approaches, or overall goals of higher education.

Aspect of teaching A: Design/planning of learning activities

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 lab, a project for a fourth year student, or a (sequence of) lectures.

In order to use a design activity as the basis for an item in your DLT portfolio, you will need to write an account of the design process and a critical analysis of the design decisions you made, making appropriate links to ideas from the educational literature. The questions below may help you to think about what such an account should include (but don't feel constrained by them).

Prompt questions to help critically analyse the design/planning of a learning and 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 it will be for me or another to teach?
- Did I think about the range of backgrounds/interest/prior experiences my students might have?
- 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 is the role of the teacher in my designed activity?
- 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 do my intended learning outcomes and the activity I've designed map on to frameworks from the literature such as the SOLO taxonomy or Bloom's taxonomy?
- Can my designed activity be usefully analysed using ideas such as constructive alignment or cognitive apprenticeship?

Aspect of teaching B: Specific instances of actual teaching

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, perhaps most famously Arthur Schoenfeld, but of course is also a key part of descriptions of how medical practitioners (and other professionals) respond to and function effectively in complex situations.

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

Your account of your chosen teaching experience should include a description of what actually happened (who did/said what etc.) 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) 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. You can think of this as being an example of a Predict-Observe-Explain activity. 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. the SOLO or 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?
 - 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 wouldn’t have mattered if they’d missed? Why wouldn’t it matter?
- 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?

Aspect of teaching C: Providing students with feedback to enhance their learning, and/or assessing students' progress

As mentioned above, the provision of feedback to help students learn is often a core part of teaching, but may also be undertaken through the marking and return of submitted items such as essays, reports, problem sets, computer programs and so on. As a teacher, your job is to provide feedback that focuses both on what the student has done well and what they have done less well, indicating why the student's performance is good or bad and how it can be improved. Feedback may take many forms: e.g. verbal or written, one-way or dialogue, structured or free-form, formative or summative. It may come from different sources: teachers, fellow students, progress through a structured activity or even automated computer feedback. And it may come at different times: during an activity, immediately after an activity or significantly later. It may also be related to formal assessment procedures.

If 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. Your account of assessing progress and giving feedback should analyse what kind of evidence you use to make judgments, and how you think students will be able to make use of the feedback you give. You may wish to use the set of questions below to help you structure your account.

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, and who gave it?
 - Why was this a useful form/source of 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 my students received, how did it compare to the descriptions of effective feedback given in the educational literature?

Aspect of teaching D: Review and evaluation of teaching, including use of findings for future planning

There are many ways in which you can gather evidence to use in reviewing and evaluating your teaching. As with feedback to students, feedback to teachers can come in many forms and from many sources. The key skills that we hope you develop in the 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?

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.

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?

Gathering evaluation evidence from yourself!

It may sound strange, but you can also use yourself as a source of evaluation data. 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.

Mentoring by an academic in your faculty

If you want to complete a DLT portfolio you should try to find a teaching mentor from within the Division. 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.

Reading some relevant 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 an expert in educational literature. However, you are expected to be able to link what you do read to your own teaching practice/context. You are expected to draw on this reading explicitly in your portfolio.

Suggestions for reading are provided in appendix 5. 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.

One way to engage with educational literature and find ways to make constructive links with your own teaching is to attend the *Teaching and Learning: Science not Magic* workshops run by the MPLS Division. See appendix 4 and the MPLS website for more information and to find out when the workshops run.

Production of a portfolio of 2500–5000 words

The written portfolio is the item which is assessed for accreditation as an Associate Fellow of the HEA. 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 that you write about your teaching practice: exploring your values, describing your teaching strategies, and explaining why you make these choices. You are expected to make use of educational literature and concepts in order to explain your approach and your reasoning. Details of the assessment criteria are provided in appendix 2.

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 the requirements (appendix 2). 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, if you are discussing your approach to giving written feedback, then it is very helpful to include one or two actual examples in an appendix, and to refer the reader to these. If you are discussing a classroom assessment technique that you have tried with your students, then the student responses might be included in an appendix for the reader to see. 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 – only include those things that you actually discuss.

Potential Portfolio items

There are many possible activities which can be written about in a portfolio. A few suggestions are made here, but you should not feel limited to these. Most portfolios that are made up of 'items' consist of an introduction, two to three items with some linking commentary, and a conclusion. A few possible items are described below.

A statement of your teaching philosophy

Typically, statements of teaching philosophies are used as the introduction or conclusion of a portfolio, and the ideas, values and beliefs they outline are used to draw together themes in the other portfolio items. Such statements are sometimes required in the US and Canada as part of academic job applications, and would typically answer questions such as: what do I expect to be the outcomes of my teaching? How do I know when I've taught successfully? Examples of US statements can be seen at the following URL: <http://www.crlt.umich.edu/tstrategies/tstpum.php>

More examples are provided in the final workshop in the series *Teaching and Learning: Science, Not Magic* (see Appendix 4). If this series is not running when you are writing your portfolio, you may contact the Educational Development Consultant (Sciences) at the OLI for advice.

Extracts from a teaching logbook or journal

A teaching journal is a good way to record your reactions to your teaching immediately after class when issues and successes are fresh in your mind. You might literally keep a logbook, or quickly record your thoughts using audio or video. For a portfolio you should also write a reflective overview which draws together how you have responded to issues and challenges over time. You may use the prompt questions provided above to help you structure such an item.

A reflective review of your teaching practice

A reflective review is typically made up of your plan of a teaching experience (e.g. a single class or set of classes), a review of how the teaching went, and suggestions of revision for the future. You may wish to draw on educational literature to justify your decisions or to explore any difficulties you encountered. You may use the prompt questions provided above to help you structure such an item. Additional help in writing a reflective review of your teaching will be provided in the MPLS Workshops series, *Teaching and Learning: Science, Not Magic* (see Appendix 4).

An account of a teaching observation

This activity can be undertaken with a peer or a mentor. You may use the guidelines and prompt questions provided above to help structure this, or your department/college's observation guidelines, but we strongly recommend you tailor them to meet your own needs and context.

Student evaluation of your teaching/a course you contribute to

Student evaluation can be undertaken by analysing course feedback questionnaires, interviewing a small number of students on the course individually or in a focus group, or incorporating classroom assessment techniques into your teaching. Be careful to be clear about whether you are asking students to evaluate your teaching or their learning. A portfolio item would review this feedback and implement or recommend changes for the future.

Design of an exercise to help students learn more effectively

Many new teachers come across areas of the curriculum where students struggle to understand a new idea, technique or concept. You might design and critique a new activity to help with this problem. In your portfolio, you could present your design with an explanation of the original problem that you saw students encounter, a rationale for how your activity could help students to learn more effectively, and (if possible) an evaluation of how successful it is in practice. You may use the prompt questions provided above to help you structure such an item.

A review of some educational literature, with a view to developing your practice

For example, you might dip into two or three books/articles on giving lectures or teaching in small groups, and use the findings to inform your own teaching. In a portfolio, you might present this in the form of a plan for a teaching session or course with rationale; or via a discussion of the literature and an evaluation of your practice so far with plans for the future. Be careful to present this as a design/planning activity – you may use the prompt questions provided above to help you structure such an item.

Observation of teaching in a setting which is unfamiliar to you

For example, you could contact a colleague at another university in the UK and request the opportunity to observe some teaching in the institution and discuss with the colleague how teaching at that institution operates. For a portfolio item you could review what you learnt from the experience, and consider how you might develop your practice and knowledge to be able to work in a similar setting.

Other items are possible, but make sure you discuss what you are going to include with your teaching mentor or with a member of the Oxford Learning Institute.

Portfolio Submission and Assessment

Portfolios are assessed three times a year, with the deadline for submission set at **Friday 1st week of each full term**. You may submit a portfolio at any time and it will be held until the next assessment period.

Two printed and bound copies of your portfolio, including a cover sheet (see appendix 1) should be submitted to the Oxford Learning Institute:

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

Any inexpensive binding which ensures the portfolio will hold together is acceptable: there is no need to pay for professional binding. Please also email an electronic copy to Kathryn.black@learning.ox.ac.uk.

Portfolios are assessed by an academic in your division 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. If a portfolio requires revision then support will be offered to you on a one-to-one basis.

If your portfolio is successful, you will be able to gain accreditation as an Associate Fellow of the Higher Education Academy. Once examination results are finalised, the Oxford Learning Institute will upload your name and email address to the Higher Education Academy's Recognition Online website. The HEA will contact you by email asking you to complete your personal details online (please be sure to indicate the position you held at Oxford when completing your portfolio). This creates a personal MyAcademy account for you, where optional features include the possibility of

subscribing to mailing lists, etc. *if you wish to do so*. You will also be able to download your Associate Fellowship certificate from the MyRecognition section of the HEA website. Mentioning your Associate Fellowship may help you when applying for academic jobs, especially those with a teaching focus.

Assessment timetable for 2015-2016

Term	Submission deadline	Results available
Michaelmas term	Friday, 1st Week (16 October 2015)	Week commencing: 25 January 2016*
Hilary term	Friday, 1st Week (22 January 2016)	Week commencing: 14 March 2016
Trinity term	Friday, 1st Week (29 April 2016)	Week commencing: 27 June 2016

*Michaelmas results come later than in other terms because of assessors' involvement in undergraduate admissions work which takes place at the end of term.

Appendix 1: DLT Portfolio Coversheet

Portfolio Coversheet - Developing Learning and Teaching

Candidate Name:		College:	
Department:			
<i>Status in connection with the University of Oxford and its Colleges</i> Tick if applicable	Student	Staff	<i>If staff, who do you work for?</i>
Contact email address:			
Portfolio Title:			Tick if this is resubmission
Portfolio word count, excluding bibliography and appendices [2,500-5,000]:		Term and year of submission:	

Permission to share portfolio

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

I do not give permission to my division and the Oxford Learning Institute to share my portfolio with future portfolio writers	
I do not 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:

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 2: Assessment sheet and notes

Developing Learning and Teaching Portfolio – Assessment Sheet

Candidate name:

Term of Assessment:

Please tick the boxes that apply and supply feedback below

Pass Criteria	Pass	Resubmit	Resubmit Criteria
1. Practice Portfolio includes description, analysis, evaluation and critique of own teaching practice. Teaching includes: <ul style="list-style-type: none"> - Design and planning - Actual teaching - Feedback for students - Review and evaluation 			Teaching practices in the portfolio are described uncritically, without analysis or evaluation.
2. Values/rationale Description and analysis of teaching in portfolio is explicitly connected to candidate's underlying values and/or rationale for teaching.			Description and analysis of teaching in portfolio does not connect candidate's teaching practice to his/her values and/or rationale for teaching.
3. Context Description and analysis of teaching in portfolio demonstrates awareness of student perspectives and of context.			Limited awareness of student perspectives and/or of context is demonstrated, or the student perspective is significantly misunderstood.
4. Educational literature Portfolio makes appropriate use of relevant ideas from educational literature in critical analysis of teaching practices.			Teaching practices described in portfolio items are insufficiently connected to educational literature, or the literature is misinterpreted.

Please include further feedback here (continue overleaf if required). If any areas of the portfolio are borderline/resubmit, please indicate where they fail to meet the criteria and how these issues might be addressed if candidate wishes to resubmit. If all areas are passed, please include feedback comments to the candidate on particular strengths of the portfolio.

OVERALL ASSESSMENT: PASS / RESUBMIT

Assessor:

Date:

Assessment sheet notes

Criterion 1 – Practice

Portfolios should include evidence that addresses each of the following four aspects of teaching. Documentary evidence should be used to support claims made in relation to practice wherever possible. Two of the four aspects of teaching should be analysed in further depth:

- **Design and planning a learning activity:** Lesson plans, lab designs, project plans, designs for a set or course of classes or tutorials, lecture plans with handouts/any visual material can be included for this area.
- **Actual teaching:** Detailed description of tutorials, lectures, classes, labs or other type of teaching.
- **Feedback for students:** Examples of actual feedback provided to students by teachers, or peer feedback exchanged between students.
- **Review and evaluation:** mentor's reports, peer observation reports, student feedback, completed minute papers.

Criterion 2 – Values/rationale

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

Criterion 3 –Context

Candidates should acknowledge and explore the student perspective and contexts which influence teaching, actively considering how a learner may experience a course or teaching setting; exploring how a degree programme or institutional setting affects the teaching undertaken; and/or discussing the specific demands of a discipline or area of study. Items are welcome which compare and contrast different contexts, or which explore contexts beyond Oxford.

Criterion 4 – Educational literature

Candidates are not expected to become experts in educational literature but are expected to incorporate relevant literature to support the 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 are also welcome to refer to items not specified on the list.

Appendix 3: Departmental and divisional DLT 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

Researcher Training Adviser: alison.trinder@mpls.ox.ac.uk

Oxford Learning Institute Contacts for DLT

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

To submit your DLT portfolio email an electronic version and send two bound, paper copies, each with a coversheet (see appendix 1) to:

Kathryn Black, kathryn.black@learning.ox.ac.uk

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

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

Appendix 4: MPLS Workshops in support of the DLT programme: Teaching and Learning: Science, Not Magic

MPLS and OLI run a series of 6 workshops during Hilary Term each year to support you in developing effective educational practices. These workshops provide an opportunity to meet others who are beginning to teach, to discuss ideas from the educational literature and link them to your experiences of effective teaching, and to engage in practical activities leading up to your portfolio. A small amount of reading is provided in advance of each workshop. Participants are encouraged to share their interests and to suggest topics they would like to discuss. The workshops are relaxed and informal, and we hope that you will actively participate and share your ideas in discussion so that all participants can gain insights by hearing about the perspectives and experiences of people in a range of different science disciplines. The aim of the workshops is to allow participants to:

- begin to take a more evidence-based approach to their teaching;
- gain insights by comparing perspectives and experiences with people from a range of different science disciplines;
- and in so doing, gain confidence in their own practice.

Discussions and activities within the workshops may also contribute directly to the DLT portfolio.

Workshops are held weekly from 12.30 to 2.00 in weeks 1 to 6 of Hilary term (if there is sufficient interest, a second series, may be arranged in Trinity term). Tea/coffee is provided and you are welcome to bring lunch. To ensure everyone has a chance to engage individually, we are currently limiting participation to a maximum of 20. In the event that there are more people wishing to attend than places, preference will be given to participants who:

- a) have expressed an intention to write a portfolio and been assigned a mentor;
- b) have either already done some teaching at Oxford or have some teaching organised; and
- c) are able to commit to attending all 6 sessions.

For further details of these workshops, and to register your interest contact:

skillscourses@mpls.ox.ac.uk

Appendix 5: Reading list

The following is NOT intended to be an exhaustive list, but it does provide a starting point. You can also look for things online yourselves. Unfortunately, there is as yet no database of science education research, however Google Scholar works well with the right combination of key words (e.g. undergraduate engineering laboratories).

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* (3rd 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

Connors, 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?* (5th 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

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.

Raine, Derek & Symons, Sarah (Eds) (2005) PossiBilities – a Practice Guide to Problem-based Learning in Physics and Astronomy: A Physical Sciences Practice Guide. Downloaded from:

- https://www.heacademy.ac.uk/sites/default/files/ps0074_factors_influencing_curriculum_development_in_chemistry_nov_2006.pdf

Spiral curriculum

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

Other

Johnstone, Alex (2005) Evaluation of Teaching: A Physical Sciences Practice Guide. Downloaded from https://www.heacademy.ac.uk/sites/default/files/ps0073_evaluation_of_teaching_oct_2005.pdf

Mbajiorgu, Ngozi & Reid, Norman (2006) Factors Influencing Curriculum Development in Chemistry: A Physical Sciences Practice Guide. Downloaded from https://www.heacademy.ac.uk/sites/default/files/ps0080_possibilities_problem_based_learning_in_physics_and_astronomy_mar_2005.pdf

Oxford University Students Union. 2010. *Teaching Review Report*. Oxford: OUSU.

Highly recommended. A section is devoted to the student experience of teaching in the Maths, Physics and Life Sciences division.

Download from http://issuu.com/ousu/docs/ug_teaching_review_report_2010.

Appendix 6: The Higher Education Academy and DLT accreditation

The Higher Education Academy (HEA) provides support to the UK higher education sector by working with individual academics and departments. One key aspect of the HEA's work is to provide national accreditation for teaching development programmes provided at individual institutions, such as the Developing Learning and Teaching programme at Oxford.

Developing Learning and Teaching is accredited at Associate Fellowship level. The HEA also accredit programmes at Fellowship level, for those whose teaching experience is more extensive (often those at postdoctoral level or in their first lecturing position). Candidates who complete a successful DLT portfolio and subsequently gain further teaching experience at Oxford may be interested in participating in the programme that leads to accreditation as a Fellow of the HEA, the Teaching Fellowship preparation programme –

<http://www.learning.ox.ac.uk/support/teaching/programmes/tfp/>

Higher Education Academy Support for Subjects

Until 2011 the HEA supported a network of discipline-based centres which provided a range of services including events, publications and teaching resources. These services are now provided centrally by the HEA which still provides discipline-based support. The following URLs may be of assistance:

<http://www.heacademy.ac.uk/disciplines>

<http://www.heacademy.ac.uk/evidencenet>

UK Professional Standards Framework

The UK Professional Standards Framework for teaching and supporting learning in higher education is a key document that guides education development programmes in the Oxford Learning Institute. It can be found here <https://www.heacademy.ac.uk/resource/ukpsf-2011-summary-document>