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Literature Review
on Teacher Education
in the 21st Century

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LITERATURE REVIEW ON TEACHER EDUCATION IN THE 21st CENTURY

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EXECUTIVE SUMMARY

The study

1. This literature review was commissioned by the Education Analytical Services Division (EASD) of the Scottish Government and undertaken between April and July 2010. The review of literature forms part of a larger programme of work contributing to the Review of Teacher Education in Scotland (RTES). The RTES is examining how the current system of educating teachers equips teachers throughout their professional career to respond to curriculum change and meet the needs of pupils in the 21st century.

2. The overall aim of this literature review is *'to understand the contribution that teacher education can make to the quality and effectiveness of the educational experience and wider personal development of young people, drawing on effective practice in Scotland and elsewhere'*.

3. The four objectives of this review are to:
   - Provide a high level overview of the current model of teacher education in Scotland, identifying current strengths and areas for improvement.
   - Identify other education systems (which are broadly comparable to Scotland) that have undergone a significant curricula change, have seen a recent rise in educational standards or are already high performing, and explore the contribution of teacher education to their overall strategy, drawing out learning appropriate to Scotland.
   - Explore the relationships between forms of teacher education and the enhancement of professionalism, and between enhanced professionalism and pupil outcomes.
   - Provide an overview of effective practice in evaluating the impact and effectiveness of teacher education.

4. The review focuses on literature from, and about, a number of education systems which were identified in consultation with The Scottish Government. Education systems included are the four nations of the UK, Ireland, France, Italy, Netherlands, Finland, Norway, Australia, New Zealand, United States of America, Canada, Singapore, South Korea and Japan.

5. Literature from a range of sources, including research papers, policy papers and 'grey literature' (papers and reports that are not easily available through conventional publication channels) was selected for review, informed by a 'best evidence' approach. This requires the reviewer to identify criteria for determining good quality research and high quality evidence and place more emphasis on those studies that match the criteria than on those that have identifiable shortcomings.

The review

6. Section 2 reviews current provision of teacher education in Scotland. There are found to be many strengths in the system, including a number of distinctive features such as the schemes for induction and for chartered

teachers. Initial teacher education in Scotland has developed and maintained a strong intellectual and academic base. However, partnerships between the various contributors to teacher education are found to be underdeveloped, at least on a nationwide basis. School staff currently play a relatively limited role in the tutoring, support and assessment of student teachers. A number of other aspects are identified as providing scope for improvement, including continuing professional development (CPD) immediately beyond the induction year; CPD for serving headteachers; planning of teacher workforce requirements; and training for provision of integrated children's services.

7. Section 3 considers the links between teacher education and teacher professionalism. Four models of teacher professionalism emerge from policy and research literature, all of which have some strengths. These are: the effective teacher; the reflective teacher; the enquiring teacher; and the transformative teacher. The dominant model of the effective teacher emphasises technical accomplishment. The reflective teacher model has been influential in UK teacher education from the 1980s and emphasises the need for continuing and collaborative professional learning. The enquiring teacher model promotes an explicit research orientation within teachers' work. The final model seeks to revitalise debates on teacher professionalism by positioning teaching as a transformative activity. All four models are pertinent in the Scottish context of *A Teaching Profession for the 21st Century* and *Curriculum for Excellence.* There is found to be little work that relates specific forms of teacher education directly to teacher quality. Evaluations of alternative routes to becoming a teacher in the USA, Netherlands and England report mixed findings and suggest that variations attributed to training route are reduced by subsequent experience of teaching.

8. Section 4 reports on international studies on the association between teacher education, curriculum change and educational standards. Some studies do identify positive associations between teacher quality and educational outcomes. Teacher learning and development, leading to quality improvements, are found to be dependent on a range of factors including making provision relevant to context and the provision of appropriate time and resource. Provision for professional learning across the career span is an important component in most systems where educational outcomes have been improving. The research literature highlights a lack of attention to the professional development needs of teacher educators and the contribution they can make to curriculum change, whether they are school-based or university-based.

9. Section 5 focuses explicitly on pupil outcomes and teacher professionalism. The methodological challenges for research on this topic are considerable and the pattern of evidence that emerges from the work that has been done (mainly in the USA which has a deregulated system of teacher education that is very different to the Scottish system) is far from clear. What work there is tends to focus on a narrow range of pupil outcomes that does not include 'wider personal development'. The achievement and development of the four capacities of *Curriculum for Excellence* – to enable each child and young person to be a successful learner, confident individual, responsible citizen and

effective contributor - will not be fully revealed in attainment measures from national assessments and examinations. Some of the research undertaken in relation to accomplished teachers who have advanced certification does suggest significant teacher learning, especially in terms of formative assessment, and some benefits in terms of improved student attainment. However, overall, the research base on the effects of advanced certification on pupil outcomes is inconclusive.

10. Section 6 outlines that the research literature on effective approaches to evaluating the impact and effectiveness of teacher education is limited. However, a framework of three possible approaches is considered: research-based evaluations of teacher education, inspection of teacher education provision and teacher/school-level self-evaluation. The strengths and limitations of each approach are discussed. Although research can investigate precise questions it is rarely cumulative, long-term or large-scale. Self-evaluation can provide a strong basis for professional development for those concerned but is usually limited in its wider significance. Inspection provides a valuable basis for comparison within, and review across, whole systems but tends to be less flexible and can be less sensitive to particular contexts.

The implications

11. Throughout the report, implications for teacher education in Scotland are suggested as they arise. The literature reviewed suggests that there is scope for a much more integrated approach to teacher education across the career course of teachers. This would incorporate more developed partnerships between the stakeholders, including schools and universities.

12. The Scottish policy context, currently influenced strongly by *A Teaching Profession for the 21st Century* and *Curriculum for Excellence,* is one in which all four models of teacher professionalism (effective, reflective, enquiring, transformative) are important.

13. The literature indicates that all aspects of mentoring, partnership and curriculum design skills may be considered in relation to all phases of teacher learning and development and in relation to the professional development of teacher educators (wherever they are based). It may be important to consider developments at three levels, those of the individual practitioner, the institution and the national system.

14. The conclusion to the report summarises the findings, the implications for Scotland and highlights omissions in the literature reviewed. For example, few longitudinal, large-scale studies or studies that involve repeated measures are reported in the international literature on teacher education. Consequently the research base on teacher education is fragmented and non-cumulative. Much of the research on teacher education in Scotland has similarly tended to be relatively small-scale and piecemeal. Whilst valuable in local contexts, this is less valuable in support of systemic change.

1. INTRODUCTION

Aim, background and objectives

1.1 The overall aim of this literature review is *'to understand the contribution that teacher education can make to the quality and effectiveness of the educational experience and wider personal development of young people, drawing on effective practice in Scotland and elsewhere'*.

1.2 The literature review was commissioned by the Education Analytical Services Division (EASD) of the Scottish Government and undertaken between April and July 2010. The review of literature forms part of a larger programme of work contributing to the Review of Teacher Education in Scotland (RTES) due to be published towards the end of 2010. The RTES, which commenced in January 2010, is examining how the current system of educating teachers equips teachers throughout their professional career to respond to curriculum change and meet the needs of pupils in the 21st century.

1.3 The literature review summarises recent research in teacher education in Scotland, elsewhere in the UK and internationally. For the purposes of this review, teacher education is defined as encompassing initial teacher education, induction and continuing professional development across the life course of a teacher's career.

1.4 The objectives of the literature review are to:

- Provide a high level overview of the current model of teacher education in Scotland, identifying current strengths and areas for improvement.
- Identify other education systems (which are broadly comparable to Scotland) that have undergone a significant curricula change, have seen a recent rise in educational standards or are already high performing, and explore the contribution of teacher education to their overall strategy, drawing out learning appropriate to Scotland.
- Explore the relationships between forms of teacher education and the enhancement of professionalism, and between enhanced professionalism and pupil outcomes.
- Provide an overview of effective practice in evaluating the impact and effectiveness of teacher education.

Scope of the review

1.5 The review focused on literature from, and about, a pre-determined list of education systems. The list was compiled in consultation with The Scottish Government, who sought to identify systems where one or more of the following factors existed: recent major curriculum reform; success in raising pupil achievement; innovative practice in teacher education. Systems included within the review are those found in the four nations of the UK, France, Italy, Netherlands, Finland, Norway, Australia, New Zealand, United States of America, Canada, Singapore, South Korea and Japan (see Appendix 3 for

further details and Table 1).

Table 1. Reasons for inclusion of comparator education systems

Education system	Recent major change to the curriculum	High or improving pupil performance (as indicated by the Programme for International Student Assessment, PISA)	Change within teacher education
Australia	✓	✓	✓
Canada		✓	✓
England	✓		✓
Finland	✓	✓	✓
France	✓		✓
Italy	✓		✓
Japan	✓	✓	✓
Netherlands	✓	✓	✓
New Zealand	✓	✓	✓
Northern Ireland	✓	.	✓
Norway	✓		✓
Singapore	✓	✓	✓
South Korea	✓	✓	✓
USA		.	✓
Wales	✓		✓

1.6 The International Review of Curriculum and Assessment Frameworks Internet Archive (INCA) was used to identify systems subject to recent reform of the school curriculum, where there is also a pattern of increased achievement over time. Sources of achievement measures include the results of the Progress in International Reading Literacy Study (PIRLS), the Programme for International Student Assessment (PISA), and the Trends in International Mathematics and Science Study (TIMSS).

1.7 Whilst drawing on these data to identify school systems with increased achievement over time, the review team acknowledge that there are limitations in using international assessment data as a proxy measure for educational standards, teacher quality or as the basis for international comparisons. International performance tables are constructed using single achievement measures. Interpretation of results requires consideration of long-term development trends for the countries, in addition to appraisal of the reliability and validity of tests and sampling standards (Prais, 2003; Bracey, 2008). A number of studies have challenged the validity of such standardised testing and rank ordering of countries, including the influence of cultural differences between nations, and have challenged the assumption that rising scores equate with rising standards (Tymms, 2004; Bonnet, 2002; Schagen and Hutchison, 2003; Hilton, 2006; Shiel and Eivers, 2009).

1.8 Inclusion criteria were not restricted to studies based on analysis of performance measures from standardised tests and examinations. This review also includes consideration of available data on the contribution of teacher education to the wider personal development of young people. The review team acknowledges that pupil outcomes are multifaceted and include affective, social and cognitive dimensions.

Review methods

1.9 Given the requirements of the Review of Teacher Education in Scotland, and the time constraints for this exercise, the review team conducted a selective literature review, informed by a 'best evidence' approach (Slavin, 2008). This requires the reviewer to identify criteria for determining good quality research and high quality evidence and place more emphasis on those studies that match the criteria than on those that have identifiable shortcomings. However, the latter were not automatically excluded from the investigation, as would be the case in a 'systematic' review, such as those carried out by Evidence for Policy and Practice Information and Co-ordinating Centre (*EPPI*-Centre). (The review criteria are contained in Appendix 1).

1.10 The research team drew on relevant peer-reviewed journal articles, reports of funded research for major funding bodies and research councils, other relevant syntheses of research evidence, government reports and policy documents. In addressing the remit of the review, attention was afforded to research commissioned by, or for, a policy-maker audience. Only literature published in the last 10 years (since 2000) was considered for inclusion, with older literature included only where the reviewers considered it to be 'very influential'.

1.11 A literature search was conducted using three commercial databases, to ensure as wide a coverage as possible, and to allow the research team to 'triangulate' across the three sets of search results, to increase overall reliability. The three databases used were: British Education Index (BEI), the EBSCO Professional Development Collection, and the Web of Knowledge Citation Indices. In addition, the reviewers used the EPPI-Centre library, the TLRP Teacher Education Group Bibliography[1], and a range of specialist sources of grey literature on the internet (e.g. Education-Line) to identify further resources.

1.12 The breadth, diversity and complexity of the subject area of this literature review and the terminology used in its discourse meant that the three databases could not be searched using complex descriptor-based Boolean search terms. Rather, the approach taken was to identify only the broadest descriptors (using the thesauri offered by each database-provider), and to subject these to a number of levels of manual screening (with some overlap between reviewers to allow cross-checking for quality assurance purposes).

1.13 As anticipated, the necessary breadth of the review generated a high volume of items for consideration (see Appendix 1, Search and screening process). Following two screening 'passes' the remaining retrieved records were organised according to sub-field: records relating to initial teacher education, induction, early professional learning, continuing professional development, chartered teacher/advanced certification/lead practitioners and leadership development were grouped and shared amongst reviewers with expertise in that area of teacher education. The synoptic fields of partnership and professionalism were also used as categories in the screening process. Each reviewer considered the relevance and warrant of the papers/reports and met

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[1] http://www.tlrp.org/capacity/rm/wt/teg/

to agree their selection for inclusion in the review. As anticipated, there was some overlap across areas of teacher education in the retrieved records, and overarching papers and reports were reviewed by multiple reviewers.

1.14 The literature selected for inclusion in this review was categorised using a classification system based around the four objectives of the review and this categorisation was recorded. Specialist reviewers then analysed and extracted data from key papers/ reports/ articles focusing on the key strands of enquiry. To assist in the subsequent analysis and report writing, the database contained proforma fields concerning the content of the paper, methods employed in the research, key terms and implications for each of the literature review objectives (see Appendix 2, Database template).

The nature and quality of the data sources

1.15 The relationship between teacher education, curriculum change and pupil outcomes is complex. Given the methodological challenges and resource implications of commissioning major longitudinal, mixed methods studies, the existing research base is not substantial. For example, very few research studies internationally have been commissioned to systematically address the impact of different forms of teacher education on pupils' wider development. Moreover, it should be acknowledged that direct and immediate outcomes are unlikely and consideration of impact often involves the identification of intermediate steps e.g. changes in curricula, school and classroom practices that are necessary for improved effectiveness.

1.16 Most research studies of teacher education have not been designed to identify definitive causal effects. A high volume of the available (English language) research on teacher effects is commissioned in the USA, which has a deregulated system of teacher education (and is very different from the Scottish system – see Appendix 3). School records that link teacher attributes (qualifications, class and subject of degree, teaching experience, age, and gender) and student performance are weak in most school systems internationally and there are difficulties in using tests designed to measure student achievement as measures of teacher quality. There are many dimensions to teacher quality requiring multiple measures over an extended period of time, including careful attention to the context of teaching (Rice, 2003; Goldhaber and Brewer, 2008; for a discussion of definitional issues in regard to 'teacher quality' see Kennedy, 2010).

1.17 Lack of attention to contextual factors (e.g. pupil socio-economic status/gender/support needs; level of teachers' education/subject degree; school type), and the scant funding available for longitudinal studies, large-scale efficacy studies or repeated measures helps to explain why the evidence base on teacher education is somewhat inconclusive as a guide for policy. However, there is much that can be learned from cross-national consideration of teacher education systems and the attempts that have been made to address common technical, conceptual and political challenges.

Structure of the review

1.18 The report is structured around the project objectives (Table 2). Section two provides an overview of the current strengths, weaknesses and areas for improvement of teacher education in Scotland as reported in the research and policy literature (in response to the first objective). Section three considers different models of professionalism in policy and research literature internationally (relating mainly to the third objective). Section four considers evidence of effective practice and is organised according to seven themes: entry requirements for teacher education; mentoring, induction and early professional development; partnership arrangements with schools; continuing professional development (CPD); collaborative approaches to curriculum design and evaluation; recognising accomplished teachers; and issues related to the professional development of teacher educators (relating to the second objective). Section five addresses links between teacher education and pupil outcomes (relating to the third objective). Section six identifies some limitations and challenges in strengthening the research base on teacher education. It considers approaches to evaluating the impact and effectiveness of teacher education including research-based methodology, inspection and self-evaluation (in response to the fourth objective). The report concludes with a review of the main themes identified in the literature and implications for Scotland. Consideration is given to areas that require further investigation and to the methodological challenges of conducting research to examine the links between teacher education, curriculum innovation and pupil outcomes.

Table 2. Objectives and review sections

Section of the Literature Review Report	Objective addressed
2. Teacher education in Scotland	Provide a high level overview of the current model of teacher education in Scotland, identifying current strengths and areas for improvement.
3. Teacher education and professionalism	Explore the relationships between forms of teacher education and the enhancement of *professionalism*, and between enhanced professionalism and pupil outcomes
4. Teacher education, collaboration and professional support	Identify other education systems (which are broadly comparable to Scotland) that have undergone a significant curricula change, have seen a recent rise in educational standards or are already high performing, and explore the contribution of teacher education to their overall strategy, drawing out learning appropriate to Scotland.
5. Professionalism and pupil outcomes	Explore the relationships between forms of teacher education and the enhancement of professionalism, and between enhanced professionalism and *pupil outcomes*.
6. Evaluating the impact and effectiveness of teacher education	Provide an overview of effective practice in evaluating the impact and effectiveness of teacher education.

2   TEACHER EDUCATION IN SCOTLAND

Key points summary

- Current provision for teacher education in Scotland is based around a series of Standards that define the knowledge and understanding, skills and abilities, values and personal commitments expected of teachers.
- Recent policy developments have been strongly influenced by the agreement *A Teaching Profession for the 21st Century* and by *Curriculum for Excellence*.
- Scottish teacher education is considered to have many strengths and several distinctive features such as the induction scheme and the chartered teacher scheme.
- A weakness by comparison with other systems of teacher education is the absence of a fully developed partnership approach across the continuum of teacher education.
- Improvements might be considered in a number of areas including workforce planning, diversity in entry routes, provision in respect of integrated children's services and the development of a research agenda to inform future policy.

Introduction

2.1   The current pattern of provision of Scottish teacher education is influenced both by what has gone before and by recent policy developments. The 2001 *Teachers' Agreement: A Teaching Profession for the 21st Century* (TP21) (SEED, 2001) is particularly significant. But *Curriculum for Excellence* – to be implemented from August 2010 - is having an increasing influence on provision, creating new challenges for all phases of teacher education. This section of the report responds to the first objective of the review and outlines key developments that have influenced policy and practice in teacher education in Scotland, identifying strengths, weaknesses and areas for improvement in the current system.

Significant developments in teacher education

2.2   Through the late 19th Century and the 20th Century, teacher education in Scotland became increasingly professionalised with initial qualifications and a range of postgraduate opportunities being provided by colleges of education and universities. Local authorities and a wide range of providers of continuing professional development (CPD) including commercial companies and consultants provided further opportunities for professional development.

2.3   In common with many other European countries, but in contrast to England, there was a distinct move of initial teacher education (ITE) into the university sector in the 1990s (Kirk, 2003). The bulk of provision for ITE is currently managed by Education Departments or Faculties in seven universities across the country, with some provision through the Open University. Entrants to the teaching profession are all graduates and this has been the case since 1984 (Marker, 2000). Initial qualifications are through a four year degree programme (mainly for primary teachers) or through a one year postgraduate programme

(primary and secondary). Some providers also offer a 'concurrent degree' that provides for the preparation of secondary teachers in particular subjects.

2.4 During the 1990s teacher supply issues led to diversification of routes of entry in England. Diversification in Scotland was restricted to the creation of part-time flexible learning routes on traditional Higher Education Institution (HEI)-based programmes (PGDE and B.Ed.), including online and distance learning.

2.5 In recent years, revisions in the predicted supply and demand for teachers have led to fluctuations in student numbers (Scottish Funding Council circular, 2010) with staffing implications for Teacher Education Institutions. However, whilst there has been change in the way in which provision is managed and governed, the core processes - curricular studies, professional studies and school experience - have remained remarkably constant (Hulme and Menter, 2008:322; Christie, 2008a).

2.6 Issues surrounding fluctuations in teacher numbers are not unique to Scotland. Wales and Northern Ireland have recently responded to the issue of over supply. Following the *Review of ITT Provision in Wales* (Furlong et al, 2006) the Welsh Assembly Government authorised a reduction in overall primary ITT provision by up to 50% and secondary by up to 25% compared with the 2004-05 numbers by 2010/11; and the reconfiguration of ITT provision through three collaborative schools covering North and mid-Wales, South-West Wales and South-East Wales. The Statistical Directorate of the WAG cotinues to develop a Teacher Planning and Supply Model (TPSM) for Wales. The review of *Teacher Education in a Climate of Change* in Northern Ireland has been ongoing since 2003. Widespread consultation has characterised this and subsequent review conferences (2004, 2005 and 2007), and a series of studies has been commissioned by the Department of Education (DE) and the Department for Employment and Learning (DEL) including a review of *Aspects of ITE in Northern Ireland* (Taylor & Usher, 2004). Douglas Osler, former Chief Inspector of Schools in Scotland, was commissioned to provide an overview report of these studies (Osler, 2005). The implications of demographic trends, the cost of ITE and the use of the teacher education estate have underpinned discussions concerning the rationalisation of providers from five to three university providers. A public consultation for the Review of Teacher Education in Northern Ireland is being conducted between June and early November 2010[2].

2.7 The major recent policy in Scotland that has influenced the development of all of teachers' work and their development as a profession has been the agreement reached between government, employers and unions in 2001, *TP21* (SEED, 2001a). Key elements of this that are especially pertinent to this review include:

- the initiation of the proposal for a chartered teacher scheme (and an advanced chartered teacher scheme, which was not followed through);
- the introduction of a 35 hours per year entitlement to CPD for all teachers;
- an induction scheme to support teachers during their first year in the profession;

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[2] See: http://www.deni.gov.uk/teachers_-_teacher_education_review-consultation

- a two stage review of ITE (see SEED 2001b; 2005).

2.8 The underlying rationale for TP21 was the further development of teacher professionalism (Doherty and McMahon, 2007). Recent reforms have sought to enhance the professional knowledge base of teaching, to raise standards within teaching and the status of the profession. The introduction of a standards framework has been a key element of this, with Scottish education now having four sets of Standards for teachers that define the knowledge and understanding, skills and abilities, values and personal commitments expected of teachers: Standard for Initial Teacher Education (SITE); Standard for Full Registration (SFR); Standard for Chartered Teacher (SCT); and, Standard for Headship (SfH) (Christie, 2008b).

2.9 The initial introduction of a list of competences into initial teacher education did attract some criticism. It was argued by some that this reduced teaching to a set of technical skills (Stronach et al, 2002 and Hartley, 2002; see also Patrick et al, 2003, for an expression of similar concerns about CPD) and was thus 'deprofessionalising' teaching. However, comparisons with standards elsewhere in the UK have been made and suggest that the Scottish standards feature certain professional elements more strongly than the listed standards elsewhere in the UK. These include greater emphases on the research element in teachers' work and a commitment to social justice and anti-discriminatory approaches (Hulme and Menter, 2008; see also Menter et al, 2006a).

2.10 Within ITE, some other important recent initiatives include the establishment in 2004 of the Scottish Teachers for a New Era (STNE) programme at Aberdeen University (Livingston 2008; Livingston and Shiach, 2009; Gray et al, 2009), the introduction in 2009 of Masters level credit within PGDE programmes, and the growth of concurrent degrees with teaching qualifications.

2.11 Other significant developments in teacher education include:

- The establishment of the teacher induction system from 2002 based on a structured mentoring system and providing significant non-contact time for new teachers (McNally, 2002; Draper et al, 2004; Pearson and Robson, 2005; Draper and O'Brien, 2006; O'Brien and Christie, 2005);
- A developing approach to early professional learning that recognises continuing support needs following induction (McNally, 2006; Hulme et al, 2008);
- The introduction and review of chartered teachers. The chartered teacher programme was introduced in August 2003 and is open to all teachers who are fully registered with the General Teaching Council Scotland and have reached the top of the main grade teachers' pay scale. Progression to chartered teacher status is by qualification i.e. progression through a self-funded Master's degree or equivalent vocational award (O'Brien and Hunt, 2005; Connolly and McMahon, 2007; Kirkwood and Christie, 2006; HMIE, 2009);
- and a programme for headship development, the Scottish Qualification for Headship (SQH) (Menter et al, 2005; Reeves et al, 2003) as well as the Flexible Route to Headship (Davidson et al, 2008).

The policy context

2.12 Scottish education policy has been developed separately from that of the other three jurisdictions, even before devolution at the end of the 20th century. As has been described in a number of places (Humes, 2003; Paterson, 2003; McPherson and Raab, 1988; McIver, 2008), there has been a close working relationship between the various stakeholders in education and this has certainly influenced both the ways in which policy has developed as well as the actual policy initiatives.

2.13 The General Teaching Council for Scotland was established in 1966, more than 35 years before those of the other UK nations. Local authority officers (notably Directors of Education) members of HMIE, Principals of Colleges of Education (more recently Deans of Education working through the Scottish Teacher Education Committee (STEC)), teacher union leaders, politicians and civil servants have worked closely together and have generally shared many of the same aspirations for education in Scotland (Menter and Hulme, 2008). This has led to a more consensual atmosphere in the policy community than exists in some parts of the UK and has been based on a relatively high level of mutual trust and respect (Humes, 2000). That is not to say that there have not been difficulties – for example the period of serious industrial unrest among teachers that led to the setting up of the McCrone Committee that eventually gave rise to TP21. But public statements by representatives of these bodies indicate considerable agreement about the importance of supporting the development of teaching as a profession as one element in ensuring that schools provide a high quality of education.

2.14 Several local authorities have supported learning communities to promote change in pedagogy and assessment practice, bringing primary and secondary teachers together and building on the achievements of *Assessment is for Learning* (Bryce, 2008). Learning and Teaching Scotland (LTS), in providing support for national educational developments, offers a wide range of resources and expertise to teachers and schools (Roebuck, 2008). A national CPD team, managed under the auspices of the Convention of Scottish Local Authorities (COSLA) plays a key role in seeking to coordinate and steer provision (see Kennedy, 2008). Her Majesty's Inspectorate for Education (HMIE) also produces many publications that support teacher development in relation to current priorities in Scottish education. This 'facilitative' role for HMIE is a development of the past decade (Weir, 2008).

2.15 School-university partnerships have been strengthened through collaborative projects such as the Schools of Ambition programme (2006-2010) (Hulme et al, 2010) and the Applied Educational Research Scheme (AERS) Learners, Learning and Teaching Network (2004-2009) (Christie and Menter, 2009).

2.16 Collectively, these developments cohere around a conception of teaching as a learning profession and a conception of schools as learning organisations that have a commitment to self-evaluation and continuous improvement (HMIE, 2006). This is consistent with *TP21* (Scottish Executive, 2001:5) which announced *'a new framework which promotes professionalism and which places teachers at the heart of teaching'*. A 'personalised' approach to

professional development was envisaged through a negotiated CPD plan for every teacher addressing personal, institutional, local and national priorities.

Current strengths

2.17 Teacher educators in Scotland and elsewhere have highlighted a number of features of Scottish teacher education as strengths, for example a shared ethos within the policy community, peer review and the strong intellectual base (Menter and Hulme, 2008; Menter et al, 2004). The concept of teacher professionalism as laid out in TP21 and enacted through a number of the policies mentioned above is based on an ideal of the teacher as a skilled worker with a high degree of autonomy (Forde et al, 2006; Doherty and McMahon, 2007). The extent to which this view of teaching is actually adopted as part of teachers' professional identity does vary however, as demonstrated by the diversity of teachers' responses to the current curriculum reforms. Recent research by the University of Glasgow (2009) suggests that teachers had become accustomed to a relatively prescriptive curriculum (*Curriculum 5-14*) and that some are finding the new responsibilities accompanying *Curriculum for Excellence* challenging.

2.18 The shared ethos within the policy community is another generally positive feature. The reliance on peer–based evaluation processes which has typified inspection of teacher education, as well as the encouragement of self-evaluation and the adoption of reflective and enquiring practices have all contributed to this (Christie and Menter, 2009).

2.19 Similar cooperation and peer review characterises the accreditation processes deployed for ITE programmes. Organised by the GTCS on behalf of the Government, these processes are now relatively non-bureaucratic and rely to a significant extent on Universities' own quality assurance procedures, as well as ensuring a match with the professional standards (Menter, 2008).

2.20 ITE has developed and maintained a strong intellectual and academic base, especially by comparison with other parts of the UK, with a continuing commitment to the study of education as a subject, its contributing disciplines and the theories and research which underpin their further development (Menter et al, 2006b).

2.21 The induction and chartered teacher schemes developed in the wake of TP21 have been much admired (Commonwealth of Australia, 2007; Ingvarsson, 2008; Egan, 2009). Both schemes have encountered some difficulties in their implementation but at their core they share the characteristics of 'extended' professionalism (Hoyle, 1974, see Section 3).

2.22 The induction scheme has made an important contribution towards the as yet incomplete creation of a genuine continuum for teacher development and learning. It has been recognised in educational research that teacher learning cannot finish at the end of ITE but should continue on throughout the career and that the first year of employment is an especially challenging time for many new teachers (Draper and O'Brien, 2006; Rippon and Martin, 2003, 2006).

2.23 The chartered teacher scheme has attracted some criticism for being too theoretically oriented and initially did not recruit very well. However recruitment and its effectiveness are improving, according to the developing research on the programme (Connelly and McMahon, 2007; Reeves, 2007; Carroll, 2009; Williamson and Robinson, 2009; McMahon et al, 2010).

Weaknesses

2.24 Humes (2000; 2003) has suggested that the close relationships within the policy community, mentioned as a strength above, have led to some inertia in Scottish education and this criticism could be applied to teacher education. One aspect of teacher education which can appear to be a weakness by comparison with approaches elsewhere, is the relative underdevelopment of partnership approaches across the teacher education 'continuum' (see Section 4), most particularly in ITE. An integrated partnership approach is important in order to produce an experience for teachers throughout their professional development that is coherent and consistently supported by all those involved, whether they are based in schools, local authorities, government or universities. There have been several attempts to address this issue, including the STNE scheme at the University of Aberdeen which has partnership with schools and local authorities as one of its underpinning principles (Livingston and Shiach, 2009). Most notably however, there was the mentor initiative established in the early 1990s as a pilot scheme at the (then) Moray House Institute of Education (Kirk, 2000). In this scheme, teachers within placement schools played a structured role in supporting students. Although, as reported by Kirk (2000) and Cameron-Jones and O'Hara (1995), the evaluation of this scheme indicated some benefits for students (that were not statistically significant) and teachers, including enhanced school experience among the pilot group of students and allocation of resources for mentor training, it was not adopted nationally. The rejection of the scheme has been attributed to inertia and anxiety about loss of role and status by higher education based tutors (McIntyre, 2005) and also to opposition from teacher unions and others, based on the lack of resources for the scheme and the potential increased workload for teachers (Smith et al, 2006a, b).

2.25 When the second stage review of ITE was set up following TP21 it was anticipated that this might lead to a radical 'shake-up' in the relations between schools and universities and their respective staffs. When the review reported (SEED, 2005), the need for enhanced partnership was indeed identified as a concern for teacher education in Scotland. This identified weakness has since been explored; coinciding with the publication of the report each education authority designated an officer to take responsibility for ensuring that school placements for ITE students were effectively coordinated within each authority's schools. An electronic database, 'Practicum', has also been established in order to support the efficient identification of placements across the country. Additionally, the GTCS have also commissioned a literature review of partnership within initial teacher education (Brisard et al, 2005) that was published and discussed by the Council's committees but, in spite of drawing attention to models elsewhere (the UK, in the USA and Australasia), it led to no particular policy changes.

2.26 However, despite the growing recognition within research and policy literature as to the benefits of partnership working, research literature suggests that school staff in Scotland play a relatively limited role in the tutoring, support and assessment of students in training within their schools in comparison to mentor teachers elsewhere in the UK (Smith et al, 2006). There are however, some notable exceptions to this, suggesting that this is an area that can be strengthened (see Cope and Stephen, 2001, at Stirling; Christie et al, 2004 at Edinburgh; Dewhurst and McMurtry, 2006 at Aberdeen).

Areas for improvement

2.27 The Audit Scotland Interim Report (2006) on *A Teaching Profession for the 21st Century* highlighted areas requiring further review and refinement, including the need to address an initial failure to create benchmarks against which progress might be measured. The aspects identified included: impact on educational attainment; improvements in classroom practice; the quality of educational leadership; workload and skill-mix; workforce morale; and recruitment and retention within the profession.

2.28 In 2007 HMIE issued a report reviewing the impact of TP21 on schools. This concluded that there had been improvements in CPD for teachers and that the induction scheme was proving effective. It suggested that The Scottish Government's (2008) review of the chartered teacher programme would be important and needed to lead to more teachers aspiring to achieve this advanced qualification.

2.29 A key issue in ITE in recent years has been the fluctuation in the number of funded student places. The workforce planning procedures deployed by the Government have not always been accurate in making medium-term predictions about the demand for teachers, leading to significant revisions of allocated ITE places (Scottish Funding Council circular, 2010). While changes in intake numbers have been evenly distributed around the ITE providers (in contrast to some other parts of the UK), they have led to considerable resourcing difficulties for providers due to rapid rises or falls in student numbers and there has been concern expressed by some providers that this may affect the quality of provision e.g. a reduction in university staffing for teacher education and a reduction in visiting tutor support (as discussed by Kirk, 2000).

2.30 In comparison to England, Scotland may be seen to have less diverse routes of entry into teaching (Menter et al, 2006a). Potential teachers who are less mobile, living in rural or remote parts of Scotland, and those who have caring commitments or are unable to relinquish their current employment may therefore experience difficulty in taking up teaching. This issue has been addressed, in part, by the introduction of distance/online learning approaches which were initiated in order to provide for such candidates. Additionally, the teaching workforce in Scotland is relatively homogeneous in its ethnic and linguistic demography, although with a disproportionately high number of women and this may be partly attributed to these factors (Menter et al, 2006).

2.31 While the induction scheme has been important to the early professional development of teachers during their first year of employment, research indicates that there is a notable absence of continuing support thereafter (Kennedy et al, 2008; Wilson et al, 2006; Fraser et al, 2007), suggesting that this is a potential area for improvement. These studies also found that CPD could be further improved by paying more attention to the affective aspects of teacher learning. Scotland is far from being alone in this particular aspect as recent work in England (Hobson and Ashby, 2010) has shown. Additionally, research suggests that Scottish teachers themselves did not always see CPD as a positive opportunity even in the 'post-McCrone' context, although many welcomed the idea of an 'entitlement' of 35 hours per year (Draper and Sharp, 2006). Kennedy (2005) has also drawn attention to the shortcomings of some approaches to CPD in supporting transformation in Scottish schools, notably that CPD parameters are often externally imposed.

2.32 Following the recommendations of the McCrone Report, the TP21 Agreement increased the numbers of additional support staff working in classrooms (HMIE, 2007; Audit Scotland, 2006) and it has been found that teachers have not been appropriately prepared to collaborate with such colleagues as effectively as they might (Calder and Grieve, 2004). Similarly, the integrated children's services agenda that has been adopted across the country has not necessarily been associated with significant changes to professional development (either pre- or in-service) (Allan, 2009; Menter, 2009).

2.33 It has also been suggested that CPD for serving headteachers is lacking, certainly by comparison with the structured SQH programme offered in preparation for headship (Woods et al, 2009; Menter et al, 2005).

2.34 Finally, it may be noted that there have been few systematic or sustained attempts to investigate the effectiveness or impact of teacher education in its various forms. As indicated above, some of the new initiatives (SQH, chartered teacher, induction scheme) have been evaluated but there has been little research on linking teacher education either to pupil outcomes or to processes of curriculum reform.

2.35 Some of these policies have become 'flagships' for Scottish education. In their nine country review of teacher education, Conway et al (2009) indicate that Scottish teacher education has many innovative features, such as the induction and chartered teacher schemes, as set out above. Indeed, Conway (2010) singled Scotland out for its 'developmental' approach to teacher education as opposed to the 'regulatory' approach taken elsewhere, again reflecting the discussion above. Nevertheless it is apparent that there are some weaknesses and areas that could be improved in the provision and in looking hereafter at links between teacher education and curriculum change and between teacher education and educational outcomes it is intended, where possible, to identify lessons from elsewhere that may assist in addressing some of these issues.

3 TEACHER EDUCATION AND PROFESSIONALISM

Key points summary

- Four models of teaching and teacher professionalism can be delineated in current literature: the *effective* teacher, the *reflective* teacher, the *enquiring* teacher and the *transformative* teacher. All of these have significance for teacher education in Scotland.
- Diverse routes of entry into teaching, including employment-based and fast track routes, tend to develop where there have been significant problems of teacher supply and quality, for example in the USA and England. Alternative routes can widen access to the profession and address specific needs.
- A number of evaluations of different types of programme indicate mixed results in terms of teacher quality. The evidence base on the effectiveness of different routes is inconclusive and high quality longitudinal research is needed to evaluate the effectiveness of strategies over time.

Introduction

3.1 This section responds to the third research objective and reviews some of the major factors that influence approaches taken towards teacher education and their delivery internationally. Four models of teaching and teacher professionalism are identified, each of which has particular emphases. In exploring teacher professionalism there is an orientation towards entry into the profession and initial teacher education, because this is the phase at which the foundations of professionalism are laid. Subsequent phases of teacher education build upon these foundations. Induction and continuing professional development are discussed in greater detail in section 4.

Approaches to teacher education

3.2 It is not only in Scotland that teacher education has been the subject of much reform over the past twenty years. A longer review of the history of teacher education shows that teacher education has consistently been a significant site of social and political debate in many countries. The inter-related themes of this contestation include the following:

- struggles for 'positioning' and the 'ownership' of teacher education;
- attempts to define teaching as a profession – and to establish whether teaching has a distinctive intellectual knowledge base;
- debate over teachers' terms and conditions, as well as pay, and the role of teachers' unions;
- the emergence of professional bodies to uphold professional standards and to control entry into the profession;
- the economics of teacher supply and demand.

3.3 These themes have created a range of responses and have led to considerable diversity in provision of teacher education. These differing approaches to teacher education may be informed by different notions of professionalism and may have repercussions in terms of teacher quality, recruitment and retention.

3.4   The struggles for 'positioning' during the past ten years have been particularly visible in England and in the USA. In part this has been a continuing debate about the content and process of teacher education. This has included arguments about the relationship between theory and practice, between pedagogical skills and subject knowledge and between values and technical competence[3].

England

3.5   Since 1998 (DfEE, 1998a) routes of entry into the English teacher workforce became even more varied in nature, with continuing expansion of employment-based routes (qualifying teachers are still required to pass skills based tests) - the recent Select Committee Report on the training of teachers suggests 15% of new teachers now take this path (House of Commons, 2010). However, an Ofsted (2005) evaluation of employment-based training noted 'wide variations between schools' and 'significant weaknesses in subject-specific training for secondary trainees' among a third of the 47 providers inspected. The Select Committee Report (House of Commons, 2010:3) cautioned against rapid further expansion.

3.6   The *Becoming a Teacher* (BaT) project (2003–2009) examined experiences of initial teacher training, induction and early professional development of entrants to the profession via university-based, employment-based and school-based routes in England. This multi-method, large-scale longitudinal study makes an important contribution to research design in teacher education comparing experiences of different training routes. The study focused on choice of route and motivation to undertake initial teacher training (ITT), rather than effectiveness of training route. The Final Report (Hobson *et al*, 2009:iv) notes that *'trainees who had followed employment-based and school-centred programmes tended to give higher ratings of the support they received and their relationships with mentors and other school-based colleagues than those who had followed other ITT routes'*. The authors caution against making generalisations about different routes, noting *'statistically significant differences between the reported experiences of student teachers following the* same *ITT route with* different *providers'* (ibid) and that variations attributed to training route were 'washed out' by subsequent experience of teaching (p. xii).

3.7   More recently Master's level work has been introduced into initial teacher education programmes in England. Teachers qualifying with a PGCE may now achieve a number of credits at M Level, which can then be recognised as part of a subsequent programme of study towards a Master's award, such as an MEd. During 2010 the Training and Development Agency for Schools has been introducing a pilot scheme for the Master's in Teaching and Learning (MTL), a new qualification that it intends to make available to all newly qualified teachers (TDA, 2010).

3.8   As well as increasing the numbers of ancillary staff, governments across the UK and elsewhere have all been developing – each in their own way – attempts to improve inter-professional collaboration around education. In England this

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[3] In Europe concepts of 'didactics' and 'educational sciences' are also important.

can be seen in the concept of 'wraparound schooling', similar concepts elsewhere are 'learning communities' in Scottish cities and 'full service' schools in the USA and Australia (Forbes and Watson, 2009). Such schemes share an interest in bringing together professionals from education, health, social services and sometimes, police and voluntary agencies, for the better integration of services, especially for those deemed to be most needy.

3.9 The other significant development over recent years has been around leadership in education. The launch of a National College for School Leadership[4] (NCSL) in England signalled an increased concern with the management of schools. Initially the focus was on current and aspirant headteachers, but increasingly leadership has been seen as an expectation for all teachers, a theme picked up by Elmore (2007) in his comparison of Victoria (Australia) and the USA and in the evaluation of the Welsh chartered teacher scheme (Egan, 2009).

The USA and elsewhere

3.10 Issues around teacher supply and quality have resulted in a proliferation of alternative routes into teaching internationally (i.e. not traditional university programmes). These are most developed in the deregulated system of US teacher education, where most States operate an alternative programme[5].

3.11 Teach for America (TFA) provides an alternative route for entrants to the profession who may not have considered teaching as a career. TFA was established in 1989 to encourage graduates with strong academic credentials to teach for a minimum of two years in high needs schools. Candidates participate in an intensive five-week summer institute as preparation for school experience. Two evaluations comparing TFA corps members with control teachers, report that Teach for America graduates achieve pupil outcomes above those achieved by comparable teachers who qualified through other entry routes (Decker et al, 2004; Raymond et al, 2001). These findings are however challenged by Darling Hammond et al (2005) who note that these studies did not control for certification status or students' prior achievement. Based on analysis of a longitudinal dataset (1996-2002) linking the achievement records of 35,000 students with school and teacher data, Darling Hammond et al (2005: 20) conclude, *'teachers' abilities to support student achievement appear to depend, both for TFA teachers and others, substantially on the level of preparation these teachers have had, as reflected in their certification status'*.

3.12 From 2003 an English version of TFA, *Teach First,* operated in London and subsequently expanded to include provision in the North West, Yorkshire, and the East and West Midlands. *Teach First* is associated with a PGCE award.

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[4] The NCSL has now changed its name to The National College for Leadership of Schools and Children's Services.

[5] The OECD study (2005) *Teachers Matter: Attracting, Developing and Retaining Effective Teachers* reported that two-thirds of the 25 participating countries offered alternative routes/certification programmes.

Trainees commit to teaching for two years and obtain Qualified Teacher Status at the end of their first year. An evaluation of innovative practice in the *Teach First* programme noted positive outcomes in terms of: impact on schools and participants; retention through the programme; and destinations after two years, with 42 per cent continuing to teach in UK schools on completion of the programme (Hutchings et al, 2006; see also Leaton Gray and Whitty, 2010).

3.13 In the USA, other alternative certification routes include the *Boston Teacher Residency, Chicago Teaching Fellows* and the *New York Teaching Fellows* programmes (Solomon, 2009; Boyd et al, 2007). These initiatives involve guaranteed teaching posts on selection and pay a salary during initial teacher education.

3.14 Alternative routes to becoming a teacher are associated with diversification of the school workforce in relation to specific needs e.g. geographic areas, student populations, priority subject areas, and under-represented groups e.g. people with disabilities, people from black and minority ethnic (BME) groups and male primary teachers. US reviews report mixed findings on the effectiveness of schemes to widen access. Wilson et al (2001) report that whilst alternative certification programmes have some success in widening access in terms of age and ethnicity, they have a mixed record in terms of teacher quality. In a literature review of alternative teacher education, Brannan and Reichardt (2002) recommend a move away from a focus on the provision of diverse routes to critical scrutiny of the methods and assumptions of traditional teacher education programmes.

3.15 The Carnegie Corporation's *Teachers for a New Era* (TNE) initiative (on which Scottish Teachers for a New Era (STNE) was modelled) was launched in 2001 and explicitly sought to raise student attainment by improving teacher quality. Kirby et al (2006: 25) note that the distinctive contribution of TNE lies in its commitment to, *'insist on formal evidence that a training program is effective in producing teachers who can improve student learning relative to teachers who have not participated in the program'.* A resource of $5 million per institution over five years was invested in eleven programs organised around three design principles: the need for evidence-based decision making; close collaboration between education and arts and sciences faculty; and the promotion of teaching as an academically taught clinical-practice profession. The use of value-added modelling (VAM) is promoted as a means of measuring impact that takes account of school and community factors and other intake variables (Kirby et al, 2006; McCaffrey et al, 2004; Harris and McCaffrey, 2009). However, most TNE sites experienced difficulty measuring the impact of the changes on pupil gains.

3.16 A synthesis of findings from six evaluation studies of alternative (secondary) provision in the Netherlands (2000-05) suggests that school-based teacher education by itself does not guarantee valuable and accelerated training outcomes (Brouwer, 2007). The quality of mentoring arrangements was questioned across the evaluations. It was noted that supervising teachers need opportunities for professional development in mentoring to facilitate reflective learning and to reduce the 'practice shock' associated with school-based routes. Brouwer (2007) identifies a role for teacher educators in modeling

action research as a practice-embedded approach to professional inquiry.

3.17 A study of teacher education curricula in the European Union carried out by the Finnish Institute for Educational Research (2007) looked at ITE, induction and in-service teacher education. It found great variation between countries in the skills and key competences required for preparation for the teaching profession. Perhaps most significantly, only five of the twenty seven countries (treating the UK as one) set out in detail the competences for entering teaching at a national level. These included the UK. In eighteen countries, national competences were adapted or further defined at a lower level, such as a Teacher Education Institution. In the remaining four countries, competence requirements are entirely set at a lower level. The report indicates that pedagogic competences tended to be seen as more important in primary teacher education than in secondary. The detail of the teacher education curricula are always, at least in part, defined at institutional level.

3.18 That report concludes by synthesising its findings with those outlined in *Improving the Quality of Teacher Education* (European Commission 2007). Both reports commend the development of the continuum of teacher professional development and the development of 'research based education in teacher education', as well as calling for further Europe-wide research on a number of aspects of teacher education, particularly supporting teaching in 'heterogeneous classrooms'.

Enhancement of professionalism

3.19 What emerges from this review of the approaches to teacher education is that there are differing conceptions of teacher professionalism underlying policy and research literature. Indeed this literature review, together with a recent review of literature on teacher identity (Menter, forthcoming) leads the authors to suggest that there are four influential 'paradigms' of teacher professionalism: the *effective* teacher, the *reflective* teacher, the *enquiring* teacher and the *transformative* teacher. Each of these leads to different emphases within teacher education across the full continuum. All of them may be identified in Scottish teacher education and have a contribution to make in the contemporary context of *A Teaching Profession for the 21st Century (TP21)* and *Curriculum for Excellence.*

The effective teacher: standards and competences

3.20 This model has emerged as the dominant one in much official government discourse across the developed world over the last thirty years. It is closely associated with the economically led view of education that stresses the need for teachers to prepare pupils to take their part in making their respective nations' economies a success (e.g. DfEE 1998b). The emphases are on technical accomplishment and on measurement. It is the model for an age of accountability and performativity (Mahony and Hextall, 2000). From a political perspective it is difficult to reject this model because it prioritises value for money for taxpayers and emphasises the opportunity for all pupils to achieve to their best potential and subsequently to contribute to the economy and society.

3.21 Such an approach may be well aligned with a nationally prescribed curriculum and a national assessment system, which extends down to the earliest stages of schooling. Indeed this particular aspect of education in the UK has seen considerable recent variation in policy across the four nations and has been the topic of considerable discussion following the publication of the *Cambridge Primary Review* (Alexander, 2009). In Scotland, although there was a clear set of guidance under *Curriculum 5-14,* introduced from 1989 onwards, there has not been a national curriculum as such and, with *Curriculum for Excellence* currently being introduced, there is even more scope for professional autonomy. In Wales and Northern Ireland there has been much relaxation of the *National Curriculum* since devolution, especially in the earlier years of schooling. Likewise, national assessment in the form of *Standard Assessment Tasks (SATs)* (and accompanying school league tables) was not developed in the same way in Scotland and has now been removed from the Welsh system.

3.22 So, it is perhaps not surprising that the ways in which the dominant standards-based approach to teaching has been defined in each country has shown some interesting variations. In a small-scale study undertaken as part of the *Teaching and Learning Research Programme,* some significant differences were identified between the statements defining what was required of new teachers in the four jurisdictions (Menter and Hulme, 2008). In particular the most explicit statements about underlying values of teaching linked to the purposes of education were found in the Northern Irish, Welsh and Scottish documents, but these were far less visible in the equivalent English document[6]. Furthermore there were much more explicit references to educational research and enquiry and to anti-discriminatory practice in the documents from the smaller nations. While it must be acknowledged that such differences in official policy statements do not necessarily reflect significant differences in practice, nevertheless the differences do suggest a differentiation in how teaching is understood in each country. Hextall and Mahony (2000) provide an account of how the standards were developed and implemented in the English context under the auspices of the Teacher Training Agency. It is quite clear from this literature that teachers and teacher educators played a very small part in contributing to these developments.

3.23 In contrast to the more politically driven effective teacher model, a common factor in respect of the other three paradigms is that they are models that have emerged much more from within the teaching profession and from within sites of teacher education.

The reflective teacher

3.24 The notion of teaching as a reflective activity emerged strongly in the UK, partly in response to the growing influence of the effective teacher model, which was seen by some as restricting teacher professionalism, rather than enhancing it (Stronach et al, 2002; Hartley, 2002). The philosophical roots of the reflective teaching model lie in the work of the American educator John Dewey. Early in the twentieth century he developed an approach to teaching based on teachers becoming active decision-makers. Similar ideas were later developed by

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[6] These documents can be accessed through http://www.learningtoteach.org

Donald Schön who wrote about *The Reflective Practitioner* (1983), stressing the significance of values and of theory informing decision-making.

3.25 In the UK, such ideas were picked up and developed in a very practical way by Andrew Pollard and his collaborators who from the late 1980s onwards, produced a series of books, including handbooks, on 'reflective teaching' (from Pollard and Tann, 1987 to Pollard, 2008)[7]. At the centre of this model was a cyclical approach to planning, making provision, acting, collecting data, analysing the data, evaluating and reflecting and then planning the next step.

3.26 Built into such a model is a commitment to personal professional development through practice. It was a model that took a firm hold in teacher education institutions across the UK during the latter parts of the twentieth century. The largest scale studies of initial teacher education undertaken in England by Furlong et al (2000) found that about 70 per cent of teacher education programmes led from universities and colleges were informed by some version of 'reflective teaching' (see also Griffiths, 2000).

3.27 The reflective teaching approach also has significance beyond ITE, for experienced teachers. In their Teaching and Learning Research Programme study 'Learning to Learn' Pedder et al (2005) found that there were opportunities for considerable teacher learning to take place in the classroom context, through, for example applying research, collaborating with colleagues, or consulting with pupils. They viewed such learning as being of high potential value. However it is also viewed as relatively high risk, and some teachers appear to be less comfortable with such approaches[8].

The enquiring teacher

3.28 Reflective teaching does not in itself imply a research orientation on the part of the teacher, although the model may be strongly influenced by a set of ideas that do promote just that conception (Forde et al, 2006). In the UK the origins of the notion of 'teacher as researcher' is usually associated with the groundbreaking work of Lawrence Stenhouse (1975), who argued that teachers should indeed take a research approach to their work. He described this as a form of curriculum development. This would make such an approach very apposite in the context of the development of *Curriculum for Excellence*.

3.29 In this model teachers are encouraged to undertake systematic enquiry in their own classrooms, develop their practice and share their insights with other professionals. Such ideas have been taken up, developed and enhanced through a range of subsequent initiatives, often associated with university staff working in partnership with teachers and lecturers in schools and colleges.

3.30 It is also to be noted that, at various times, such approaches have received 'official' endorsement through funded schemes in England and Scotland (see McNamara, 2002; Furlong and Salisbury, 2005; Hulme et al, 2010). Indeed a range of recent initiatives concerning accomplished teachers (such as the

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[7] This literature appears to be quite widely used in ITE in Scotland.
[8] See also Pedder, 2007.

chartered teacher) and indeed ITE have introduced a strong enquiry element into the frame, as in STNE (Livingston and Shiach, 2009). Teacher enquiry frequently figures within contemporary approaches to professional development (Campbell et al, 2004; Campbell and Groundwater Smith, 2009) and has been found to 're-energise' teachers (Burns and Haydn, 2002). So, it seems possible for the enquiring teacher model to be compatible with the effective teacher.

3.31 Ponte et al (2004) conducted descriptive case studies in three countries – the USA, Australia and the UK - of programmes that aimed to introduce action research in initial teacher education. They conclude that there is a need to introduce student teachers to inquiry-oriented approaches to teaching during ITE in order to provide a firm foundation for similarly modelled career-long professional learning i.e. to develop a disposition towards thoughtful and critical self-study.

3.32 Some of the most developed approaches to teacher as researcher/the enquiring teacher have been developed in Europe (Altrichter *et al*, 2006; Ronnerman *et al*, 2008), North America (Cochran-Smith and Lytle, 1993; 2009) and Australia (Groundwater-Smith, 2006; Diezmann, 2005; Deppeler, 2006).

The transformative teacher

3.33 The final model to be put forward incorporates and builds upon elements of the previous two. However its key defining feature is that it brings an 'activist' dimension into the approach to teaching. If the prevalent view of the teacher is someone whose contribution to society is to transmit knowledge and prepare pupils for the existing world, the view here is that teachers' responsibilities go beyond that; they should be contributing to social change and be preparing their pupils to contribute to change in society.

3.34 The most recent and cogent articulation of this model is that set out by the Australian teacher educator, Judyth Sachs (2003), who talks of 'teaching as an activist profession'. Those who advocate teaching as a transformative activity will suggest that some challenge to the status quo is not only to be expected but is a necessary part of bringing about a more just education system, where inequalities in society begin to be addressed and where progressive social change can be stimulated (Zeichner, 2009; Cochran-Smith, 2004). In aspiring to achieve greater social justice through education however, those such as Clarke and Drudy (2006) have argued that it is important to consider the influence of teachers' own beliefs and values, which they bring to their work at whatever stage of their career they are at.

The future of teacher professionalism

3.35 In the 1970s Eric Hoyle wrote an influential paper that suggested that models of teaching existed at some point on a spectrum between 'restricted' and 'extended' versions of teacher professionalism (Hoyle, 1974). Crudely speaking the first model depicted above, the effective teacher, rests at the 'restricted' end of the spectrum, where teaching is largely defined in terms of a range of technical skills, with the other three models being at various points towards the 'extended' end of the spectrum, where teachers are seen as more autonomous

and their own judgement is called upon to a much greater extent (Adams, 2008).

3.36 In one of the few studies that considers the future of teacher education in the UK (especially England) Edwards et al (2002) argue on the basis of an analysis of the consequences of recent reform for teacher education, that teachers should be seen as *'users and producers of knowledge about teaching, in communities of practice which are constantly refreshed through processes of professional enquiry, in partnerships between practitioners and researchers'* (p.125). That is, teachers should be given increased control over the professional knowledge base of teaching.

Implications for Scottish teacher education

- The research literature discussed in this section suggests that employment-based teacher education routes can in some circumstances add value where there are issues surrounding teaching supply or quality of teachers. Such routes may also offer greater opportunities to those who may currently be unable to participate in the more traditional routes available within Scotland.
- There is scope for the development of a much more integrated model of the teacher education continuum that more fully promotes partnerships between the full range of stakeholders at all stages of teachers' careers.
- While all four models of teacher professionalism have importance in the Scottish context, the introduction of *Curriculum for Excellence* would appear to highlight the importance of the enquiry and reflective models; while the commitment within Scottish education to social justice and inclusion would highlight the relevance of elements of the transformative approach. Nevertheless the effective teacher model also remains very important in the pursuit of educational standards.

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4 TEACHER EDUCATION, COLLABORATION & PROFESSIONAL SUPPORT

Key points summary

- Teachers' academic calibre impacts positively on pupil achievement. Low performing teachers in the earlier years of schooling have a longer-term detrimental impact on pupil outcomes. Length of experience (beyond the first five years) is not strongly associated with improved outcomes.
- Academic skills tests to regulate entry to the profession are not reliable predictors of teacher quality. Many dimensions of effective teaching are not reliably predicted by tests of academic ability.
- The specific contribution of partnership schools to the design, organisation and management of teacher education is under-researched.
- Systematic mentoring is a key feature of effective support for new and early career stage teachers. Effective mentoring requires investment in mentor selection, preparation and support.
- Whilst there are difficulties in attributing impact, research reviews suggest that CPD is most effective when it is site-based, fits with school culture and ethos, addresses particular needs of teachers, is peer-led, collaborative and sustained.
- School and curriculum reform need to be congruent with reform of teacher education i.e. close links between school systems and teacher preparation in universities, and partnership work between the various bodies involved in curriculum development and teacher development.
- Scant attention has focused on the professional learning of teacher educators and the contribution they can make to curriculum change, whether they are school-based or university-based.

Introduction

4.1 In response to the second objective, this section of the report addresses the question: What evidence is there of the contribution of teacher education to the development of young people in countries beyond Scotland? It should be noted that there is significant cross-national variation in terms of the governance and regulation of teacher education and the scale and context of provision (Wang et al, 2003; Stoel and Thant, 2002; Ingersoll, 2007). Teacher education programmes vary cross-nationally in terms of entry, assessment, practicum requirements, arrangements for induction, early professional learning and CPD, and compensation and reward systems for recognising accomplished teaching. Programmes reflect particular cultural contexts and the local needs of specific education settings. Any interpretation of findings reported here should therefore be treated with due care to 'context specificity' (Crossley and Watson, 2003; Brisard et al, 2007).

Entry requirements for teacher education

4.2 Whilst the evidence base on teacher effects is complex, some research studies indicate that a teacher's academic calibre impacts on pupil achievement (National Council on Teacher Quality, 2004; Goe, 2007). Based on an analysis

of outcomes from the Programme for International Student Assessment (PISA) across 25 school systems, the McKinsey Report (2007) noted a positive association between high performing systems and selective entry requirements for primary teacher education. The Report maintains that low performing teachers in the earlier years of schooling have a detrimental impact on pupil outcomes in the longer-term. The Report also highlights that Singapore, South Korea, Finland and Hong Kong - countries with records of high levels of attainment in international assessments (see Appendix 3) - recruit teachers from the top third of their graduate cohort, although it should be noted that there is no evidence of a direct causal link between the two factors.

4.3 Research on the impact of testing as a means of regulating entry to the profession is inconclusive. Few jurisdictions operate tests to regulate entry to the profession; those that do include Finland, England and the USA. Prospective teachers in England are required to pass computer-based skills tests in literacy, numeracy and ICT. Forty-one US states require prospective teachers to pass licensure tests. However there is considerable variation in *what* is tested (basic skills, pedagogical knowledge, content knowledge), *how* it is tested (multiple choice, open-ended questions, portfolios or performance-based measures), and the required minimum performance (Committee on Assessment and Teacher Quality, 2000). A review of research evidence on the effectiveness of testing policies reports, *'there is currently little evidence available about the extent to which widely used teacher licensure tests distinguish between candidates who are minimally competent to teach and those who are not'* (ibid.: 3).

4.4 Where testing systems operate they have been challenged on equity issues. Records of US licensure tests show lower success rates for black and Hispanic candidates, impeding policies to widen access to the profession. In a review of UK and US research literature on widening access to initial teacher education, Moran (2008) notes that many dimensions of teacher effectiveness, especially those associated with successful practice in high needs schools, are not reliably indicated by tests of academic ability.

Partnership arrangements with schools

4.5 Research evidence indicates that despite the high value attached to collaboration, most school-university teacher education partnerships remain HEI-led (Furlong et al, 2000; Menter et al, 2006a) (see Table 3 for international examples of partnership in teacher education). Edwards and Mutton (2007) note that a strong policy emphasis on partnership working does not of itself establish parity of involvement in the development of practice across institutional boundaries. Reflecting on professional learning within a six-year school-university partnership in England, McLaughlin and Black-Hawkins (2004:282) note, *"If the creation and dissemination of knowledge beyond the individual teacher is to be an aim and is to happen, then shifts and changes in the structures, roles and relationships of both universities and schools are demanded."*

Table 3. Partnership in Teacher Education: international examples

Separate roles	Focus on pedagogic relationships		Collaboration	
Distinct roles, centralised	*Reflection on practice*	*Inquiry-oriented*	*Local collaboration*	*Large–scale collaboration*
Teacher education in **Singapore** involves a partnership between the Ministry of Education, the National Institute of Education (the sole provider of ITE) and schools. The NIE and schools have clearly defined roles in a move towards school-based provision from 1999. Schools liaise with one Supervision Coordinator, who has responsibly for all trainees across several schools in a particular locality. NIE supervision focuses on quality assurance across schools and does not provide subject specific mentoring. The grading of candidates is jointly decided. The school principal chairs a Practicum Assessment Panel. Trainees are allocated to schools by the Ministry of Education. School placements are not coordinated by the NIE. Increased responsibility for ITE among schools has raised some issues regarding the training and support for teacher-mentors (Wong and Chuan, 2002).	The University of Utrecht, **Netherlands**, offers a model of teacher education that emphasises the integration of theory and practice (Korthagen, 2001). Three principles underpin the model of *Realistic Teacher Education* i.e. professional learning is more effective when: (a) directed by the needs of the learner; (b) rooted in their experiences; and, (c) involves critical reflection on experience. Whilst emphasising the role of reflection in integrating theory and practice, the work of the Utrecht group has been criticised by Hagger and McIntyre (2006:153) for under-emphasising the professional knowledge and expertise of teacher mentors. In this respect, expertise in the initial teacher education partnership is seen to rest with the universities.	Practical school experience forms a significant component of initial teacher education in **Finland**. Universities operate *teaching schools* (Normal schools), which enable a close alignment of university and school experience. Ostinelli (2009) reports that attainment by Finnish students is related to the centrality of education studies and a research-based approach in Finnish teacher education. Research by Maaranen and Krokfors (2008) maintains that formal positioning of teaching as a research-informed profession helps to integrate theoretical and practical components of teacher education.	Professional Development Schools (PDS) in the **US** promote strong collaborative partnerships at a local level but are limited as a model for system-wide change. PDS have three core purposes: supporting pupil achievement; improvement of pre-service teacher education and professional development for *all* educators; and the promotion of practice-based enquiry. PDS can involve the co-design of teacher education curricula and increase the direct involvement of HEIs in school reform efforts (Mitchell and Castenelli, 2000; Molseed, 2000; Morris et al, 2003). A distinctive feature is the formation of 'instructional teams' of mentees, school-based mentors and university tutors. Some PDS models - such as that established by the University of Colorado - have created 'master teacher' roles with no class teaching, to take a lead role in school-based teacher education (Utley et al, 2003).	School-university partnerships in **Australia** have a long trajectory, influenced by the work of Carr and Kemmis (1988), and in the 1990s the *Innovative Links and National Professional Development Program*, involving 14 Australian universities working with over 100 schools (Grundy et al, 2003). The notion of the 'scholarly teacher' informs research pathways within pre-service teacher education programmes (Diezmann, 2005), the formation of teacher research networks aimed at improving teacher competencies and enhancing pupil outcomes (Peters, 2002; Deppeler, 2006) and the development of inquiry-oriented ITE programmes (Ponte et al, 2004). Mentoring newly qualified, returning and pre-service teachers and those needing professional support is a feature of the draft Standards for accomplished and lead teachers in Australia.

4.6　The National Partnership Project in England (NPP) (2001-2005), funded by the TDA, sought to increase the capacity and quality of schools' involvement in initial teacher education in England. The NPP, delivered through nine regions, provided funding for a range of small-scale innovation projects. These included: mentor training; development of school-based training materials; outreach work with partnership schools; dissemination events; and projects to harmonise procedures between schools and ITE providers (Campbell et al, 2007). In their evaluation of the National Partnership Project Furlong et al (2008) note tension between 'collaboration' and centralisation of 'control' over partnership work in England. Furlong et al (2008:318) conclude that whilst new partnerships with schools have expanded capacity and addressed the problem of teacher supply, this has produced a form of teacher education that is *almost entirely practically oriented. The essential contributions of higher education to professional formation – the consideration of research, of theory and of critique – all of these have been expunged as important components of professional education.'*

4.7　There are few high quality studies that have examined the specific contribution of the partnership school in school-university ITE partnerships. Moyles and Stuart (2003) conducted a systematic review of evidence relating to how school-based elements of partnership support trainee teachers' professional development. In a review of English language reports of research conducted in the UK, USA, Australia, Canada and Europe published between 1992 and 2002, Moyles and Stuart (2003) identified only two in-depth studies. The weight of evidence from these studies was judged to be low. Both of the included studies highlighted the value of communication in developing professional skills: (1) Baird (1996) identified the importance of regular verbal and written feedback by teacher mentors to student teachers; and (2) Mills (1995) reported positive outcomes from paired school experiences.

4.8　The distinctive contribution of higher education to teacher education has been the focus of research in England as the involvement of schools has increased. A questionnaire by Williams and Soares (2000) explored university tutor, teacher-mentor and student teacher perceptions of the university role in postgraduate secondary ITE. The findings indicate little support from teacher mentors for relinquishing links with higher education institutions or extending the training role of schools. Teacher mentors valued the contribution made by universities to administrative arrangements, quality and standards, and the availability of expertise in relation to research. Similarly, case study research by Burn (2006: 257) identified a complementary role for universities.

4.9　Some research studies in England have noted that teacher education is marginalised in expressions of schools' core concerns. Child and Merrill (2003) note that teacher development is not considered in schools' strategic plans for improvement. Research by Price and Willett (2006) indicates that many headteachers in England do not consider the CPD potential of ITE involvement and are not encouraged to give ITE a prominent place in School Development Plans. School leaders were not asked about ITE in school inspection and did not record ITE involvement as a form of CPD. Where additional funding is allocated to schools for innovation, comparatively few resources go to CPD (Penney and Houlihan, 2003; Yeomans et al, 2000; Ofsted, 2001).

4.10 The pedagogical contribution of school-based teacher educators in England requires further consideration if ITE coordinators are to assume the role envisioned in collaborative models of partnership (Mutton and Butcher, 2007, 2008).

Mentoring, Induction and Early Professional Development

4.11 Post-qualification induction is an important stage within the continuum of professional learning. Induction standards have been specified in North America (Scott, 2001; Shields et al., 2001; Youngs, 2002), New Zealand (Piggot-Irvine et al, 2009); Scotland (Draper and O'Brien, 2006; McNally, 2002), Northern Ireland (Moran et al, 1999; ETI, 2004; Abbott et al, 2009) and England (Totterdell et al, 2003; Harrison et al, 2005). Induction periods across Europe range from ten months to two years (European Commission, 2010).

4.12 A systematic review of research literature on induction found *'strong support for claims that induction improves teaching effectiveness and promotes new teachers' sense of wellbeing'* (Totterdell et al, 2004:2). This review noted that effective induction systems attend not only to the development needs of newly qualified teachers, but also provide support for mentor teachers and school leaders. Successful mentoring requires adequate release time to support the role, in addition to opportunities for face-to-face meetings with mentees. Case studies of exemplary induction practice highlight the significance of access to a 'community' or 'family' of professional support for provisionally registered teachers (Piggot-Irvine et al, 2009).

4.13 Whilst most studies indicate potential benefits associated with effective mentoring, some studies continue to report variable quality in mentoring practices and mentor preparation (Jones, 2002, 2005; Jones et al, 2002; Harrison et al 2005; Bubb and Earley, 2006; Bubb et al 2005). The *Newly Qualified Teacher Quality Improvement* study (2008), a large-scale study funded by the Training and Development Agency (TDA) for Schools found that the experiences of Newly Qualified Teachers (NQTs) regarding induction are often less comprehensive than members of the school Senior Leadership Team (SLT) believe.

4.14 Research by Carter and Francis (2001) on workplace learning in New South Wales, Australia, suggests that effective learning for beginning teachers is linked to induction into a vibrant collective learning culture in a school supported by partnership with a university. The beginning teacher-mentor survey and case studies undertaken through this research suggest that internships are potentially important components of ITE but require sustained and sophisticated collaboration between universities, schools and education systems.

4.15 Howe (2006) reviewed induction programmes in Australia, Britain, Canada, France, Germany, Japan, New Zealand and the United States and concluded that the best approaches were based on:

- individualised induction plans and funding for mentor training;
- development of partner schools for more extended periods of induction -

mixed between HEI and schools in the first year followed by more intensive school-based elements in second year;

- reduction in responsibilities in addition to reduction in teaching workload - time for reflection;
- development of an organisational culture in which there is collaborative exchange involving a range of professionals aimed at supporting newly qualified teachers;
- separation of the support and assessment functions of induction.

4.16 Several studies highlight the importance of establishing formal mentoring relationships in the workplace, including effective selection and preparation of school-based mentors (Bullough, 2005; Hobson et al, 2009b). Effective mentors ensure an adequate degree of challenge, possess subject expertise, and support mentees' critical interrogation of practice (Smith and Ingersoll, 2004; Harrison et al, 2006; Hobson et al, 2007).

4.17 The international research literature associates mentoring with positive outcomes for mentor teachers (Hobson et al, 2009b). Huling and Resta (2001) report that formal mentor training can support professional growth for mentors in three areas: personal pedagogical improvement; enhanced professional exchange with peers; and leadership development. Lopez-Real and Kwan (2005) report that 70% of mentors involved in school-university initial teacher training (ITT) partnership programmes in Hong Kong claimed to have benefited professionally from mentoring through engagement in critical reflection and professional dialogue. Mentor accounts reported by Hagger and McIntyre (2006) suggest an increase in collaboration and reduction in professional isolation. Simpson et al (2007) identify benefits in terms of the exchange of new ideas and practices. Hobson et al (2007) note that some teachers are 're-energised' and 're-engaged' with the profession through the adoption of a mentoring role in school.

4.18 Research studies examining the impact of the influential Santa Cruz New Teacher Programme (SCNTP), established in 1988, report retention rates of 88% after six years, compared with a national rate of 56% (Moir et al, 2009). The SCNTP provides mentor support from experienced teachers (with an average of 17 years teaching experience) who are released full time from teaching duties (for a period of two to three years) to mentor newly qualified teachers in their first year of professional practice. Systematic mentor training is provided for initial preparation and continues through weekly mentor forums and professional development planning. A rigorous selection process is undertaken involving school leaders, district administrators and unions. Support for new teachers generally includes approximately two hours mentoring each week and specifically arranged seminar groups focusing on various topics such as pedagogy and assessment and working with school data. Based on evidence from programme evaluation, including analysis of mentor interview transcripts and State retention data, Moir and Bloom (2003:1) maintain that, *'mentoring offers veteran teachers professional replenishment, contributes to the retention of the region's best teachers, and produces teacher leaders with the skills and passion to make lifelong teacher development central to school culture'.*

4.19 A three-year evaluation of the *Early Professional Development (EPD) Pilot Scheme* in England (Moor et al, 2005a) reported that mentoring at an early career stage had a positive impact on mentees' teaching practice, career development, and commitment to the teaching profession. The EPD evaluation reported *'strong evidence that the early professional development of teachers had led to them becoming more effective members of their school communities'* (Moor et al, 2005a: iv). This study is one of the few UK studies to assert a link with pupil gains. Reporting survey findings from year 3 of the evaluation, Moor et al (2005a:iv) maintain that *'more than three-quarters of teachers and mentors indicated that EPD had considerably enhanced pupils' learning'* (ibid).

4.20 The evidence base on the effectiveness of different approaches to mentor preparation and the relative effectiveness of different mentoring strategies is limited (Hobson et al, 2009). The majority of studies are based on self-report accounts from mentees' and mentors offered in survey responses and participation in interviews, with a lack of observational research or research employing quasi-experimental designs. However, the challenges of operationalising control or comparison groups in educational research are well documented and this explains the scarcity of research that attempts to link induction arrangements with student achievement (Young, 2006; 2009).

Continuing Professional Development

4.21 Career-long professional learning to improve retention and sustain teacher quality has been found to be desirable (Day, 2002; Day et al, 2007; Brighouse, 2008; Niemi, 2008a,b). Initial preparation is insufficient to meet teachers' professional learning needs throughout their careers. Longitudinal research through the VITAE project (*Variations in Teachers' Work, Lives and their Effects on Pupils*) (2001-2005) drew attention to factors affecting teachers' work lives and the need to ensure the on-going commitment, motivation and effectiveness of teachers across the professional life course (Day et al, 2005; Day et al, 2006a, b; Day and Gu, 2007; Gu and Day, 2007; Sammons *et al*, 2007). The VITAE project was funded by the Department for Education and Skills and jointly conducted by the School of Education, University of Nottingham and the Institute of Education, University of London. The four year project involved 300 primary and secondary teachers in 100 schools in seven local education authorities in England (Day et al, 2007).

4.22 Site-based professional development activities include peer coaching, mentoring, modelling, observing and providing feedback to others. Practice is most likely to be enhanced in a lasting way when decisions about CPD policy and practice consider the social context for adult learning and allow for richer learning experiences than are usually offered in short courses based on a developmental model of skills acquisition (Kelly, 2006).

4.23 Contemporary thinking on CPD indicates that it is most effective when it fits existing school culture, is peer-led, collaborative and sustained (beyond one term) (Cordingley et al, 2003*;* Boyle et al, 2005; Bubb and Earley, 2009; Goodall et al, 2005; Cordingley et al, 2005; Cordingley et al, 2007; Timperley et al, 2007; Lord et al, 2008; Darling Hammond et al, 2009). For example, following a review of experimental studies, Darling Hammond et al (2009:9)

conclude that *'sustained and intensive professional learning for teachers is related to student-achievement gains'.* Programmes with between 30 and 100 contact hours over six to 12 months showed a significant positive effect on student outcomes. Programmes of less than 14 hours in total showed no statistically significant effect on student learning.

4.24 Bolam and Weindling (2006) analysed evidence from 20 projects concerned with capacity-building through teachers' professional development: five systematic reviews, six studies using surveys and case studies and nine evaluation studies published between 2002 and 2006. Nine studies were judged to provide strong evidence to inform policy. There is 'strong' evidence in support of collaborative CPD and CPD designed to meet the needs of teachers at different career stages; and 'fairly strong' evidence for increased effectiveness where teachers have ownership of professional development. Bolam and Wiendling's review (2006) indicates that CPD can make a positive contribution to teachers' knowledge and skill, motivation and morale. Few studies attempt to provide evidence of improved pupil performance.

4.25 A systematic review by Cordingley et al (2007) explored how teachers can be supported in their CPD with the help of specialist expertise. Approaches identified as enhancing the effectiveness of CPD included interviewing participants to establish 'individual starting points' and tailoring CPD to address particular needs. The review noted that effective CPD combined innovative specialist input with an ongoing programme of school-based support. Formal 'input' was described to be 'extensive and sustained' with peer support available. Effective CPD was described as 'self-directing' i.e. specialists ensured that practitioners had a level of autonomy as they developed and applied new learning to their practice.

4.26 A systematic review of the impact of thinking skills programmes linked changes in teachers' classroom practice with teachers' engagement in inquiry-oriented CPD (Baumfield et al, 2005). This review reported that teachers developed more productive questioning strategies, improved pupil grouping practices, and showed increased flexibility in planning and assessment. Baumfield et al (2005) identified four studies where the role of university researchers as co-inquirers and critical friends promoted change in teachers' practices that were associated with improved outcomes for pupils, particularly improved problem solving and understanding of concepts (Fennema et al, 1996; Franke et al, 1998; Hojnacki and Grover, 1992; Zohar, 1999).

4.27 Few research studies have examined the relationship between characteristics of professional development and change in teachers' practice in the longer-term. A questionnaire by Boyle et al (2004) investigated the professional development of primary and secondary teachers across England. In this self-report study, 77% of the 779 participants in longer-term professional development activities reported making changes to at least one aspect of their practice as a result of involvement in CPD. Change most commonly occurred in relation to planning (51%), teaching style (43%) and assessment practices (40%). Observation of colleagues and sharing practice were the most common longer-term development activities. Coaching' and 'research inquiry' were rated as the most effective activities (Boyle et al*,* 2005).

4.28 Alignment between individual professional learning needs and school development is not always strong and can be enhanced through collaboration with external partners. Powell at al (2003) report that school-level dissemination of teacher learning from accredited CPD is often informal and ad hoc, rather than strategic and embedded. Bolam and Wiendling (2006) note that balancing national, school and individual needs is problematic. The majority of teachers in a study by Hustler et al (2003) reported that school development needs took precedence over their individual learning needs. In their evaluation of the CPD partnership project (2004-05) involving 26 local education authorities (LEAs), the General Teaching Council for England and the Department for Education and Skills, Moor et al (2005b) found that collaboration between schools and LEAs contributed towards *'greater understanding of the CPD needs of particular groups of teachers; greater awareness of how to identify training needs, in turn leading to more tailored and effective CPD provision'* (p. iv).

4.29 A variety of programmes have developed in recent years to address the development needs of headteachers (Menter et al, 2005; Reeves et al, 2003). Woods et al (2009) note that headteachers in post for two years or less prioritised CPD that addressed the technical challenges of the job. Experienced headteachers valued professional development focused on building leadership capacity at all levels. Moorman and Pont (2007) identified a need for professional development programmes for headteachers from the middle years of headship. Based on interviews with 14 experienced headteachers, Stroud (2006) identified a demand for personalised programmes of coaching and mentoring involving heads in shaping their own professional development.

4.30 The findings from *Teaching and Learning International Survey* (OECD, 2009) suggest that effective school leadership makes an important contribution to the development of other teachers in school. School leaders who demonstrate strong instructional leadership are more likely to use further professional development to address teachers' weaknesses, foster better student-teacher relations and teacher collaboration, and recognise teachers for innovative teaching practices. Drago-Severson (2007) has identified four strategies used by leaders to support teacher learning: teaming; providing leadership roles for teachers; collaborative inquiry and reflective practice; and mentoring. Research suggests that leadership preparation programmes are better aligned to support school and curriculum reform where there is a clear focus on the technical and adaptive dimensions of change (Murphy *et al*, 2008; Fullan, 2009).

Collaborative approaches to curriculum design and evaluation

4.31 Teacher education curricula need to reflect the changing needs of the school system. The modern professional role involves an extended set of competencies including teaching an increasingly diverse range of learners, values education, literacy and numeracy across the curriculum, using assessment data effectively, engaging in action research and self-review, collaborating in school teams (including inter-agency working) and integrating technology effectively (Crocker and Dibbon, 2008; Finnish Institute for Educational Research, 2009; Calder and Grieve, 2004)

4.32 School and curriculum reform need to be congruent with reform of teacher education (see 4 overleaf). Increased flexibility to adapt the curriculum and classroom instruction to meet individual needs places greater demands on teachers' pedagogical competence. Addressing educational priorities requires a system-level approach (Moorman and Nusche, 2007).

Recognising accomplished teachers

4.33 Concern with teacher quality across the career phases has focused attention internationally on policy levers to incentivise and support the continuing professional development of experienced teachers (Hinds, 2002; Darling-Hammond, 2000; Kleinhenz and Ingvarson, 2004; Ingvarson, 2008). One strategy to enhance teacher quality is the creation of standards and assessments for the certification of accomplished teachers. This is evident in North America in (voluntary) National Board certification (NBPTS, 2002; National Research Council, 2008), and also in Australia in the proposed 'accomplished' and 'lead teacher' grades (AEEYSOC, 2010; Ingvarson, 2010). In the UK, grades and attendant pay scales have been created to recognise and reward accomplished teachers. These vary according to different arrangements for the governance and regulation of teacher education across the UK and include the Advanced Skills Teacher (AST) and Excellent Teacher grades in England (TDA, 2007), the pilot chartered teacher programme in Wales (Egan, 2009) and the Scottish chartered teacher programme (GTCS, 2009). Singapore, Japan and South Korea all also offer forms of advanced certification.

4.34 The research literature contains mixed messages about the impact of current schemes recognising accomplished teachers. The evidence base on National Board certification in the United States suggests some positive outcomes in terms of teacher learning (especially in terms of formative assessment practice) and pupil gains (Vandevoort et al, 2004; Cavalluzzo, 2004; Cantrell et al, 2007; Goldhaber and Anthony, 2007; Petty et al, 2007; Sato et al, 2008; National Research Council, 2008). Other studies suggest positive contributions to the professional learning of others including appointment to promoted posts, mentor, cooperating teacher, instructional coach and staff facilitator roles; and participation in school-based and networked professional learning activities (Frank et al, 2008; Lustick and Sykes, 2006; Sykes et al, 2006; Park et al 2007; Gareis and Nussbaum-Beach, 2007).

4.35 However, the research base is not uniformly positive. Researchers have challenged the relationship between innovative pedagogy and pupil gains, the possibilities for teacher leadership in hierarchical school cultures and accreditation of 'accomplishment' through Board certification assessment processes (Rouse, 2008; Silver et al, 2009; Ballou, 2003). Equity issues have been raised regarding the distribution of accomplished teachers; little evidence indicates that pay rewards increase teacher mobility to high needs schools (Koppich, Humphrey and Hough, 2006; Goldhaber, Perry and Anthony, 2004).

Table 4. Collaborative approaches to curriculum design and evaluation: international examples

Finland	Norway	Netherlands	Australia	New Zealand
Curriculum reform in Finland from 1994 has increased teachers' participation in curricular-decision making and enabled the construction of school-specific policies (Hansen, 1998). All teachers are afforded opportunities to work together for joint planning and evaluation of practice. One afternoon each week is protected, without timetabled classes, to facilitate systematised collaboration and joint work.	In 2005 the Ministry of Education and Research launched the national *Program for School Development*, which was expanded in 2007 to become *The Knowledge Promotion Reform*. This curriculum reform gave teachers more freedom over choice of teaching methods. A key feature of the reform was the promotion of collaborative work to build schools' capacity for organisational change.	The relationship between higher education and schools in terms of curriculum development is advanced through the work of The Netherlands Institute for Curriculum Development (SLO). SLO has over thirty years experience in the development and exchange of curricula information. SLO staffs translate research-based educational innovation into products and services that are of use in everyday school practice and that address problems felt in that practice.	Targeted interventions to promote teacher change and professional growth in Australia include the Victorian *Teacher Renewal Partnership* programme (2001-04), which involved external facilitators (from Deakin University or subject associations) working on innovation projects with 50 schools (Perry et al, 2002).	In New Zealand, evolution of responsibility for curriculum decisions to schools has been accompanied by the introduction of National Standards in 2010 for reading, writing, and mathematics for the first eight years at school. Assessment data from 2010 will be used to set school-wide targets for student achievement.
A research-orientation to teacher education and curriculum development is encouraged through links between schools, universities and development organisations such as the national LUMA Centre.	Drawing on the established literature on 'learning organisations', a research strand was built in to the reform effort to support evidence-informed change: the *National Programme for Practice-based Research and Development*. Through this program, teacher education institutions initiate research and development activities with and for teachers and schools. Many development projects involve practitioners directly in conducting research and setting research priorities (Salo et al, 2008).	There is much to be learned from the collaborative approach to 'educational design research' advanced by SLO (van den Akker et al, 2006). Design research is an iterative process, involving analysis, design and formative evaluation of prototypes, before 'up-scaling' innovations proven to be effective. Teachers work with researchers to field test curricula materials, contributing to research-based improvement of professional practice.	The University of Newcastle teacher education program draws on the New South Wales *Quality Teaching* model to offer an integrated approach: co-design of curriculum content with teachers and university teacher educators; joint work with teachers in schools to support professional development; support for teacher research; and teacher education students' work with academics and students from other disciplines, including social work.	The teacher Inquiry and knowledge building cycle articulated by Timperley et al (2007) has informed the development of self-review tools for teachers.
An evaluation of the LUMA project, which aimed to raise standards in maths and science, noted the significance of teacher-to-teacher collaboration and inter-school cooperation in sustaining motivation and sharing innovative approaches to teaching and learning (Allen et al, 2002).				Cycles of teacher self-review are organised through the following five themes:
				What are our students' strengths and learning needs?
				What are our professional strengths and learning needs?
				Engagement in professional learning.
				Engagement of students in new learning.
				What has been the impact of our changed actions on students?

4.36 A review of the deployment of ASTs in England has highlighted the need for training to support the teacher developer role of ASTs, especially in regard to leading in-service and effective outreach work (Ofsted, 2003). Taylor and Jennings (2004:23) recommend that: advanced practitioner roles form part of a 'career in education' and should not be seen as 'an alternative to school leadership'; outreach roles should not be seen as 'remedial' (supporting 'failing' teachers) but offer opportunities for pedagogic leadership.

4.37 Adoption of the AST model in Wales, following a review of the two-year pilot of the Welsh chartered teacher scheme (2007-09), is currently under consideration by the Welsh Assembly Government. An evaluation of the pilot, conducted by Egan (2009), has drawn attention to the need for greater clarity in relation to 'middle leadership' to promote distributed forms of leadership.

Professional development of teacher educators

4.38 Scant attention has focused on the professional learning of teacher educators and the contribution they can make to curriculum change, whether they are school-based or university-based. Nixon et al (2000), among others, have argued that universities need to commit to the professional renewal of both school teachers and university-based teacher educators. Teacher educators commonly enter higher education as a second career. Concern has been expressed about the variable quality of professional induction and strategies to support CPD for teacher educators, including the development of a research identity (Murray, 2005, 2008a/b; Murray and Male, 2005)

4.39 There is some disparity between the promotion of research-informed teaching on the one hand, and concerns about the capacity of teacher educators to engage in and with high quality applied and practice-based research. In the move towards school-based teacher education, the partnership between university-based and school-based teacher educators achieves greater prominence. Murray (2008b:118) maintains that teacher educators remain an *'under-researched and poorly understood occupational group'*

4.40 International research studies report shared concerns about the professional learning of teacher educators (Swennen and Bates, 2010). A study of induction practices in six countries undertaken by members of the Association of Teacher Educators in Europe did not find any examples of satisfactory experiences among a sample of 9 novice teacher educators (van Veltzen et al, 2010). Only one country, Israel, offers national level professional support for novice teacher educators, which is provided through the MOFET Institute (Ben-Peretz et al, 2010).

4.41 Drawing on an established body of work in the UK, Murray (2010:197) contends that strategies to address the professional learning needs of teacher educators are imperative for a number of reasons including *'ensuring thriving teacher education communities, maintaining research-informed teaching in pre- and in-service courses for teachers, and contributing to the building of capacity in the broad field of education research'.*

Implications for Scottish teacher education

Entry requirements
- Available evidence suggests that entry tests are not always effective in discriminating between prospective candidates competence to teach. Whilst education systems that perform well in international assessments often have selective entry requirements, there is no evidence of a direct link between teachers' academic calibre and pupil performance.

Partnership
- Partnerships need to resource CPD for school staff working with student teachers so that they develop skills in guiding, supporting and evaluating the professional capacities of student teachers and offer opportunities to contribute to curricula design and evaluation.

Induction/Mentoring
- Effective mentoring programmes require investment in mentor selection, training and support. Some local authorities in Scotland have put in place systematic mentoring processes adapted from the New Teacher Center Santa Cruz.
- Research suggests variable quality in practice where formal mentoring arrangements are standard. The involvement of universities in induction support extends opportunities for teacher-mentors and mentees and can inform the review and improvement of pre-service teacher education programmes.

Continuing Professional Development
- Issues highlighted in the research include consideration of how to extend and integrate mentoring and coaching as a feature of CPD across the career course and how to promote deeper understandings of CPD informed by a professional learning perspective.
- There is a need for greater differentiation of CPD to address specific needs at different stages and locations; and closer alignment between CPD planning and school development planning.

Collaborative approaches to curriculum design
- Research and evidence-informed approaches to the improvement of professional practice are supported by sustained collaboration between teachers and researchers and partnership work between the various bodies involved in curriculum development and teacher development.

Accomplished teachers
- Evaluations of the Advanced Skills Teacher role in England and the pilot Chartered Teacher programme in Wales suggest that the leadership role of 'accomplished teachers' requires development.

Professional development of teacher educators
- Building the capacity of teacher educators to engage in high quality research and scholarship is a continuing priority and challenge for Schools of Education in Scottish universities. Advances have been made through collaborative approaches to capacity building in the Applied Educational Research Scheme (AERS) and continue to be advanced through the work of the Scottish Educational Research Association (SERA).

5   PROFESSIONALISM AND PUPIL OUTCOMES

Key points summary

- It is widely agreed that teaching quality is linked to pupil outcomes and it is often suggested that teacher education contributes to the development of teacher quality.
- However, teaching quality is difficult to define and the concept of pupil outcomes related to teacher quality is contested. These and other factors create considerable methodological challenges for researching these matters. There is very little published work on 'wider' pupil outcomes.
- There is conflicting evidence (mainly from the USA) about the impact of higher level teaching qualifications on pupil attainment.

Introduction

5.1   This section of the report addresses the third objective of the literature review and explores the relationships between enhanced professionalism and pupil outcomes. It is widely accepted that teaching quality is a key determinant of successful schooling, as suggested by the McKinsey Report (2007) and by the European Commission:

> *Research shows that teacher quality is significantly and positively correlated with pupil attainment and that it is the most important within-school aspect explaining student performance…Furthermore, other studies have found positive relationships between in-service teacher training and student achievement.* (European Commission, 2007: 3)

5.2   Notably, the European Commission report cites an Israeli study that suggests that teacher training *'may provide a less costly means of increasing test scores than reducing class size or adding school hours'* (ibid.)

5.3   The definition of teaching quality and its measurement remain problematic and the evidence reviewed is far more equivocal than the EC report suggests. Furthermore, there is little research exploring the links between teacher education and pupil outcomes. The research that does exist is limited in its scope. Some definitions of teaching quality may derive simply from measuring pupil outcomes and this leads to a somewhat circular definition of both terms – you judge good teaching by pupil outcomes, therefore the best teachers are the ones where pupils have the best outcomes

5.4   The term 'pupil outcomes' is hotly contested. Given the contemporary global influence of international benchmarking studies such as the Programme for International Student Assessment, the Trends in International Mathematics and Science Study and the Progress in International Reading Literacy Study, there is a tendency to define pupil outcomes simply in terms of attainment results in standardised tests. However, such results are but one part of the outcomes that may reasonably be expected of education. In the Scottish context, the achievement and development of the four 'capacities' of *Curriculum for Excellence* - successful learners, confident individuals, responsible citizens,

effective contributors - will not be fully revealed by such data. This review has identified very little work that links teacher education directly to the 'wider personal development of young people' referred to in the aim of the study.

5.5   However, if it is accepted that teachers do vary in their quality and that the outcomes achieved by pupils do matter, then it is important to attempt to clarify these concepts so that meaningful investigation and discussion can inform policy, not least on forms of teacher education that will lead to improvement in teaching and outcomes.

Research linking teaching education and pupil outcomes

5.6   The literature search carried out for this review has revealed remarkably few studies that examine the influence of teacher education on pupil outcomes. The great majority of efforts to undertake such work have been carried out in the USA and this work is summarised here - as previously noted in Section 1 the U.S. education system has many differences to the Scottish system and this should be noted when considering the transferability of research findings. One of the reasons for the paucity of such work is undoubtedly the methodological complexity of devising studies where linkages between teacher education and pupil outcomes can be isolated from other factors.

5.7   Borko et al (2008) suggest that research on the 'Effects of Teacher Education' has its methodological roots in natural sciences and is concerned to identify cause and effect. They suggest it has become more prevalent in the wake of the *No Child Left Behind* agenda in the USA and the currency of research that is designed to identify 'what works'. However, although believed by policymakers to have useful predictive value Borko et al suggest that *'[such] studies cannot always account for why something works or fails to work in particular contexts'* (Borko et al, 2008: 1024).

5.8   In a review of work in the USA that uses standardised student achievement test scores as the outcome measure, Goe (2007:2) points out that even such a uniform approach has difficulties, including (emphases in original):

- *Standardised achievement tests were intended to measure student achievement and were* not *designed to measure teacher quality.*
- *It is difficult to sort out* teacher *effects (i.e. the contribution of teachers) from* classroom *effects (i.e. the contribution of peers, textbooks, materials, curriculum, classroom climate, and other factors).*
- *It is difficult to obtain linked student-teacher data that make it possible to connect specific teachers to student achievement test scores.*

5.9   Goe (2007) uses two 'input measures', teacher qualifications and teacher characteristics, a process measure of teacher practices and an outcome measure, teacher effectiveness. She concludes that the findings of the reviewed studies are inconsistent or of no practical significance even when the findings are statistically significant.

5.10 In 2008, Cochran-Smith and Fries published 'a review of reviews' of research on teacher education from the 1920s to 2005. They report that Ballou and

Podgursky (2000a, b) found that the evidence that teacher effectiveness is enhanced by advanced degrees earned in Schools of Education is weak. However, Darling-Hammond (2000) re-examined the same material and concluded that Ballou and Podgursky had misrepresented most of the existing evidence base in order to argue that teacher education makes no difference to teacher performance or student learning (Cochran-Smith and Fries, 2008: 1062). The Abell Foundation (2001) reviewed 150 papers published over 50 years and came to the conclusion that:

> *The academic research attempting to link teacher certification with student achievement is astonishingly deficient; certification is incapable of providing any insight into an individual's curiosity, affinity for children, and/or instructional skills.* (ibid: 1062-1063)

5.11 Cochran-Smith and Fries also report that Wilson et al (2001) reviewed 57 studies over the period 1985-2000 and showed a positive connection between teacher preparation in their subject matter and their performance and impact in the classroom (ibid.: 1063). They also refer back to Report of the American Educational Research Association Panel on Research and Teacher Education edited by Cochran-Smith and Zeichner (2005), where the editors found that:

> *Research on certification is limited, but the weight of evidence generally favors certification over non-certification or under-certification, as measured by student achievement. 42 states require teacher testing, but there is little evidence these have predictive validity. Studies on the impact of accreditation are almost non existent.* (ibid: 1066)

5.12 A recent report from the Committee on the Study of Teacher Preparation Programs in the United States reaches similar conclusions (National Research Council, 2010:22). They point to the methodological and conceptual difficulties in establishing causal links between teacher preparation and pupil outcomes:

- *There are no well-formed theories that link teacher preparation to student outcomes.*
- *The complex nature of schooling children makes it difficult to identify empirically the role of teacher preparation among the many intertwined influences on student outcomes.*
- *The use of strict experimental design principles can be problematic in some educational settings…it is difficult to control for all the important factors that are likely to influence student outcomes.*

5.13 The Committee (NRC, 2010) also considered the wider issues of quality control in teacher education (see also Section 6 below) and pointed out that in the USA, as elsewhere, there are procedures for ensuring quality at individual and at institutional level. They point out that there are many difficulties in 'teacher tests', not least being confident that the items measured are significant in teacher performance. Referring to institutional quality, they review the application - at state level in the USA - of Standards and point out:

> *The standards that do exist are not based on research that demonstrates links between particular standards and improved outcomes for students*

taught by teachers who were educated in a particular way because such evidence is not available. …. We note that teacher education is hardly alone in lacking data that directly link components of professional preparation to the outcomes for those who receive the professionals' services[9]. (NRC, 2010: 159)

5.14 A study in North Carolina over the years 1994-2004 reported that elementary school students in Grades 2 to 5 fared better in math and reading tests when they had been taught by teachers with National Board Certification (NBCTs) (Clotfelter et al, 2007). Similarly, a small-scale study by Sato et al (2008) reported higher quality assessment practices among NBCTs. However, such findings have been challenged by Rouse (2008) who did not find a significant relationship between board certification and pupil attainment in his quasi-experimental study of 54 teachers in North Carolina. In other studies, Gimbert et al (2007) have attempted to relate different models of teacher preparation to student attainment but could find no correlation whilst Lustick and Sykes (2006) found significant achievements in teacher learning through Board certification, but did not consider student outcomes. However, in a survey of NBCTs due to renew their certification (after ten years), 98% reported that National Board Certification had positively influenced their careers and 92% reported that National Board Certification had positively influenced their students' learning (Petty et al, 2007).

5.15 In the UK, work undertaken by the Centre for Market and Public Organisation at Bristol University (Slater et al, 2009) has examined the effect of individual teachers on pupil outcomes. Using a definition of teacher quality restricted to impact on student outcomes, Slater et al (2009) use a unique dataset containing the GCSE examination results and Key Stage 3 test results in maths, science and English for 7,305 pupils taught by 740 teachers across 33 schools in England between 1999 and 2002. Pupil records are linked with particular teachers through class lists provided by the schools. The analysis considered subject-specific prior achievement (for previous teacher effects) and observable school effects (intake, resources, selection). According to the findings of this (non peer reviewed) study, teacher characteristics of gender, age, experience and education do *not* play any statistically significant role in explaining variability in teacher effectiveness. A negative effect was shown only in relation to very low levels of experience. The authors concur with research conducted in the US (Kane et al, 2008) in concluding that teacher characteristics are not reliable indicators of teacher quality.

5.16 One English study of the influence of CPD took a longitudinal approach and did claim that there were detectable changes in teaching style that derived from the professional development experiences (Boyle et al, 2005). Those CPD experiences that were found to be most effective were the longer term ones that included peer observation and sharing of practice. However, a relatively large scale study of CPD in England found that only 24% of schools were attempting to evaluate CPD undertaken by teachers in terms of the influence on pupil attitudes (Goodall et al, 2005).

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[9] See Section 6 below.

5.17 Little is known about the relationship between characteristics of different professional development activities and pupil outcomes. The evaluation of the GTCE *Teacher Learning Academy* (TLA) (Lord et al, 2009) provides some evidence to support a link between enquiry-based learning and positive outcomes for teachers, pupils and schools. The evaluation found evidence of impact on teachers' capacity to reflect on practice and self-evaluation, school policies (e.g. behaviour management, CPD approaches and pupil involvement), pupils' progress (before and after tests, and using Assessment for Learning approaches). However, the evaluators noted that *'schools did not appear to have a systematic approach to evaluating CPD and its impact'* (p.109) and recommended greater use of pre- and post-intervention methodologies by teachers and CPD leaders to support robust assessment of impact on classroom practice and pupil learning.

5.18 A systematic review of induction studies (Totterdell et al, 2004) indicated that the lack of large-scale and longitudinal research in this area prevents the type of investigation that might lead to a sound understanding of the connection between enhanced professionalism and the quality of pupil outcomes.

5.19 A systematic review of subject specialist input into CPD in England did find some evidence of impacts on pupils in the following areas: learning and achievement (e.g. improved knowledge of scientific concepts, problem solving, mathematical skills, literacy skills, reasoning, and use of ICT) as well as affective development (e.g. attitudes to learning, motivation and self-esteem) (Cordingley et al, 2007).

5.20 In Scotland, a study of CPD for science teachers by Thurston et al (2008) suggests that it was possible to measure impact in terms of increased pupil attainment by relating this to the changes in classroom practice attributed to CPD. They conclude that CPD can facilitate changes in the professional practice of teachers; however, it must be supported by well structured opportunities allowing teachers to draw support and advice from each other.

5.21 Some writers have positively associated action research partnerships between schools and universities with improving pupil outcomes (e.g. Costello et al 2000; Slater and Ravid, 2010). Similarly, mentor training and development has been found to lead to improvements in teaching and learning (Strong, 2009). A small-scale survey (95% response rate) by Dallat et al (2000) of 20 teachers following a one-year course in Expert Teaching in Northern Ireland concluded that changes to practice are most likely to occur where teachers*: have time to reflect and review their practice; participate in collegial discussions and observations to share practice and encourage professional development; learn in their school context; and undertake longer term professional development*.

5.22 As Day et al (2005; 2006a, b) have shown teacher commitment is very important in these matters. They argue that professional development should not be divorced from the need for wider contextual understanding of what enhances teacher commitment to the profession; taking a standards-based approached to professional development may serve to decrease commitment. They suggest that policymakers and school leaders should consider the contexts for professional development which can change practice positively -

that is, contexts in which teachers' professional values are acknowledged and built on. If commitment can be sustained across the career phases then problems of teacher retention are less likely to occur. Day and Gu (2007) also suggest there is a particular lack of consideration given to the CPD needs of more experienced teachers.

5.23 In England, Hurd (2008) used inspection evidence to assess whether the presence of student teachers in secondary schools had an effect on pupil attainment. The study considered more than 1200 schools over a three year period.

> *The number of trainees has no significant effect on school results at A-level or General Certificate of Secondary Education (GCSE), or on the overall value added between Key Stage 3 and GCSE level. However, at Key Stage 3 level at age 14, while there appears to be a very small depressing effect on achievement in schools with low numbers of trainees, there is a significant positive effect on achievement in schools with larger numbers of trainees.* (Hurd, 2008:19)

In a previous article, Hurd et al (2007) found that involvement in ITE appeared to have a positive influence on teachers' professional development but found it difficult to relate this to pupil outcomes.

5.24 In the USA some Professional Development Schools (PDS) have explicitly sought to bring improvements in pupil outcomes and teacher education together. The Kansas State University PDS Partnership project[10] offers an example of an initiative with the dual aim of improving pupil outcomes and improving teacher preparation. The project shows significant gains in student achievement and positive outcomes of reform of the teacher education programme (Shroyer et al, 2007). The report authors acknowledge that sustained and intensive work requires investment, support for professional development and change among faculty, school staff and administrators.

> *"If the ultimate vision for teacher education is to enhance K-12 student learning, then teacher educators in K-12 schools and colleges of education and arts and sciences must perceive themselves as directly responsible for the teaching and learning of K-12 students as well as that of future and practising teachers."* (Shroyer et al 2007, p. 223)

5.25 Research also indicates that leadership is crucial in securing improvements in pupil outcomes. The major review of such literature, carried out in New Zealand by Robinson et al (2009) found the most important aspect is that school leaders must be active in areas of teacher learning and development. The leader must be seen to be active to demonstrate to teachers that he/she sees the value of what is happening.

Summary

5.26 In reflecting on the range of efforts to connect teaching development and pupil

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[10] See http://coe.k-state.edu/about/pds/index.htm

outcomes it may be helpful to distinguish three levels: the *national system*, the *school* and the *individual teacher*, see Table 5 for examples.

Table 5. Connecting teacher development and pupil outcomes: some examples

System wide	*School level*	*Individual teachers*
Finnish ITE is provided at Master's level and includes a strong research element across all teacher education routes. Teacher education students are introduced to research at an early stage and are required to complete a series of small-scale pedagogical inquiries before submitting a research-based Masters thesis (Ostinelli, 2009). The research-based approach has been in place for 30 years. A study by Jyrhämä et al (2008) suggests that pupils appreciate the approach by student teachers who have been working in classrooms prior to doing teacher education and favour a more experiential approach. Tryggvason (2009) asks why Finnish teacher education is successful and finds on the basis of interviews that *'Finnish teacher educators aim to educate reflective and exploring teachers by using a variety of methods in their own pedagogy' (p.369).* Hargreaveset al, (2007) suggest that detailed attention to learning (curriculum and pedagogy) is a basis for high performance, rather than prioritizing performance through high-stakes testing.	In Alberta, Canada, there is a well-established school improvement scheme that is promoted across the whole state but is implemented at a school level (Taylor et al, 2006). The emphasis is on community engagement and so although each school develops its own approach, every school is encouraged to engage parents, students and other groups in improvement processes. The state provides a wide range of support and monitoring services for schools, including, for example, reviews of professional development for teachers[11]. A report commissioned in Alberta concludes*: The importance of professional development that is sustainable and connected to meaningful, locally based contexts reiterates the strong connection developing in Alberta between school improvement initiatives, research-based inquiries such as collaborative and action research and professional development programs.* (In-Praxis, 2006:46)	Many of the *Teachers for a New Era* (TNE)[12] schemes in the USA have sought to follow individual students through into their school postings and ascertain whether the TNE approach to their preparation leads to improved outcomes for students. The most sustained work has been done at Boston College under the leadership of Marilyn Cochran-Smith (Ludlow et al 2008). Through creating 'a culture of evidence and enquiry', the Boston team has been seeking to identify linkages between students' experience, learning and success as a teacher, by following students from their pre-service program through to their first teaching post. As yet, little has been published by way of findings, but this will be important material to review when it is available. Similar work is being undertaken as part of the STNE project at Aberdeen and has been devised in discussion with Boston College colleagues.

Implications for Scottish teacher education

- Although there is little hard evidence to demonstrate the connections between teaching quality, teacher education and pupil outcomes, there is widespread professional agreement that they are positively related.
- These linkages are under-researched, not least in the Scottish context.
- The research reviewed suggests that consideration should be given to the national, school-based and individual levels of provision. It is likely that successful developments will require intervention/support at all three levels.

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[11] In Scotland the Schools of Ambition scheme is an example of a broadly similar approach, with each school determining its own priorities (http://www.ltscotland.org.uk/schoolsofambition/about/index.asp)
[12] See http://www.teachersforanewera.org

6 EVALUATING THE IMPACT AND EFFECTIVENESS OF TEACHER EDUCATION

> **Key points summary**
>
> - Building research capacity in teacher education is a recognised priority internationally. Reviews of teacher education research in different national contexts consistently indicate that the field of teacher education research is fragmented and non-cumulative.
> - Research-based evaluations of teacher education systems are limited; however, there are other avenues that could be explored such as inspection and school-level self-evaluation.
> - Inspection facilitates comparison between providers against pre-specified criteria and also provides a basis for national overviews of the quality of teacher education.
> - Some studies indicate that the use of evidence to inform policy and practice in teacher education at school level requires further development.

Introduction

6.1   The previous section provided an overview of research exploring the link between teacher education, teacher quality and pupil outcomes internationally. This section seeks to explore the fourth objective that is concerned with identifying effective practice in evaluating the impact and effectiveness of teacher education. In conducting this review it is apparent that the literature on effective evaluative practices is limited. In this section some limitations of the research base on teacher education are outlined; and a framework of evaluation methodologies is offered that includes: *research-based evaluations*; and the evaluation of teacher education through *inspection* and *school-level self-evaluation* practices.

Research

6.2   Reviews of research in the UK (Menter et al, 2010; Murray et al, 2009), New Zealand (Cameron and Baker, 2004) and Australia (Murray et al, 2008) indicate that the field of teacher education research is fragmented and non-cumulative, with a high volume of 'one off' single cohort studies. Building capacity in research *on* and *for* teacher education has been identified as a priority for educational research in the USA (Wilson et al, 2001; Cochran-Smith and Zeichner, 2005), UK (Munn, 2008) and Continental Europe (Erixon Arreman, 2008; Lunenberg et al, 2007). There is little evidence of evaluative research in teacher education. Kirby et al (2006: 25) note that, '*While rife with rhetoric and innovative ideas, teacher education reform is sadly short on objective evaluations'.*

6.3   At present, there are few large-scale quantitative studies with a longitudinal focus and little evidence of large-scale systematic research being undertaken to directly inform the on-going development of teacher education programmes in the UK and beyond (Wideen and Grimmett, 1997; Wilson et al, 2001).

Cochran-Smith and Zeichner, (2005:5) note *"this dearth of larger and longer studies is the case, at least in part, because teacher education has rarely been a research priority for funding agencies or a focus of well-supported programmatic research."*

6.4   Given the concern with persistent underachievement in urban schools and schools facing challenging circumstances, there is a relative lack of attention to teacher effects in these constituencies. Moreover, analysis of large-scale datasets of official records raises equity issues regarding the distribution of 'accomplished teachers'. Based on an analysis of official records in North Carolina (1997-2000), research by Goldhaber et al (2004) suggests that regardless of whether districts offer explicit incentives, teachers are more likely to apply and be awarded advanced certification if they are employed in more affluent schools and in districts with higher-achieving students.

6.5   Evaluating the contribution of policy interventions to raise teacher quality through teacher education is methodologically challenging. Research reviews indicate a need for further major studies using matched pairs designs (to examine the relationship between certification status and pupil outcomes) and the development of sophisticated value-added models to examine teacher effects (Harris and McCaffrey, 2009). Current research contends with limitations of sample size, availability of reliable and comparable student assessments at stage levels and curriculum areas (regional/ national assessment), as well as the considerable challenge of building statistical models that are attentive to background variables influencing teacher and pupil performance (see Cavalluzzo, 2004; Cantrell et al, 2007; Creemers et al, 2010).

6.6   There are resource implications in operationalising in-depth case studies of classroom practice that are attentive to particular institutional contexts and their locale. Many studies do not use direct observation but rely on proxy indicators such as teaching samples from portfolio submissions (Silver et al, 2009), construction of teaching problems through scenarios (Hogan and Rabinowitz, 2009), or data packages of classroom artefacts and curriculum materials from participants (Borko et al, 2005; Clare and Aschbacher, 2001).

6.7   Research reviews (see 6.2) suggest a need for further research to develop and field test prototype instruments to investigate the features of enhanced professional practice in authentic settings. A mixed-method approach drawing on the *complementary* expertise of teacher education faculty in partnership with researchers from the school effectiveness tradition might generate new inter-disciplinary collaborations in teacher education research (see for example productive possibilities indicated in European models of educational design research suggested by van den Akker et al, 2006). At present, there remain very few examples of large-scale, sequential mixed-method designs relevant to the study of teaching quality. Notable exceptions include Sato et al (2008) on formative assessment practices, work by Day et al (2007) on teacher resilience and competence, Hobson et al (2009) on routes into teaching and Stronge et al's (2007) comparison of NBCTs with non-NBCT colleagues using pre-instructional, dispositional and in-classroom variables.

6.8 Multi-disciplinary mixed methods approaches are at an early stage of development within the Scottish Teachers for a New Era (STNE) research programme. The relative dearth of such studies stands in contrast to the current emphasis placed on impact assessment and policy relevance in research commissioning (Research Councils UK, 2007).

Inspection and self evaluation

6.9 The main purposes of teacher evaluation are: (1) *quality assurance and accountability* ('assessment *of* teaching'), and (2) *professional development and the improvement of teaching* ('assessment *for* teaching') (Danielson and McGreal, 2000; Kleinhenz and Ingvarson, 2004; Isore, 2009; Stronge and Tucker, 2003). Unsurprisingly the literature contains different positions in relation to evaluation practice and the extent to which the dual purposes of evaluation are compatible (Ferguson et al, 2000; Bates, 2004; Perryman, 2006). A review of the characteristics of Inspectorates of Education in Europe, by Standaert (2000:56-7) notes tension between what he describes as an 'economic-technical' model of inspection that is concerned with output control and a 'pedagogic-didactic' approach that is more concerned with creating internal evaluation cultures.

6.10 The Standaert review (2000:44) notes the influence of the 'standards movement' on school inspection in Europe. The Report suggests there is a growing emphasis on outcome measures within an *'input-context-processes and output model'*:

- *output (covering attainment, achievement, results, outcomes);*
- *teaching-learning processes (curriculum, pupil guidance, quality of teaching, assessment, ethos, school climate);*
- *management (school management, leadership, organisation, quality assurance, communication, staff management);*
- *context input (infrastructure, financial context, characteristics of incoming pupils, legal demands, support structures outside the school)* (ibid).

6.11 Reviews of evaluation practices internationally note the need for systemic approaches that align *teacher* evaluation with mechanisms for (internal and external) *school* evaluation and school *system* evaluation (Faubert, 2009; Isore, 2009). Self-evaluation is increasingly used as a systematic form of reflection at team or school level (McNamara and O'Hara, 2004; Swaffield and MacBeath, 2005). Reporting the findings of a large–scale study of staff attitudes towards self-evaluation, Vanhoof et al (2009:27) note that *'working on successful self-evaluation requires, first and foremost, a sufficiently developed reflective capacity.'*

6.12 Different approaches taken to maintaining the quality of initial teacher education in Europe are reported in *Quality Assurance in Teacher Education in Europe* (Eurydice, 2006).

6.13 In England, the quality of initial teacher education programmes is inspected by the Office for Standards in Education (Ofsted, 2009). The outcomes of the inspection bear directly on the future allocation of training places to the provider

concerned. The results of the inspections are also included as a set of data within performance profiles that are made available by the TDA annually[13]. The methodology for the inspections has evolved over a number of years but now relies heavily on a self-evaluation document (SED)[14], especially for those providers deemed to be performing well. Where full inspections are carried out, then a series of meetings and observation visits are held with trainees, providers and school partners. One of the major concerns is that schools where students are placed are not directly affected by the outcomes of the inspection and the provider may have little or no control of the quality of support being provided (UCET, 1999).

6.14 The TDA also carries out a survey of Newly Qualified Teachers annually (most recently, TDA 2009[15]) which is used to assess the overall effectiveness of initial teacher training (ITT) provision as well as to identify any providers which may be doing exceptionally well or badly. The survey is distributed to all NQTs in February each year and was supplemented by an induction tutor survey from 2007. NQTs rate their training in relation to the following factors (TDA, 2010[16]):

Curriculum, teaching skills, assessment and progression:
- *helping them understand the National Curriculum;*
- *providing them with the relevant knowledge, skills and understanding to teach their specialist subject;*
- *providing them with the knowledge, skills and understanding to use information and communications technology (ICT) in their subject teaching;*
- *preparing them to teach reading including phonics and comprehension (primary NQTs only);*
- *helping them plan their teaching to achieve progression for learners;*
- *helping them to establish and maintain a good standard of behaviour in the classroom;*
- *helping them use a range of teaching methods that promote children's and young people's learning;*
- *helping them to understand how to monitor, assess, record and report learners' progress.*

Continuing professional learning:
- *preparing them to begin their statutory induction period;*
- *preparing them to use the career entry and development profile (CEDP);*
- *preparing them to share responsibility for their continuing professional development (CPD).*

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[13] Performance profiles are available from: http://dataprovision.tda.gov.uk/public/page.htm?to-page=publicDownloadTheProfiles
[14] For Self Evaluation Document Guidance (TDA, 2009) see: http://www.tda.gov.uk/upload/resources/pdf/s/sed_guidance.pdf
[15] The TDA NQT survey is available from: http://dataprovision.tda.gov.uk/public/page.htm?to-page=providersNqtSurvey
[16] The TDA NQT survey is available from: http://dataprovision.tda.gov.uk/public/page.htm?to-page=providersNqtSurvey

Teacher preparation for diversity:
- *helping them to teach pupils with special educational needs in their classes, with appropriate support;*
- *preparing them to work with learners with English as an additional language;*
- *preparing them to teach learners of different abilities;*
- *preparing them to teach learners from minority ethnic backgrounds.*

Working with others:
- *preparing them to work with teaching colleagues as part of a team;*
- *preparing them to work with other professionals (e.g. social workers, health workers, police officers);*
- *preparing them to manage the work of others in their classroom to achieve learning objectives;*
- *preparing them to communicate with parents and carers;*
- *preparing them for their teacher's statutory responsibility for the welfare and safeguarding of children and young people.*

6.15 Research papers concerning the inspection process in England have focused on concerns about consistency (Sinkinson, 2004), reliability (Campbell and Husbands, 2000; Sinkinson and Jones, 2001) and the 'surveillance' aspect of inspection (Wilkins and Wood, 2009).

6.16 In Scotland, a cyclical process of Collaborative Review was undertaken between 2002 and 2006 in accordance with guidelines set out in a Handbook for Collaborative Review, developed jointly by representatives of higher education institutions, the General Teaching Council for Scotland, Education Authorities, schools, teachers' professional associations, HMIE and the (then) Scottish Executive (SE, 2001a). In contrast to England, these reviews did not lead to the award of resource allocation grades to particular institutions or courses. Recent 'aspect reviews' of teacher education provision in Scotland, led by HMIE, have focused on particular themes and have considered provision across the whole sector: the preparation of student teachers to teach literacy (HMIE, 2002); student teacher placements (HMIE, 2005; 2006); and mentoring arrangements (HMIE, 2008). These were designed to provide helpful support and guidance for future development to all providers. In addition HMIE carried out a 'Scoping Review' of Initial Teacher Education (HMIE, 2003) that preceded the Second Stage Review of Initial Teacher Education (see section 2). HMIE does have a mandate to inspect ITE if required, but currently chooses not to do so.

6.17 The international literature records attempts to bring the quality assurance and professional learning functions of inspection into closer alignment (summarised in Table 6). These include the involvement of the profession in the generation of evaluation standards; the specification of standards tailored to the needs of teachers at different career stages; the promotion of collaborative peer review and the use of multiple data sources within cyclical review processes.

Table 6. Evaluation: merging quality assurance and professional learning

Limitations of evaluation systems	*Advances in evaluation practice*
Some concerns have been raised regarding the lack of precision in systems designed to evaluate teaching quality. A review of local teacher evaluation policies in 7 Midwestern States in the USA found that less than one in ten school districts required evaluators to be trained in order to improve inter-rater reliability (Brandt et al, 2007).	Systems of evaluation will have more credibility and power if they are not only 'publicly known' but 'publically derived' (Danielson and McGreal, 2000:22).The involvement of teachers in the design and implementation of evaluation systems is recommended (Kyriakides et al, 2006). See, for example, the involvement of the profession in the generation of Standards and assessment of their achievement in the National Board for Professional Teaching Standards scheme in the USA and the Highly Accomplished and Lead Teacher levels proposed in Australia.
Evaluation systems have traditionally been characterised by top-down, one way communication, where the teacher's role is passive.	Contemporary understandings of adult professional learning have emphasised the importance of active involvement (see for example Shulman's *Teacher Assessment Project* at Stanford, USA) and a sense of agency e.g. through the provision of options within a range of activities (Shulman, 1991).
Teacher evaluation systems in some countries do not differentiate the roles, responsibilities and performance standards expected of teachers at different career stages (Isore, 2009). Public accountability demands that early career stage teachers are subject to the same evaluation procedures as their more experienced colleagues. Evaluation systems are often designed to assure minimal competency rather than assess and promote accomplishment (Peterson, 2000).	Self-assessment and self-directed inquiry in professional development might reasonably be expected of the experienced reflective practitioner, whereas guided self-assessment within supportive communities of practice may be more appropriate in meeting the development needs of novice teachers (Danielson and McGreal, 2000). The advantages of an integrated framework of professional standards lies in the specification of standards at different career stages and the requirement of reflection and development planning to support career progression (TDA, 2007).
Teacher evaluation systems based on observable teaching behaviours reflect models of student achievement based on skills acquisition. Systems for teacher evaluation need to be congruent with current conceptions of what constitutes 'good teaching' and research-based understandings of how pupils' learn.	New approaches to teaching and professional learning require different approaches to the evaluation of teaching and teacher education. For example, teaching for understanding (Wiske, 1998) and the development of higher order critical thinking skills require different evaluation practices than those designed to assess the outcomes of teaching informed by transmission models of learning (Danielson & McGreal, 2000).
School principals are the most common school-level evaluators (Mathers et al, 2008). Based on research in Australia, Kleinhenz and Ingvarson (2004) suggest that evaluation by principal judgment is not reliable. Empirical studies in the USA also indicate that principal ratings of teacher performance are frequently inaccurate (Peterson, 2000).	Content knowledge and content-related pedagogy of observers are viewed as important by teachers subject to external evaluation. Assessment of evaluators' expertise influences teachers' expectations of likely learning from review processes. Peer evaluators matched according to background, knowledge and experience are more effective than models based on seniority alone.
Many evaluation systems are reliant on quantitative measures: ratings systems; pupil performance data. Over-quantification is often associated with attempts to assure 'objectivity'.	Professional judgment is needed to make sense of evaluation data – establishing warrant from evidence. Multiple sources of evidence from multiple perspectives enhance evaluation systems.

School-level evaluation of teacher education

6.18 In England, the Training and Development Agency for Schools funded school-led projects to explore the impact of ITT on school improvement, pupil attainment and staff development through the Partnership Development Schools (PDS) programme (2006-09). Whilst some impact measures are described as 'anecdotcal', the TDA (2008:3) notes that PDS impact reports contain some evidence of attempts to systematically evaluate the impact of ITT by *'measuring student performance and behaviour and analysing student perceptions... [through] the use of questionnaires, surveys, focus group interviews and individual interviews with mentors and trainees'.*

6.19 Some studies have noted concern regarding current capacity in schools to conduct systematic evaluations of CPD. The review of *Teacher Education Curricula in the EU* (Finnish Institute for Educational Research, 2009:7) notes that *"in-service teacher education was hardly mentioned at all in the documents and only in a few documents were there skills and competences highlighted which should be taken into consideration when planning contents, methods, etc. for teachers' in-service education".* An Ofsted evaluation of CPD in schools also reported weaknesses in evaluation, noting that, *"Few of the schools evaluated successfully the impact of CPD on the quality of teaching and on pupils' achievement because they did not identify the intended outcomes clearly at the planning stage"* (Ofsted, 2006:4).

6.20 A wide range of evaluation instruments are currently employed in the evaluation of teachers, schools and teacher education (see Table 7). At all three levels, a systematic approach involving observation of classroom practice, scrutiny of documents and pupil performance/achievement records and engagement with stakeholders is discernible.

Table 7. Evaluation instruments

Teacher evaluation	School evaluation	Teacher education
Systematic classroom observation - principal ratings using observation protocols. *Teacher self-report:* interviews, surveys, instructional logs. *Teacher data gathering*: portfolios/ teacher work samples/ teacher dossiers. *Analysis of classroom artefacts.* *Collaborative peer evaluation:* 'instructional rounds'. *Analysis of pupil attainment, achievement data and value added*. *Stakeholder surveys* from pupils, parents, community. (Isore, 2009; Goe et al, 2008; City et al, 2009, Harris and McCaffrey, 2004)	*External evaluation:* ranging from full inspections of schools and individual teachers, to inspections of specific subjects. Instruments: observation of lessons; interviews with school leaders; teachers, parents and pupils; questionnaires to be completed by school staff and parents; study of school documents. *School self evaluation*: Questionnaires. Target setting & achievement tracking. Value added measures. Peer observation. Portfolios (e.g. *Schools of Ambition)* School enquiry groups. Pupils as researchers. (Faubert, 2009; Standaert, 2000; Kellett, 2005; Ruddock and Flutter, 2004)	*External Inspection: single or multiple phase.* - Off-site analysis and risk assessment. Pre-visit briefing. - - Site visit including observations of teaching; Joint observation with 'trainer'; individual and group interviews with current and post-qualification students; scrutiny of student files and evidence; interviews with and observation of teacher educators; visits to placement schools/colleges; interviews with managers/ coordinators; scrutiny of course documentation/VLE resources; *Provider self-assessment* – internal evaluation report. (Ofsted, 2009; ETI, 2009; Estyn, 2007; Eurydice, 2006)

6.21 Evaluation through research, inspection and school-level inquiry each have strengths and limitations, these are outlined below in Table 8.

Table 8. Overview of strengths and limitations of evaluation through research, inspection and school-level inquiry

	Strengths	Limitations
Teacher education research	• can investigate precise questions; • plurality of approaches and designs that can be used together to address complex problems of practice (Borko et al, 2008); • advances in value-added (VAM) methodology (Kirby et al, 2006; McCaffrey et al, 2004; Harris and McCaffrey, 2004). The objective of VAM is, *'to determine how students' learning and achievement differ having been in their assigned teacher's classroom rather than being taught by an alternative teacher'* (Harris and McCaffrey, 2010:254)	• rarely cumulative, long-term or large-scale (Cochran-Smith and Zeichner, 2005); • claims to generalisability in the applied field of teacher education are influenced by the contextual nature of teaching and learning (Florio-Ruane, 2002). • effectiveness research in teacher education does not *'itself generate practical solutions, even on a small scale'* (Burckhardt and Schoenfeld, 2003:5 cited by Borko et al, 2008:1024). High quality research findings add to the range of available evidence, supplementing professional expertise and local knowledge.
Inspection of teacher education	• valuable basis for comparison within and review across whole systems; • connects with self-evaluation practices (MacBeath, 2006).	• less flexible and can be less sensitive to particular contexts.
School-level evaluation	• strong basis for professional development; • connects with developing models of inquiry-minded accomplished teaching (Cochran-Smith and Lytle, 2009) and aspirations for *'teaching as a research-informed and research-informing profession'* (Lingard and Renshaw, 2010).	• limited in its wider significance; • weak capacity in data skills at school level and within professional preparation (Earl, Torrance and Sutherland, 2006). While schools are data rich organisations, capacity to interrogate data to inform decision making is not always well established among staff.

Implications for Scottish teacher education
• At present, literature on effective evaluative practices is limited.
• Increased flexibility and autonomy have accompanied enhanced attention to school self-evaluation. *Curriculum for Excellence* provides a strong vehicle for linking curriculum development and teacher development.
• Teacher enquiry in Scotland has a long history but remains piecemeal. Much work undertaken by teachers on the chartered teacher programme, the GTCS teacher researcher scheme and local authority learning communities is focused on systematic reflection through self-evaluation. Moving from a reflective capacity at an individual level to a team and school level remains a challenge.
• Research suggests that further collaborative work between teacher mentors and university-based teacher educators and researchers would enhance the research base on teacher education.

7 CONCLUSIONS

7.1 The overall aim of this review was, *'to understand the contribution that teacher education can make to the quality and effectiveness of the educational experience and wider personal development of young people, drawing on effective practice in Scotland and elsewhere'.*

7.2 In reviewing research on teacher preparation, Cochran-Smith observes that *'most of the broad policy aspects of teacher preparation have little or no conclusive empirical evidence'* (2006:118). She suggests there are two reasons for this. First, research on teacher preparation has been 'marginalized and underfunded'. Second, very little of the research undertaken *'was designed to establish empirical linkages to pupils' learning, partly because teachers' knowledge, learning and beliefs were assumed to be important outcomes of teacher preparation in and of themselves and partly because it was considered self-evident that teachers who knew more, taught better'* (ibid). If this was true in the USA in 2006, it is also still the case today in Europe. The findings in relation to the review objectives are summarised in Table 9.

Table 9. Summary of findings in relation to the objectives

Objective	Summary of findings
Provide a high level overview of the current model of teacher education in Scotland, identifying current strengths and areas for improvement.	A number of very strong features were identified although the major area for improvement was in linking these aspects into a coherent and integrated whole, based on partnerships between the stakeholders.
Identify other education systems (which are broadly comparable to Scotland) that have undergone a significant curricula change, have seen a recent rise in educational standards or are already high performing, and explore the contribution of teacher education to their overall strategy, drawing out learning appropriate to Scotland.	Although it is rare to find studies which establish causal links between curricular change, teacher education and improvements in educational standards, many insights into the improvement of practices in teacher education at the various stages of the continuum were identified, from a range of settings, which may be of value to consider in the Scottish context.
Explore the relationships between forms of teacher education and the enhancement of professionalism, and between enhanced professionalism and pupil outcomes.	Four models of teacher professionalism were identified and linked to particular approaches to teacher education. The evidence on linkages between enhanced professionalism and pupil outcomes was found to be limited, contradictory and somewhat inconclusive.
Provide an overview of effective practice in evaluating the impact and effectiveness of teacher education.	Three main approaches to evaluation were considered: research, inspection and self-evaluation. Although research can investigate precise questions it is rarely cumulative, long-term or large-scale. Self-evaluation can provide a strong basis for professional development for those concerned but is usually limited in its wider significance. Inspections provide a valuable basis for comparison within and review across whole systems but tend to be less flexible and can be less sensitive to particular contexts.

7.3 Most of the work covered in this review has focused on teacher learning and development, because so little has been done that links teacher education directly to pupil outcomes and pupils' wider personal development. Indeed

connecting that teacher learning perspective to the 'educational experience and wider personal development of young people' is rarely an explicit part of the work reviewed here. This review has not considered what might be learned from looking at other professions, but that would appear to be another important avenue for development[17]. In 2005, Christie and Menmuir proposed a common framework of Standards for initial teacher education, health and social care; and Forbes (2007) gives an account of modules shared by pre-service education students and social work and community education students. Nixon et al (2000) argued that *"universities might productively position teacher education with other areas of professional learning such as health and social care and develop professional learning as both a major field of collaborative research and scholarship, and a public resource"* (pp.256-7).

7.4   Throughout Sections 3-6 of this review, a number of implications have been suggested for teacher education in Scotland. How might these be brought together to offer an overall evaluation of the challenges and opportunities that now exist, drawing on the extensive range of literature that has been covered?

7.5   Scotland does have the benefit of clear complementary policy statements about the work of teachers (*A Teaching Profession for the 21st Century*) and about the new curriculum (*Curriculum for Excellence*). This literature review has indicated that it is important to have a clear conception of the nature of teacher professionalism. Research suggests that provision for teacher learning and development needs to be developed across the professional lifecourse with appropriate opportunities at all stages. At present there appear to be some discontinuities in provision. Where good practice exists it may be built upon. For example, mentoring skills developed by teachers in the context of induction may be adapted for initial teacher education. An enquiry orientation to teaching is another example of practice which is still very localised[18] but could be more widely promoted and supported if the potential synergy between the twin policies is to be more fully realised.

7.6   Provision cannot be made on a 'one size fits all' basis. This review indicates that teacher learning depends on the relevance, appropriateness and quality of what is made available. While the Standards provide a set of criteria against which various levels of professional performance may be judged, ensuring a quality threshold, they do not provide for the personalised learning that becomes increasingly required as teachers move through their careers.

7.7   A difficulty with much of the research undertaken within Scotland is that it is often relatively small-scale and piecemeal. It is often of considerable value in local contexts, but is less valuable to the wider system. If there is to be a more integrated and coherent approach to teacher education provision through the career lifecourse then it would be possible to incorporate a research and evaluation strand, so that some of the questions that it has not been possible to answer - either in Scotland or elsewhere – might be addressed in the future.

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[17] Egan and Simmond's (2002) review of CPD in Wales looked at practices in engineering, health, law and medicine.
[18] Examples include Chartered Teachers, *Schools of Ambition*, FLaT projects and the GTCS teacher research scheme. AERS has engaged with practitioner action research, LTS has conducted pilot projects with LAs involving action research and some LAs have set up action research groups.

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APPENDIX 1: SEARCH AND SCREENING PROCESS

EBSCO Professional
Development Collection

British Education Index

Search terms ≈ *Teacher (Education
OR (Professional Development))*

3592

1434

+
+ EPPI Library reviews
+ TLRP/TEG bibliography
+ other known key documents
+ Web of Knowledge highly cited

−
− duplicates
− FE/HE
− excluded countries
− specific curriculum areas

2215

750 to Reviewer 1

750 to Reviewer 2

750 to Reviewer 3

+ + Key missing papers provided by Subject Specialists

−
− Multiple papers from same study/author
− Less relevant to Review Objectives
− Warrant of findings/conclusions for Review Objectives

709

302 to Subject Specialist 1: Initial Teacher Education

97 to Subject Specialist 2: Partnership

130 to Subject Specialist 3: Teacher Professionalism

69 to Subject Specialist 4: Induction

171 to Subject Specialist 5: EPD/CPD

49 to Subject Specialist 6: Accomplished Teaching

38 to Subject Specialist 7: Leadership

−
− Multiple papers from same study/author
− Less relevant to Review Objectives
− Warrant of findings/conclusions for Review Objectives

290 documents analysed, reviewed and synthesised (best evidence synthesis)

APPENDIX 2: DATABASE TEMPLATE

APPENDIX 3. COMPARATOR EDUCATION SYSTEMS

EDUCATION SYSTEM	CURRICULA CHANGE This column draws on the INCA Recent Education Reforms Comparative Tables, 2009, http://inca.org.uk/Table4.pdf	STANDARDS This column draws from Bradshaw et al (2007abc); OECD (2004; 2007); Office for National Statistics (2202ab); Scottish Executive, 2004; Ruzzi (2006); Sheil and Cheevers, (2007);Thorpe (2004); The Scottish Government (2007).	(INITIAL) TEACHER EDUCATION This column draws on research and policy documents from the comparator systems (as cited below).
Scotland	Full implementation of *Curriculum for Excellence*, 3-18 (SEED, 2004) from 2010. Priorities for CfE: A commitment to consultation and stakeholder engagement; de-cluttering of the curriculum; improving transitions between stages of schooling; tackling disengagement in the middle years (11-14 years); tackling the 'opportunity gap'; improving opportunities for vocational education (14-16 age group). Four capacities: to enable each child or young person to be a successful learner, confident individual, responsible citizen and effective contributor.	Scotland's performance in 2003 for Mathematics, Reading, and Science was significantly above the OECD average. In these three areas, only three educational systems (always including Finland and Korea) have mean scores that are (statistically) significantly higher than Scotland's. In PISA 2006, Scotland's performance in Maths and Reading was above the OECD average whereas in Science, it remained significantly higher than the OECD mean score. A slight decline in the mean scores from PISA 2003 to 2006 in Maths and Reading was observable.	• Routes: BEd, PGDE, concurrent degrees. Few part time routes. Development of master's level credit within PGDE at universities of Glasgow and Aberdeen. Scottish Teachers for a New Era (STNE) at Aberdeen University. Some Gaelic medium provision at Aberdeen & Strathclyde. • Seven university providers, plus the Open University. HEI-led school-university partnership arrangements. • Teacher Induction scheme introduced in 2002. Chartered Teacher programme introduced in 2003. • First Stage Review of ITE by the Scottish Executive was completed in 2001; The Second Stage Review of Initial Teacher Education reported in 2005 (SEED, 2005). • Chartered teacher programme introduced 2003. (see: http://www.learningtoteach.org/#)

EDUCATION SYSTEM	CURRICULA CHANGE	STANDARDS	TEACHER EDUCATION
Australia	Consultation on the future *National Curriculum for the 21st Century* commenced in 2008. National curriculum to be introduced in four subject areas in 2011 - English, mathematics, science and history. The draft senior secondary curriculum was released in May 2010. Influenced by the New Basics programme, Queensland (Lingard et al, 2003) and the Essential Learnings curriculum framework, Tasmania (Melville, 2008).	National assessment and reporting programme to accompany new national curriculum. High average performance (PISA). Australia performed above the OECD average in PISA 2003 Mathematics, Reading and Science scales. (They were all not significantly different from Scotland's mean scores). Similarly, Australia remained above the OECD average in PISA 2006 for these three areas. (Of the three subjects, Australia's mean score was not significantly different from Scotland's except in Mathematics where it scored significantly higher than Scotland). There was a notable decline in Australia's reading performance scores between PISA 2000 and 2006.	• Routes: Four year, double-degree and one year ITT programmes. • *National Framework for Professional Standards for Teaching* produced in 2003. (http://www.curriculum.edu.au/verve/_resources/national_framework_file.pdf) • Strong 'practice-based' school-university partnership arrangements. • Across the states & territories in Australia a variety of initiatives operate at accomplished teacher level e.g. the Victorian Experienced Teacher with Responsibility & the Western Australian Level 3 Classroom Teacher Position (see Kleinhenz and Ingvarson, 2004). The Advanced Skills Teacher grade was not widely adopted in the late 1980s. • The *Rewarding Quality Teaching Research Report* (Daniels, 2009) proposed a four band teaching career structure in which Accomplished and Lead Teacher roles will have pay points of twice the starting salary and 2.5 times the starting salary respectively. The report acknowledges that there is currently insufficient work on the measurement of teaching standards. In common with concerns in the US, this report identifies a need for strategies to ensure an equitable distribution of exemplary teachers across schools. (see http://www.mceecdya.edu.au/verve/_resources/Rewarding_Teacher_Quality-Final_Report_-_GDA_2009.pdf)

EDUCATION SYSTEM	CURRICULA CHANGE	STANDARDS	TEACHER EDUCATION
Canada	National, local and school-based curriculum system. Protocol of collaboration across provinces. Influence of 'travelling' 'Essential Learnings' curriculum framework, Tasmania (Melville, 2008).	Pan-Canadian Assessment Programme (PCAP) tests in reading, maths and scene introduced in 2007. High average performance (PISA). In PISA 2003, Canada scored significantly above the OECD average in Mathematics and Science (but not significantly different from Scotland) and significantly above the OECD average in Reading (with a significantly higher mean score than Scotland). Canada's performance in PISA 2006 also showed that their mean scores were significantly higher than both the OECD average and Scotland's. Canada is one of the six highest scoring countries for PISA 2006.	• Routes: Four pathways in ITE: *consecutive, concurrent, graduate and sole degree models* (see Gambhir et al, 2008). • Responsibility vested in the ten provinces and three territories (Crocker and Dibbon, 2008). The provincial government licenses teachers graduating from university-based teacher education programme (55 HEI providers). A College of Teachers accredits teacher education programmes in two provinces: Ontario and British Columbia. • Teachers are prepared to teach one or two stages: primary, middle, secondary academic/vocational.

EDUCATION SYSTEM	CURRICULA CHANGE	STANDARDS	TEACHER EDUCATION
England	The Early Years Foundation Stage (EYFS) and a new national curriculum for secondary schools (Key Stages 3 and 4) came into force in 2008. Following three major reviews of the primary curriculum in 2009[19], the revised primary curriculum was published in 2010. In June 2010 the Coalition government announced that it did not intend to implement the new primary curriculum (http://www.education.gov.uk/curriculum). National Standard Assessment Tasks (SAT) for pupils aged 7 (KS1) and 11 (KS2) and performance tables. End of KS3 science tests in 2010, replaced by national sampling. National tests at KS3 replaced by teacher assessment in 2008. Assessment for Learning Strategy (DCSF, 2008) (http://publications.education.gov.uk/eOrderingDownload/DCSF-00341-2008.pdf)	England's scores for Reading, Mathematics and Science in PISA 2000 were significantly above the OECD average. England's mean score for Science in PISA 2006 was significantly higher than the OECD average. The mean score for Mathematics was not significantly different from the OECD average. Although the mean score for Reading was slightly above the OECD average, the difference was not statistically significant. In PISA 2006 there is no significant difference between the mean scores of England and Scotland in Science, Mathematics, and Reading.	• Routes: range of routes into teaching: University administered (BEd, BA/BSc with QTS, PGCE), school-centred (SCITT) and employment-based (Graduate, GTP; Registered Teacher Programmes RTP; and Overseas Trained Teacher, OTT). (Hobson et al, 2006) (http://www.education.gov.uk/research/data/uploadfiles/RR744.pdf). • Teach First programme (London, the North West, Yorkshire, and the East and West Midlands), selects, trains, places and supports 'talented' graduates in challenging secondary schools. The graduates commit to teaching for two years and obtain *QTS* at the end of their first year (http://www.teachfirst.org.uk/). • Thewlis Report (2006) on Induction (http://www.tda.gov.uk/upload/resources/pdf/i/icm_report.pdf). • NfER Report (2009) on early CPD (http://www.tda.gov.uk/upload/resources/pdf/e/earlycpd_execsummary.pdf).

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[19]The government commissioned *Independent Review of the Primary Curriculum* (http://publications.education.gov.uk/eOrderingDownload/Primary_curriculum_Report.pdf), the *House of Commons Children, Schools and Families Committee National Curriculum* review, and the *Cambridge Primary Review* located at the University of Cambridge (http://www.primaryreview.org.uk/Downloads/Finalreport/CPR-booklet_low-res.pdf).

EDUCATION SYSTEM	CURRICULA CHANGE	STANDARDS	TEACHER EDUCATION
Finland	National Framework Curriculum introduced in 1994. Basic School Curriculum Framework revised in 2004. Collaborative system of curriculum reform. Tradition of school-based curriculum development.	Consistent high performance in PISA assessment tests in reading, mathematics and scientific literacy. In 2003 Finland was the highest performing educational system in Reading and Science. It was the second highest performer in on Mathematics scale. In PISA 2006, Finland was the highest performing educational system in Science and second in Reading and Mathematics. Finnish students were also the Top Readers when both PISA 2000 and 2003 were taken into account.	• Routes: Bachelor-masters system. Pre-school teachers hold a bachelor's degree in educational science. Secondary teachers complete a Master's degree in the subject they teach as well as pedagogical studies. • Final Report of the Teacher Training Development Programme (2006) (http://www.minedu.fi/OPM/Julkaisut/2006/Opettajankoulutus.html?lang=en). • Entrance requirements follow a two-step process: (1) national multiple choice assessment of literacy, numeracy and problem solving skills; (2) university selection procedures based on communication skills, motivation and academic ability. • Professional Development Schools operate. 'Osaava Verme' is a national programme for developing mentoring to support early career teachers. • Students complete small-scale pedagogical inquiries before submitting a research-based Master's thesis (Ostinelli, 2009).
France	New programmes of study were introduced for primary schools in 2008 (reduced school week and introduction of personalised coaching) and secondary schools in 2009. Socle commun (common core) published 2006.	In PISA 2003, France scored significantly above the OECD average in Mathematics (but significantly lower than Scotland) and Science (not significantly different to Scotland). France's reading score was better than its PISA 2000 score but not significantly different to the 2003 OECD average (but significantly lower than Scotland). France's mean scores in PISA 2006 in the three subjects lay on the OECD average (either lower or not significantly different from Scotland).	• Routes: ITE provided through the IUFM (Instituts Universitaires de Formation des Maîtres) and the (highly selective) Grandes Ecoles. One year of training following a three year Bachelor's degree. • Recent reforms of initial teacher training: universitisation and Masters level entry from 2010. • Entry to the profession is regulated through a national competitive exam and scores can influence a teacher's level of salary on appointment. (http://www.education.gouv.fr/)

EDUCATION SYSTEM	CURRICULA CHANGE	STANDARDS	TEACHER EDUCATION
Italy	The 'primo ciclo' (first cycle) of education was introduced in 2004 (five years of primary education and three years of lower secondary). National curriculum but recent moves towards decentralisation and increased autonomy for schools.	Italy scored significantly lower than the PISA 2003 OECD average in Reading, Mathematics and Science (although there was significant improvement on the 2000 Science mean score). Similarly, in 2006 Italy's scores in the three areas were significantly lower than both the OECD average and Scotland.	• Routes: Two-year postgraduate ITT for secondary: diploma di specializzazione. Four year simultaneous degree for pre-primary and primary ITT. 3+2 model recommended. • In Italy serving teachers are recruited to act as supervisors for school practice. Supervisors are appointed on a part time basis (their teaching commitment is halved) for between two to four years by a panel of university and school administration representatives. Supervisor appointments cannot be renewed for a further four years to ensure that supervisors retain recent and relevant experience. • The University of Milan-Bicocca has pioneered teacher preparation 'laboratories' – experimental learning courses that facilitate small group inquiry, reflection and collaboration (Moon et al, 2003).
Japan	*Education Reform Plan for the 21st Century* announced in 2001. Curriculum reform to include reduction in content, increased emphasis on problem solving, integration of IT in student learning and expansion of elective studies. New curriculum guidelines for elementary schools in 2011, junior high schools in 2012 and high schools 2013.	High average performance (PISA). In PISA 2003, Japan scored significantly higher than the OECD average in Science (their mean score was significantly higher than Scotland's), Mathematics (the mean score was not significantly different from Scotland's), and Reading (the mean score was lower than Scotland's). Based on PISA 2003, Japan was one of the top three countries in scientific literacy. For PISA 2006, Japan scored significantly higher than the OECD average (and Scotland) in Science and Maths. In Reading, its mean score was on the OECD average and was not significantly different from Scotland. Japan was among the six highest scoring countries in 2006.	• Routes: Four-year ITT courses. HEI-based. • Teaching has a strong collaborative ethos and this is reflected in lower contact hours but comparatively high working hours. • In their first year teachers spend up to two days each week in one-to-one coaching with 'guidance teachers' in their classrooms. • The practice of 'lesson study' enables groups of teachers to work together to refine lessons and improve practice. The sharing of 'best practice' is afforded a high value. • Introduction of teacher qualification renewal system (http://www.mext.go.jp/english/).

EDUCATION SYSTEM	CURRICULA CHANGE	STANDARDS	TEACHER EDUCATION
Netherlands	Development and dissemination of information about curricula through SLO, the Netherlands Institute for Curriculum Development.	High performance. High degree of institutional stratification. In PISA 2003, the Netherlands performed significantly better than the OECD average in Mathematics (significantly better than Scotland), Reading and Science (neither significantly different from Scotland). In PISA 2006 the Netherland's performance in Mathematics, Reading and Science were all significantly above the OECD average. (Reading and Science scores were not significantly different from Scotland's).	• Routes: Bachelor-masters system from 2002. • The Dutch Association for Teacher Education has developed a professional standard for teacher educators, which is applicable teacher educators based in higher education institutions and schools. • Alternative certification programmes from 2007 to counteract projected teacher shortages (Brouwer, 2007).
New Zealand	A review of the school curriculum was undertaken 2000-2002. A revised curriculum was published in 2006. *The New Zealand Curriculum: Draft for Consultation.* New curriculum introduced from 2007.	National Assessment strategy introduced in 1999. High average performance. New Zealand performed significantly above the OECD average in PISA 2003 Mathematics, Reading and Science; (they were not significantly different from Scotland's mean score). With PISA 2006, New Zealand acquired a significantly higher mean score than either the OECD average or Scotland's mean score in all three areas. New Zealand is one of the six highest scoring countries for PISA 2006.	• Routes: One and four year primary ITT, one or two year postgraduate secondary Diploma ITT. • Range of providers: colleges of education, universities, polytechnics and private tertiary education providers/teacher training establishments. • Bilingual and Maori-medium education. • Revised Professional Standards from 2010. • Teachers Council piloting induction and mentoring programmes (2009-2010) and trialling Draft Guidelines for Mentor Teacher Development (http://www.teacherscouncil.govt.nz/).

EDUCATION SYSTEM	CURRICULA CHANGE	STANDARDS	TEACHER EDUCATION
Northern Ireland	Revised national curriculum from September 2007. Introduction of the Foundation Stage/Key Stage 1.Introduction of Citizenship education and MFL in primary curriculum. Re-organisation of secondary education to include entitlement to blended pathways of academic and vocational learning. Move towards a generic 'skills-based', as opposed to a subject-based, curriculum. Subjects considered as 'stands' within 'Learning Areas'. Emphasis on linkage. New curricular areas: citizenship, employability, personal planning (Learning for Life and Work). Statutory Curriculum and Assessment change from September 2006 (CCEA). New framework for achievement (CCEA, 2005) to accommodate credit accumulation and transfer across programmes of study and across England, Wales and NI. (http://www.ccea.org.uk/)	Northern Ireland's (NI) performance for Mathematics, Reading and Science in PISA 2000 and 2003 were significantly above the OECD average. In PISA 2006 NI's science score was higher than the OECD average, but performance in Mathematics and Reading declined. There is no significant difference between NI's and Scotland's performance in PISA 2006 in Science and Reading. NI's mean score for Mathematics was significantly lower than that for Scotland.	• Routes: Four-year B.Ed or one-year PGCE. PGCE programmes within Northern Ireland are awarded postgraduate level credits (as well as postgraduate in stage). • A number of recent reviews of ITE, including: Taylor and Usher Report (2004) reviewed aspects of ITE in Northern Ireland: Diversification, demography, costs and use of estate (merging colleges). Osler Report (2005) Policy Review of Teacher Education in Northern Ireland. • A Values-Based Approach to Teacher Education (Smith et al, 2008) (http://www.tlrp.org/pub/documents/smith%20RB%2035%20FINAL.pdf). • ETI (2005) report on Induction and Early Professional Development. (http://gtcni.openrepository.com/gtcni/). • Review of Teacher Education, 2010 (http://www.northernireland.gov.uk/news-de-300610-ministers-launch-review). (see: http://www.learningtoteach.org/#)

EDUCATION SYSTEM	CURRICULA CHANGE	STANDARDS	TEACHER EDUCATION
Norway	Revised curriculum in 2007. Primary & secondary curriculum organised through subjects to improve transition. Moved away from organising the primary curriculum (ages 6-10 years) through 'areas' in 2006. Basic skills in literacy, oracy, numeracy and ICT have been integrated into all subjects & year groups.	Norway's performance in PISA 2003 Mathematics and Science was significantly lower than the OECD Average (and also had a significantly lower mean score than Scotland). Norway's Reading score was not significantly different to the OECD average (but significantly lower than Scotland). In PISA 2006, Norway's scores in Science and Mathematics were significantly lower than both Scotland and the OECD average. The Reading score was significantly below the OECD average.	• Routes: four-year program for primary and lower secondary school, and a three-year program for pre-school teaching (Garm and Karlson, 2004) or one-year Practical Teacher Education (Stephens et al, 2004). • In Norway a state-funded national development programme *Mentoring Newly Qualified Teachers* was established in 2003. This allows teacher education institutions to support local authorities by offering mentor training and by developing locally based induction programmes (European Commission, 2010). • The value of collaborative inquiry at an early stage is emphasised (Haugaløkken & Ramberg, 2007; Maaranen & Krokfors, 2008).
Singapore	Review of Primary Education in 2008. Pre-school framework revised in 2003. Review of upper secondary education from 2002. Revised 16-18 curriculum introduced in 2006. In 1997 the *Thinking Schools, Learning Nation* initiative was launched to increase curriculum flexibility and relevance of learning.	Continuous improvement in pupil outcomes since independence in 1965. In a paper published by the National Center on Education and the Economy, 2006, both PISA 2000 and 2003 (and TIMSS 1995, 1999 and 2003) were analysed for mathematics and science, for which it was found that the top Mathematicians for Grade 8 and Above between 1995 and 2003 were Singaporean students (Ruzzi, 2006). Singapore participated in PISA 2009, which is yet to be published.	• Routes: One year (PGDE), two year (Diploma) or four year (BA) primary ITT. One (PGDE), two (PGDE(PE)) and four year (Diploma Art, Music, Home Economics) secondary ITT. • One provider of ITE: National Institute of Education (NIE) (http://www.nie.edu.sg/). • Post-qualification all teachers are entitled to one hundred hours of fully paid professional development per annum (McKinsey, 2007).

EDUCATION SYSTEM	CURRICULA CHANGE	STANDARDS	TEACHER EDUCATION
South Korea	Highly centralised. Statutory national curriculum revised in 2007. From 2000, greater emphasis placed on the development of creativity with the school curriculum (3-18 years). The number of compulsory subjects in the curriculum decreased to make space for optional subjects.	High performance in international assessments. High social equity. For PISA 2003, Korea performed significantly above than the OECD average in Mathematics, Reading and Science (also having significantly higher mean scores than Scotland). Based on PISA 2003, Korea was one of the top three countries in scientific literacy. With PISA 2006, Korea gained mean scores that were significantly above the OECD average (Maths and Reading mean scores were significantly higher than Scotland whereas Science scores were not significantly different from Scotland). Korea also significantly increased its reading performance from PISA 2000 and was the highest performer in Reading in PISA 2006.	• Routes: Four year ITT courses, with award of Master's degree (secondary). Over supply of secondary teachers. No probation period. • Applicants for primary teacher training must be placed within the top 5% of their academic cohort in the national College Entrance Examination. • Teachers with three years post-qualification experience are entitled to 180 hours of Ministry of Education approved training, which carries small salary increments and improved promotion prospects (Wang et al, 2003). (http://english.mest.go.kr/)
United States	Decentralized strategy for curriculum change and systemic instructional improvement. Standards-based education reform.	For PISA 2003, the USA performed significantly below the OECD average for Mathematics and Science whilst on the OECD average for Reading. (The mean scores for the US were all significantly lower than Scotland). With PISA 2006, the mean score for Science and Mathematics was below the OECD average score in Mathematics. (both mean scores were significantly lower than Scotland's).	• Routes: Deregulated system of teacher education. Over 1000 providers. Certification determined at state level. High volume of alternative routes e.g. *Teach for America* (http://www.teachforamerica.org) *Teachers for a New Era* (http://www.teachersforanewera.org). • National Council for Accreditation of Teacher Education (NCATE) provides guidelines to regulate national standards (http://www.ncate.org/). • National Board certification system (voluntary) for recognising accomplished teachers (http://www.nbpts.org/). • Professional Development Schools have developed strong school-university partnership arrangements.

EDUCATION SYSTEM	CURRICULA CHANGE	STANDARDS	TEACHER EDUCATION
Wales	Introduction of pilot Welsh Baccalaureate (2003). Parity of esteem for academic and vocational learning pathways set down in *The Learning Country* (2001). *Learning Pathways 14-19* offers flexible and unified framework of curricular provision. Foundation Phase (for children aged 3-7 years) replaced the National Curriculum at Key Stage One from 2008 (based on a model of experiential learning). Welsh is a compulsory subject for all pupils up to age 16. (http://wales.gov.uk/topics/educationandskills/?lang=en)	Welsh students' performance in Science in PISA 2006 was relatively consistent with Scotland's. Performance in mathematics was significantly lower than that for Scotland. Reading scores were lower when compared with all three other countries in the UK including Scotland. (To date, only PISA 2006 data are available for Wales).	• Routes: Variety of routes to QTS: B.Ed, BA Education, B.Sc or PGCE. GTP and RTP provision. No SCITTs scheme in Wales. An employment-based teacher training scheme ('the Scheme') came into operation in 2004 (Estyn, 2004) (http://www.estyn.gov.uk/publications/GTP_New_Route_Teaching_ITT.pdf). • HEI providers (plus Open University) in three centres of teacher education: Aberystwyth and Bangor – North & Mid Wales Centre; Swansea and Carmarthen – South West Wales Centre; Newport and Cardiff – South East Wales Centre. HEI-led partnership model. • Reviews of ITE: Furlong Review of Initial Teacher Training (ITT) provision in Wales reported in January 2006. A HEFCW review of ITT partnership model in Wales reported in July 2004. • *Excellent and Innovation in ITT* (Estyn, 2003 (http://www.estyn.gov.uk/publications/excellenceinnovation.pdf). • Professional Development Framework (GTCW, 2006). • Pilot of the Welsh Chartered Teacher programme (Egan, 2009) (see: http://www.learningtoteach.org/#)