



SCOTTISH
MUSEUMS
COUNCIL



Museums as providers of Continuing Professional Development for teachers

Report on the Royal Observatory Edinburgh Visitor Centre's
piloting and evaluation of CPD sessions for teachers, and on the
development of resources to support those sessions

**Prepared for the Scottish Museums Council
by Dan Hillier**

Foreword

Scotland's museums share a commitment to making their collections and learning services accessible and relevant to the widest audiences. Providing Continuing Professional Development (CPD) is not only an audience-broadening avenue that is available to museums; it is a way for museums to improve the quality of support they offer to the formal education sector, and a means of promoting awareness of the wide learning opportunities that museums can offer.

CPD addresses development needs, maximises individual strengths, and equips people with the skills and knowledge they need to keep pace with changes in their professional environments. The expertise that is resident in museum staff and partners can make museums match-fit for the challenge of identifying CPD audiences and hosting or delivering relevant developmental learning.

This report shares valuable insights and instructive findings derived from a pioneering pilot CPD programme led by the Royal Observatory Edinburgh (ROE) Visitor Centre. In reporting on the programme, it outlines elements of best practice and makes practical recommendations for museums exploring CPD as a learning activity.

While the ROE pilot explored museums as hosts for and providers of CPD to teachers, professional development supports practitioners from all sectors. The Scottish Executive intends to promote the Community Learning and Development (CLD) profession, highlighting CLD practitioners as a potential CPD audience, in addition to teachers. Local authorities are able to make museums, galleries and heritage centres part of their CLD strategies. Many museums are already building links with their communities, with schools and local authority departments. The ROE pilot programme demonstrates the benefits of such partnership working.

Acknowledgements

The following individuals and their organisations have provided valuable support and advice to the ROE CPD programme:

Bob Kibble, Moray House School of Education
Hamish Ross, Scottish Earth Science Education Forum
Alison Townley, Primary Teacher, West Lothian Council
Dr John Cooke, Institute for Astronomy at ROE
Dr Marek Kukula, Institute for Astronomy at ROE
Dr Wayne Holland, UK Astronomy Technology Centre at ROE
Stuart Pitt, Secretary to the ROE Trust
Meg Morrison, Education Officer, West Lothian Council
Ken Edwards, Education Officer, Edinburgh Council (now with Moray Council)
Martyn Crawshaw and Louise Sutherland, Teachers, Highland Council
Rhona Goss, Head Teacher, Angus Council
James Moore, Assistant Head Teacher, Fife Council
Jack Jackson, HM Inspector of Schools, Scottish Executive Education Department
Lesley Cameron, Head Teacher, West Lothian Council
Fiona Wilson, Access and Learning Officer, Dumfries & Galloway Museums
Helen Powell, Operations Manager, Highland Folk Park
The Highland Hotel, Newtonmore

The ROE Visitor Centre is supported by the Particle Physics and Astronomy Research Council (PPARC), and the three organisations based at ROE:

- the UK Astronomy Technology Centre, a PPARC establishment;
- the Institute for Astronomy of the University of Edinburgh; and
- the ROE Trust

Acronyms

CPD	Continuing Professional Development
GTCS	General Teaching Council for Scotland
IfA	Institute for Astronomy of the University of Edinburgh
PPARC	Particle Physics and Astronomy Research Council
ROE	Royal Observatory Edinburgh
SESEF	Scottish Earth Science Education Forum

Royal Observatory Edinburgh

Visitor Centre

Blackford Hill

Edinburgh

Tel 0131 668 8404

Fax 0131 668 8407

Email vis@roe.ac.uk

Web www.roe.ac.uk/vc/

Scottish Museums Council

County House, 20-22 Torphichen Street
Edinburgh EH3 8JB

Tel (switchboard) 0131 229 7465

Tel (information service) 0131 538
7435

Fax 0131 229 2728

Email inform@scottishmuseums.org.uk

Web www.scottishmuseums.org.uk

A large print version of the text is available on request.

Contents

Introduction	1
Royal Observatory Edinburgh and the Scottish Earth Science Education Forum	1
What is Continuing Professional Development?	2
How do museums benefit from providing CPD?	2
Increasing demand for CPD	3
Promoting museums' unique assets as learning environments	3
Teachers: a growing CPD market	4
Issues for museums as providers of CPD	4
ROE CPD for teaching 5-14 Earth in Space	4
<i>The process of developing CPD</i>	5
<i>Delivering CPD for teachers: challenges and opportunities</i>	6
<i>Evaluating the urban and rural CPD pilots</i>	7
<u>Observations on shared and particular challenges and opportunities</u>	
1. Museums as host venues for CPD for teachers	
2. Do joint CPD/public events increase the viability of running CPD sessions in museums?	
3. The format for CPD in rural areas	
4. Developing a nationwide CPD programme through partnership with local authorities	
<u>Summary of evaluation findings</u>	
Recommendations for museums	11
Epilogue	16
Further reading and resources	17
Appendix A: Summary of the ROE/SESEF pilot CPD	
Appendix B: Comparison of the four pilot events	
Appendix C: Issues for museums CPD providers or hosts to consider	
Appendix D: Distinctive aspects of ROE's CPD	

Introduction

In May 2003, the Royal Observatory Edinburgh (ROE) Visitor Centre led a consortium of nine organisations, including five local education authorities, to win a major contract from the Scottish Executive to develop CPD materials as part of the national 'Improving Science Education 5-14' initiative. For the ROE, this was the culmination of three years' work in developing its role in CPD. Drawing on that three-year experience, this report offers advice and recommendations for museums considering a role in CPD delivery.

Royal Observatory Edinburgh and the Scottish Earth Science Education Forum

The ROE has been at its Blackford Hill site, south of the city centre, for over a century. With some 150 staff, it comprises three main organisations: the UK Astronomy Technology Centre (UK ATC) of the Particle Physics and Astronomy Research Council (PPARC), the Institute for Astronomy (IfA) of the University of Edinburgh, and the ROE Trust. The ROE Visitor Centre is part of the UK ATC and is supported by all three organisations.

The Scottish Earth Science Education Forum is a young organisation, established in 2002. A network of individuals interested in promoting geological, meteorological and astronomical sciences, its membership is drawn largely from teaching and academia, including museums.

Partnership between ROE and SESEF came about through the two organisations' close links with the University of Edinburgh, particularly the university's Moray House School of Education.

What is Continuing Professional Development?

Continuing Professional Development (CPD) is the process by which professionals update their skills and knowledge throughout their careers. The Museum Association describes CPD as:

“a process that allows people to enhance their knowledge, skills and competence throughout their careers...it involves a variety of activities including reflecting on what you do, making your work more focused and taking on new challenges.”

‘Inset’ or ‘in-service’ training has been the main avenue for teachers wishing to update or refresh their skills. These one- or half-day events are a key element of CPD programmes, but do not define the limits of CPD. ‘The range of experiences that contribute to teacher development is very wide and should be recognised as anything that has been undertaken to progress, assist or enhance a teacher’s professionalism.’ (Scottish Executive 2002, *Continuing Professional Development: Teaching in Scotland*). CPD can include activities like ‘developing school, local authority and national policies; ... secondments; professional reading and research; mentoring/supporting colleagues; curricular planning/development;...working with others, including as part of inter-agency teams ...subject-based activities including involvement with professional bodies and associations...’(Scottish Executive, *Professional Review and Development 2002*)

How do museums benefit from providing CPD?

Supporting learning is a core museum function. While CPD may seem a departure from learning activities such as receiving schools visits, conducting adult education and captivating tourists, it is an important learning area. Key to advancing and enhancing professional skills, CPD for teachers is an efficient and effective way of indirectly supporting pupils’ and students’ learning. Museum-based CPD can influence the way teachers make use of museums and objects throughout their careers.

Increasing demand for CPD

The teachers' pay and conditions agreement, *A Teaching Profession for the 21st Century*, also known as and referred to in this document as 'the McCrone Report', requires teachers to undertake 35 hours of CPD annually, outside their teaching commitments. 'Teachers are required to agree an annual CPD plan with their immediate managers and to maintain a record of the CPD activities they have undertaken.' (Scottish Executive 2002, *Continuing Professional Development: Teaching in Scotland*) This not only formalises the role of CPD for Scottish teachers; it will increase their demand for high quality and relevant CPD. Additionally, the national Chartered Teacher Programme (CTP) aims to recognise, reward and retain the best classroom teachers. 'Access to the programme [is] open to the top of the main grade who have maintained a CPD portfolio.' (Scottish Executive 2002, *Continuing Professional Development: Teaching in Scotland*)

Recognising the opportunities that the McCrone Report and national funding offer, many organisations are taking on the task of providing responsive and relevant CPD. Museums, as providers or hosts of CPD for teachers, will need to rise above that competition, their unique assets giving them some advantage in this.

Promoting museums' unique assets as learning environments

Among those unique assets is the museum environment itself. Museums can stimulate new perspectives and their expert staff can offer other professions, like teaching, new ideas and approaches. Museums – their staff, environments, collections, and interpretative expertise – can bring fresh ideas and approaches to teachers and classroom techniques.

A CPD event offered by a museum can open teachers' eyes to the museum as a resource to support their work. The introduction gives museums an opportunity to highlight the other services and activities they offer.

Setting up CPD events brings museum staff into contact with inspiring and motivated educational professionals. It strengthens links between museums, schools and the

education sector as a whole. Ultimately, museums might aim to integrate CPD for teachers with their work for schools.

Teachers: a growing CPD market

There are around 50,000 teachers in Scotland. The diverse CPD needs of this large market – dealing as it does with the vastly different needs of children from pre-school to late-teen years – are underscored by the marked divisions that exist between primary and secondary teaching. Although one aim of the 5-14 guidelines is to ease the transition for pupils between primary and secondary education, inevitable differences between the classroom styles and subject treatments of primary and secondary teachers remain.

Secondary teachers are likely to be subject specialists and to view CPD as a means of updating their personal knowledge and understanding of their particular subject. Primary teachers are masters-of-all-subjects and are as likely to view CPD as a means of refreshing their classroom strategies as building subject knowledge. CPD deliverers must be cognisant of these differing needs and interests.

Issues for museums as providers of CPD

While ROE's CPD work has been aimed at science teachers, the experience offers lessons for museums considering a role in CPD provision for any subject.

ROE CPD for teaching 5-14 *Earth in Space*

ROE has been developing its role in CPD since a major review of the ROE Visitor Centre in 2000. This concluded that the ROE Visitor Centre's priority would be to develop its role in supporting science education. The decision was strongly influenced by the Scottish Executive Education Department which advised that science organisations should contribute to the growing field of CPD for teachers. The Scottish Science Strategy, a Scottish Executive initiative to 'maintain the excellence of our science base in Scotland' (Scottish Executive (2001) *Working Together for*

Scotland: A Programme for Government, in *A Science Strategy for Scotland*) undertakes to ‘support ... initiatives to ensure high quality updating of [teachers’] skills’.

The ROE’s project culminated in four pilot CPD events. Two were held in urban areas, and two took place in rural museums. This tested the differing CPD needs of urban and rural teachers and compared the roles of museums both as providers of and hosts for CPD sessions. ROE hosted one of the urban pilots at the observatory. The second event was held at a training centre, maintaining ROE’s dual role as host and provider. The two rural pilots were held in museums, examining the role of museums as hosts for CPD for teachers.

The process of developing CPD for teachers

Advisory panel: The ROE formed an advisory panel of teachers, head teachers and educationalists to focus on CPD for 5-14 science teaching. The *Earth in Space*, one of nine attainment targets in the 5-14 science guidelines, exemplified a key issue for 5-14 science teaching: that many teachers have a low level of confidence with 5-14 science, and this lack of confidence contributes to poor teaching of the area.

Market research: The University of Edinburgh awarded the observatory’s Institute for Astronomy a grant of £7,000 to carry out market research surveying 100 teachers and head teachers in four local authority areas. The grant was part of a university ‘knowledge transfer’ programme encouraging university departments to share expertise with professions. The survey provided mixed feedback on the type of CPD teachers required. This information indicated a range of issues, listed at Appendix C, for museums to consider as CPD providers and/or hosts.

Options study: Through their close links with the University of Edinburgh, ROE and SESEF became partners. SESEF, a network of individuals interested in promoting geological, meteorological and astronomical sciences, commissioned an options study to clarify the approaches to CPD that ROE and SESEF might undertake in collaboration with each other.

In 2003, ROE and SESEF secured a £5,000 grant from the Small Award scheme run by PPARC to develop and pilot CPD for the *Earth in Space* part of the 5-14 curriculum. ROE commissioned an experienced science educationalist to develop a CPD resource pack which ROE scientists and SESEF teachers reviewed.

The early research and consultation raised key issues relevant to any CPD developed by a museum. There was clear evidence that teachers predominantly look for:

- trainers with credible classroom experience;
- trainers who can enthuse;
- teaching ideas that are curriculum-linked and can be readily applied to their classrooms;
- signposting to good quality written resources, many of which already exist but which teachers do not have time to find or appraise; and
- “twilight” CPD events, typically two-hour sessions that take place locally after school.

Delivering CPD for teachers: challenges and opportunities

While urban and rural locations share common challenges and opportunities for CPD provision, rural locations present additional considerations for CPD providers. To test the challenges offered by, for example, smaller and sparser populations, remoteness, and differing teaching needs, the Scottish Museums Council sponsored two pilots at rural museums. The CPD pilots at Dumfries Museum and Camera Obscura and the Highland Folk Park in Newtonmore combined CPD with public astronomy activities.

The rural pilots tested challenges and opportunities shared with urban locations by examining:

1. museums as host venues for CPD for teachers; and
2. whether joint CPD/public events increase the viability of running CPD sessions, the two issues being relevant to all museums as hosts for CPD.

The Dumfries and Newtonmore pilots also

3. explored the particular needs of CPD for teachers in rural areas;

4. and examined the potential for developing a nationwide CPD programme through partnership with local authorities, an ambition held by the ROE.

Observations on these shared and particular challenges and opportunities emerged from the pilots' evaluations. They are outlined below, correspondingly numbered one to four.

Evaluating the urban and rural CPD pilots

SESEF carried out a detailed evaluation of the first two pilots, conducted in urban areas. They interviewed participants, local authorities, deliverers and project partners. SESEF also interviewed a small number of participating teachers, one year after they attended the pilot sessions. Appendix A outlines details of the urban pilots. Appendix B compares the formatting, scheduling and conduct of the urban and the rural pilots.

Responses to feedback sheets, completed by most of the 50 teachers who attended the rural sessions, and interviews with key individuals involved in staging the events contributed to the evaluation of the Dumfries and Highland pilots.

Observations on shared and particular challenges and opportunities

1. Museums as host venues for CPD for teachers

While all the pilots, rural and urban, took place in spaces of differing dimension and character, the majority of participants at all the sessions felt that the museum offered a 'good' or 'very good' venue. In written comments, the issue raised most frequently was lack of space at one of the venues. The ROE's experience demonstrates that all new venues present different challenges to anticipate and overcome.

In tune with their varying responses as to whether coincident public events attracted them to participate in the CPD sessions (see below), teachers at the rural events expressed divergent views on whether the museum as a venue attracted them to the event. Nearly three quarters were largely uninfluenced by the venue while the remainder were enticed by the museum setting. We can conclude that the museums played a positive but modest role in encouraging teachers to attend these CPD sessions.

The museums had a positive influence on the trainers and astronomers, motivating them to invest time and effort in travelling to and delivering the events, and rewarding them with the museums' reception and attraction of public interest. The pilots' trainers and astronomers thrived on working with both the teachers and the public and have expressed interest in taking part in future events.

2. Do joint CPD/public events increase the viability of running CPD sessions in museums?

Did the public events attract teachers to the CPD? Feedback from both rural sessions showed divergent views among teachers on this point. Three quarters said the events made little or no difference to their decision to attend. But a small number were positively influenced to attend, 'a lot' or 'quite a lot', by the public activities.

Did the events affect the organisation of the CPD session? For the organisers, the combined public/CPD rural events meant swift reorganisation between the CPD and public sessions. One of the trainers felt that if public events mean more museum staff are present, this can only aid the running of the CPD sessions. Such events take time to organise and small museums would need assistance in advance and on the day to ensure smooth running.

The astronomers who ran the public activities also took part in the CPD, a role that was new to some of them. This illuminated the need for ROE to cultivate a number of astronomers to enable them to work with teachers in a CPD session as well as running public outreach activities.

Did the joint event affect the viability of running the CPD session? While teachers' fees will cover the cost of delivering CPD sessions, events in rural areas can incur additional travel, subsistence and accommodation costs. By combining CPD with public events, ROE explored the financial viability of bringing trainers and astronomers to a rural area, the public activities generating additional income to subsidise costs. The Scottish Museums Council's sponsorship provided that income for the pilots. But the exercise revealed that museums, or the CPD provider (if the

museum is acting as a CPD host rather than deliverer), need to raise sponsorship money or charge admission to the public activities. Both public sessions were well attended, but even if the public had been charged a reasonable fee to attend, it is unlikely this income would have adequately cross-funded the CPD sessions.

Community collaboration was responsible for increasing the viability of the Highland pilot. A local hotel offered the ROE team free accommodation as a way of supporting the event. Such cooperative arrangements can make a critical difference to the viability of bringing a team to run CPD and public activities to a rural area's museum.

3. The format for CPD in rural areas

Both rural pilots ran for two to three hours. The content and delivery had been tried and tested in earlier pilots and again received positive feedback.

The scheduling of the two events differed. Dumfries and Galloway Council, like many rural authorities, tries to offer CPD events in the east and west to make them accessible to all teachers. The pilot at Dumfries Museum was fully booked within two weeks of being advertised. It was held between 4.00pm and 6.00pm, prior to the public event at 7.00pm. The Highland session was held on a Saturday morning to allow teachers the time they needed to travel lengthy distances across the region to attend. Feedback revealed that many participants would welcome events that were local to them.

Because teachers in rural areas often care for 'composite classes', they need to accommodate the needs of children of different ages and abilities. In response to this fact, both pilot sessions covered all levels, from A-F, an approach which was appreciated by the participants.

4. Developing a nationwide CPD programme through partnership with local authorities

ROE invited museums to host the combined CPD and public events, rather than "cold calling" relevant local authority education departments. Despite initial interest

from several museums, they ultimately cited a number of reasons for not being able to host an event:

- Winter closure of the rural museum made it costly to re-open the buildings for a CPD event held during the autumn school term.
- The workload at a small independent museum made it difficult to devote sufficient time and energy to hosting the event.
- The demands of Christmas events made it difficult to devote the time necessary to stage a CPD event in the winter school term.
- The museums felt there were not sufficient links between the content of the CPD and its collections to justify staging the event.
- Additionally, local authorities were neutral about the idea of the pilot event.

Overcoming such barriers, Dumfries Museum and Camera Obscura and Highland Folk Park expressed enthusiasm for hosting an event. From the Dumfries museum's perspective, the well-regarded reputation of the ROE and its partners made it easy to persuade local authority education officers to endorse the event and help promote it. The Highland pilot was greatly assisted when Highland Council appointed two seconded teachers to promote CPD for science education in the region.

For both museums, it was the public events, rather than the CPD sessions, which proved incentives to taking part in the pilots. The public events brought exciting astronomy activities to the museums and this fact persuaded the museums to stage the CPD sessions.

Summary of evaluation findings

- Teachers in rural areas have relatively few opportunities to attend local CPD events. If rural museums can use the national network of museums and educational organisations to bring CPD sessions to their local areas, they are likely to be well attended.
- CPD sessions have specific space and logistical requirements. These may be barriers for some museums that would otherwise wish to host CPD sessions.
- CPD providers may see museums as interesting and stimulating venues in which to run CPD sessions.

- Linking public events with CPD can create activity that justifies the distance travelled by the providers, particularly if local sponsorship and cooperation supports the initiative.

Recommendations for Museums

The following recommendations for museums interested in developing or hosting CPD programmes for teachers are based on the evaluation of the pilots and on ROE's wider experience of developing and running CPD sessions. Although that experience is rooted in science education, it is likely that many of the approaches and issues will be relevant to any part of the 5-14 guidelines.

Build your network for CPD for teachers

Developing high quality CPD for teachers requires expertise in:

- the subject area
- approaches to teaching and learning relevant to the subject area
- understanding teachers' needs in this area
- writing and creating CPD materials
- planning and running CPD sessions for teachers.

It is unlikely that any member of your museum staff will have all the above skills. You will need to work in partnership with other organisations and might consider the following:

- ***Your local education authority***

If you do not have close links with your local education department, a CPD project might be the trigger to create one. Involve your local education officers from the outset: approach them for advice and maintain the liaison throughout your programme's development, delivery and evaluation. 'Local authorities are responsible for ensuring teachers have access to a wide range of quality development opportunities' (Scottish Executive, *Continuing Professional Development: Teaching in Scotland*), so make your CPD provision, or potential for it, known to your local authority.

- ***Teachers and head teachers***

Careers Scotland's 'Excellence in Education through Business Links' programme

can fund up to five days of teachers' time on a CPD project. So secondment is an avenue for importing expertise into your CPD programme development.

- ***Teacher training college***

Individuals at teacher training colleges may also import the skills and enthusiasm you require for running CPD sessions.

- ***Education consultants***

As important as partnering the right organisations, you will need to find individuals who can complement your own staff's strengths and personalities to form a strong CPD team.

Identify needs and wants

Your network or partners will help you identify what local teachers need and where you have potential strengths to support them. Many museum educators will feel that learning through objects is their starting point for helping teachers, particularly as this can take place in the classroom as well as the museum. Listen to the opinions of teachers and education advisers and be aware that teachers' wants may not be the same as the needs defined by educationalists. For example, the role of Information and Communications Technology (ICT) in education is often a source of debate when developing CPD. Again, listen to your network to define the appropriate approach for your CPD audience. Regular discussion with all partners is essential to reaching a shared view of good quality teaching and how CPD can support this.

Define format and materials

Holding twilight half-day CPD sessions and resisting the temptation to cover too much content at once is a good place to start. Your local authority can advise on optimal dates and times for scheduling CPD events.

Teachers expect to leave a CPD session equipped with a resource pack. The ROE resource pack is a 90-page, black and white, spiral-bound document. Your early development work is likely to focus on the production of your resource pack, a high quality reference which teachers will use.

Equip the museum space for the CPD session

While teachers are likely to appreciate the fresh surroundings of a museum, this novelty should not be at the expense of the practical requirements for a CPD session which include:

- seating for up to 25 participants;
- table tops for setting out demonstration teaching equipment for teachers to try out and discuss;
- appropriate IT and visual aids;
- satisfying catering (an important criterion, especially for successful twilight sessions).

Market your CPD

Local authority education departments are invaluable partners for marketing CPD. Teachers look to their authority first and foremost for CPD opportunities. Ideally, your event should be included in their annual CPD programme, which is usually prepared in May and June for the following school year. Local authority education advisers and CPD managers can also help identify and target areas of need among local teachers and may actively encourage teachers to sign up for your event. Coloured A4 fliers are also effective as advertisements on staffroom notice boards. Be mindful that it is difficult to predict the uptake of training events – an event that does not book up on one date might be a sell-out two months later.

Plan and deliver your CPD sessions

Well-developed planning and management skills are vital to effective CPD delivery. To make the most of a two- or three- hour workshop, you will need to set appropriate and realistic aims for your CPD sessions. You, or your CPD deliverer, must be able to manage time well and be capable of confidently leading a group of adults with varying personalities and objectives. Obviously, CPD providers must be able to work well with adult learners, but this may be a transition that some teachers acting as CPD deliverers may find daunting.

Enthusiasm, credibility with teachers and subject expertise are key attributes for CPD trainers. If your trainer has these attributes, the additional subject expertise of other

museum staff may be warmly welcomed by many participants. The enthusiasm of museum staff and experts, like the ROE's astronomers, for sharing their knowledge with others is a competitive advantage museums hold over other potential CPD providers.

Be aware of the risk inherent in having only one person able to deliver your CPD sessions. If he or she leaves, you may be left with a skills vacuum, rendering the museum incapable of delivering CPD. To minimise such risk, your CPD team should include, or have access to, more than one person skilled in delivering CPD. And to help sustain the organisation's growing CPD capacity, write notes to guide future trainers. Even if you do not plan to lead the sessions yourself, attend 'Train the Trainer' courses. The CPD organiser also needs to understand the skills involved in delivering relevant and effective CPD sessions.

Every museum is unique, and the combination of in-house and imported training skills, and local teacher needs, differ from region to region. The scheduling, focus, content and conduct of CPD programmes need, not only to answer identified needs, but to respond flexibly changing requirements.

Evaluate your CPD sessions

Feedback sheets are essential for monitoring the quality of your CPD and may include questions on applicability and relevance of content, appropriateness of format, effectiveness of delivery, practicality of venue and suitability of catering. Evaluation of the longer-term impact on classroom practice and learning is a specialist research activity that is not widely conducted. But building long-term links with teachers, schools and local authority education departments will eventually reveal long-term results, for all participants. Reflecting on the strengths and weaknesses of your pilot sessions with your partners is likely to be your greatest source of feedback and will quickly build your understanding of what works for your audiences and what doesn't.

Consider accreditation

With the aim of providing a database of good quality CPD sources for teachers, the

General Teaching Council for Scotland has set up a National Register of CPD providers. To be registered, CPD providers must outline the quality assurance procedures they employ. So registration on the General Teaching Council for Scotland's database would recommend your CPD services. Many teachers will welcome a certificate to acknowledge their attendance at your session.

The national Chartered Teacher Programme (CTP) aims to recognise, reward and retain the best classroom teachers. 'Access to the programme [is] open to the top of the main grade who have maintained a CPD portfolio.' (Scottish Executive, *Continuing Professional Development: Teaching in Scotland*) Contact your local teacher education college if you wish to investigate how you might contribute to their CTP.

Accreditation is closely linked to marketing, endorsement and awareness-raising being common to both processes. Market forces can be as effective as accreditation in sorting the good from the poorer providers. In practice, your links with your local education department and word-of-mouth recommendation are likely to be the ways you develop your reputation.

Examine costs of developing and delivering CPD

Costs depend on each organisation's circumstances, but the ROE's experience may offer some initial guidance:

- The ROE CPD programme cost £3,000 to develop, including copying costs for the pilot resource packs.
- Teachers will pay up to £25 for a twilight session.
- ROE pays trainers a professional fee of £350 per day, commensurate with other specialists working for museums. This ensures that the expertise and commitment of the trainer is appropriate to the standards required in delivering effective CPD.
- Partner organisations provided invaluable in-kind support.

Epilogue

The ROE CPD programme is continuing to develop and expand. An ROE-led consortium seconded three teachers for one year (2003/2004) to develop and pilot workshops and residential Easter and summer schools, and to train teachers to become CPD facilitators. A project officer will take these sessions to education authorities throughout Scotland during 2004/2005.

Meanwhile, ROE is developing a new workshop to encourage and support teachers to practice astronomical observation in their schools. This project is being developed in partnership with the Edinburgh Cultural Coordinators and has funding from the Scottish Museums Council.

The ROE is now discussing future CPD events with around five Scottish museums. Working with museums as venues for CPD has attracted interest within the science education sector.

Further reading and resources

While CPD for teachers has been around for many years, the experience of providers within science education has not been extensively written up and codified. As the ROE's experience demonstrated, much advice lies in networking, commissioning studies and piloting. You can also develop your understanding of CPD by visiting the websites of:

General Teaching Council for Scotland	www.gtcs.org.uk
Learning and Teaching Scotland	www.ltscotland.org.uk
Careers Scotland Excellence in Education through Business Links	www.careers-scotland.org.uk
Group for Education in Museums	www.gem.org.uk
National Grid for Learning	www.ngflscotland.gov.uk
Scottish Cultural Resource Access Network (SCRAN)	www.scran.ac.uk
Scottish Museums Council Learning and Access Team	www.scottishmuseums.org.uk
Royal Observatory Edinburgh	www.roe.ac.uk
National Priorities in Education	www.nationalpriorities.org.uk
Teaching in Scotland	www.teachinginscotland.com
Chartered Teacher Project Consortium	www.ctprogrammescotland.org

Appendix A: Summary of the ROE/SESEF pilot CPD

The following table describes elements of the ROE/SESEF CPD common to all four pilot events, providing an initial checklist for any CPD project being developed.

Curriculum coverage	<p>The ROE/SESEF CPD covers the <i>Earth in Space</i> part of the 5-14 science curriculum. <i>Earth in Space</i> is approximately one ninth of the 5-14 science curriculum and covers shadows, night and day, moonphases, planets, space exploration, stars and galaxies, and ideas about the Universe.</p> <p>The explicit emphasis is on Knowledge and Understanding and practical teaching ideas for the subject. There would be an implicit approach to promoting new teaching and learning strategies.</p>
CPD resources	<p>ROE created three resources:</p> <ol style="list-style-type: none">1. Resource packs for teachers were distributed through the CPD sessions. This is a 90 page, black and white, spiral-bound document. The six main sections correspond with key topics in the <i>Earth in Space</i> curriculum. Each section includes:<ul style="list-style-type: none">▪ a narrative discussing the key ideas and misconceptions of the subject; and▪ a set of practical suggestions for teaching the key ideas.2. A set of demonstration teaching equipment. The teaching equipment consisted of material that could be readily acquired by any teacher. A positive decision was made not to focus on use of ICT as there are varying facilities and competencies within schools.3. Notes for trainers providing guidance on how to use the resources during a CPD session.
CPD trainer	<p>Alison Townley, a teacher from St Joseph's Primary School, Bathgate, was seconded through Careers Scotland's 'Excellence in Education through Business Links' programme to be trained by Bob Kibble to run the pilot CPD sessions. Alison ran the pilot sessions in partnership with John Cooke, an astronomer at ROE.</p>
Delivery of session	<p>The format of each pilot varies (<i>see following table</i>) but each session typically involves the trainer:</p> <ul style="list-style-type: none">• introducing the teaching equipment and activities• letting the teachers try out a number of activities• facilitating discussion on how these might be used in the classroom.

Appendix B: Comparison of the four pilot events

The following table summarises how the four pilot events (two urban, two rural) varied from each other.

	West Lothian (urban)	Edinburgh (urban)	Dumfries (rural)	Highlands (rural)
Venue	Livingston Education Centre, a local authority CPD venue	Royal Observatory Edinburgh	Dumfries Museum and Camera Obscura (a former observatory)	Highlands Folk Park, Newtonmore
Duration and scheduling	After-school twilight session 1600 – 1800	Sandwich course <i>Session I</i> : full Saturday at the Observatory; <i>Session II</i> : twilight session two months later	Twilight session 1600 – 1800, followed at 1900 – 2100 by public astronomy activities	Saturday morning session 1000 – 1300; ROE also ran public astronomy activities, in parallel with the CPD and in the afternoon.
Format of session	Twilight session followed the delivery described in table at Appendix A	Full day and twilight activities supplemented by: presentation by ROE astronomer on working at the observatory; and a session critiquing the Visitor Centre for school visits. The follow-up session discussed teachers' experiences of using the new ideas in the classroom.	Twilight session: public astronomy activities included observing with telescopes, meteorite handling and a comet-making demonstration	Twilight session: in the afternoon, ROE ran Starlab inflatable planetarium sessions for the public and demonstrated techniques for safely observing the forthcoming Transit of Venus
Venue for session	Training room at the centre	Classroom-type area in the observatory's Visitor Centre (with spectacular views over Edinburgh)	Museum exhibition areas, including a mezzanine floor.	A traditional corrugated iron Highland Church building. The space was effectively classroom-sized.

Appendix C: Issues for museums CPD providers or hosts to consider

The ROE's and SESEF's early research underlined a number of issues which attracted contradictory opinions from teachers and educationalists and highlighted inconsistencies between teachers' demands and the advice of the advisory panel and educationalists. These issues remain unresolved but indicate areas which museums considering a role in CPD delivery or hosting should examine.

1. Do venues such as the observatory or museums offer alternative, more inspiring settings for CPD, than a school or local education resource centre?
2. How should the subject expertise of museum professionals be used for CPD?
3. Should the content address both the teacher's knowledge of the subject and how to teach it in the classroom? Educationalists are keen to improve both. This would involve promoting different approaches to teaching science, e.g. greater use of questioning and thinking skills and improving teachers' own subject knowledge or providing ready-made teaching activities.
4. Should the CPD provide ready-made teaching activities or require teachers adapt resources to their classroom?
5. Does the convenience of a 'twilight' session after school outweigh the potentially more comprehensive experience of a full day CPD event?
6. Is it possible to develop high quality CPD events throughout Scotland without the need for ongoing subsidy or project funding? Past project experience in science education has shown it is possible to provide one-off high quality and stimulating CPD with sponsorship or project funding. ROE wanted to develop a model of CPD that could grow into a national programme, reaching teachers across Scotland. The model needed to be affordable for teachers and yet financially viable for ROE to sustain.

Appendix D: Distinctive aspects of ROE's CPD

The ROE opted to develop pilot CPD events that are perhaps likely to differ from CPD developed by other museums in three main respects:

1. The ROE pilots focused on supporting classroom practice instead of encouraging teachers to use museum resources by, for example, bringing classes to the museum.
2. The ROE CPD sought to improve primary school teacher *confidence* in teaching science, low confidence with science being a key issue for many primary teachers and one which hinders their ability to teach science effectively. Museums need to identify teachers' requirements in the subject area they choose to address.
3. The ROE has a long-term aim to offer a nationwide programme of CPD creating a national network of CPD trainers. It therefore chose to experiment with training trainers. Providing local CPD events that require just one or two individuals reduces the complexity of the challenge.