

The Curriculum for Initial Teacher Education: Literature Review

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1. Introduction

In order to inform the development of its new inspection framework for initial teacher education (ITE), Ofsted wishes to draw on the available evidence from research about ITE. To frame this, Ofsted has posed two research questions as the focus for this review of the literature:

1. How does the curriculum of ITE providers prepare/equip their trainees for the first years of in-service teaching?
2. To what extent does ITE curriculum impact upon new teachers' teaching practice/experience?

In order to address these questions we have sought to review the extant body of literature in order to:

- summarise available evidence about the curriculum for initial teacher education in England and in selected international systems;
- highlight examples of good practice and strong research evidence;
- identify gaps in the literature and questions for further research.

This review will support other research into the ITE curriculum being carried out by Ofsted, including stakeholder surveys and other fieldwork. It follows and draws on Ofsted's recent research into the school curriculum. In this review, as well as exploring findings from the literature relating to the research questions above, we will identify gaps in the research and suggest questions for Ofsted's research.

2. Methodology

2.1 Review process

The search for literature used recognised review methodologies with key search terms and variations linked to the themes in the analysis framework (see below), using electronic databases specific to education. Studies were selected for inclusion based on their quality, assessed by consideration of the points for focus above and their relevance to the analysis framework and Ofsted's aims for the review. The review focussed on peer-reviewed literature from England and internationally, with an initial emphasis on literature from the last five years.

Key word searches were undertaken in research databases, focussing primarily on the British Education Index, Proquest and ERIC. The search criteria used a combination of search terms in abstracts or titles or both, for example:

England **OR** United Kingdom
+
Phrases indicating our target topic: initial teacher education **OR** initial teacher training
+
One word indicating the subject of interest: curriculum

In line with good review practice, a range of inclusion and exclusion criteria were applied while searching for literature. Consideration was given to manageability in the timeframe of the review.

Our criteria were therefore set to enable effective searching against the research questions. The criteria were:

- peer-reviewed articles were prioritised, including reviews that summarised findings from a number of studies. In addition, relevant grey literature found was used where appropriate;
- our initial geographical focus was on countries which are high-performing in international tests such as PISA, those which have a significant body of published education research, and anglophone systems, including England, Australia, Canada and the USA, the Netherlands, Singapore and Finland. As the review progressed this expanded to other countries where appropriate and in turn focussed on particular aspects of ITE in order to illustrate key points; the timeframe was initially limited to 2014-2019 in order to keep the returned searches both manageable and up-to-date, although earlier publications have been included where appropriate;
- all articles chosen were in English, with full-text available without the need for a library research request.

The outcome of each search was recorded in a spreadsheet format in order to keep track of terms used and results (Table 1). Following the initial search process the titles and abstracts of the retrieved records were considered against the inclusion and exclusion criteria given above, with any that did not meet these being discarded. The abstracts of remaining papers were then considered against the research questions and their relevance to these, with those that did not appear germane being rejected.

Because a single researcher reviewed each paper, we erred on the side of caution in not excluding potential sources and focussed on those which were most likely to provide information relating to the framework for analysis (below). Finally, some articles were sourced from wider searches, previous activity by the authors of this report and citation searches from other papers. These studies may not have met the search criteria described above but were included where appropriate to provide greater depth of information.

2.2 Analysis

The papers that remained following the search and screening process described above were reviewed in order to draw out any significant findings and details for the review. Our framework for analysis included these themes:

- definitions of and purposes for the curriculum for initial teacher education;
- effectiveness of and quality in the initial teacher education curriculum;
- impact on recruitment and retention of trainees;
- variations between phases, routes and systems;
- any additional information.

Database searched	Date of Search	Search Terms	Filters / Limiters applied	# of Records retrieved	# of Records excluded after screening	# of Records included in analysis
BEI	5/03/2019	'initial teacher education' OR 'initial teacher training' OR 'pre service education' OR 'teacher education' AND England OR Britain OR UK OR united kingdom OR great Britain AND curriculum	2014-2019, English, peer reviewed	74	69	5
Proquest	12/02/2019	'teacher education' AND initial AND Netherlands	in abstract, from 1/1/14, peer reviewed, then by journal title (removed non-English and subject-focussed)	272	267	5
ERIC	20/02/2019	'teacher education' AND 'Australia'	peer-reviewed, last 5 years;	122	118	4
Proquest	20/2/2019	~"teacher education"(in title) AND Singapore (in abstract)	peer-reviewed, last 5 years;	6	3	3
Proquest	5/03/2019	'initial teacher education' OR 'initial teacher training' AND Curriculum AND England	2014-19, English, peer reviewed	381	376	7
Proquest	20/3/2019	'teacher education' AND science	in title, 2014-2019, English, peer-reviewed	62	26	13

Table 1. Example of search spreadsheet recording

3. Findings of the review

We preface our findings with a note that published research with any explicit discussion of the curriculum for initial teacher education proved hard to find. Much of the research in initial teacher education covers issues such as the balance of theory and practice; the roles of universities, schools, and mentors; the professional practices and identities of initial teacher educators; and the impact of adherence or otherwise to professional standards. This lack of research is in itself a finding worthy of note since it means that additional information about the curriculum needs to be drawn out from other sources, such as Ofsted's current surveys of providers.

Often the studies we found which related to the curriculum did not describe it as such, and so information was extrapolated from discussions of issues such as pedagogies, subject knowledge and professional competencies. In addition, what research there is about the initial teacher education curriculum (whether or not it was described as a curriculum) often takes a deficit view, describing perceived failings and missed opportunities and advocating changes to delivery and/or content. A few small-scale studies raised criticisms and trialled approaches to them; we have included the findings from these where appropriate.

Overall, this means that there is a lack of information on what makes a successful curriculum for initial teacher education. However, notwithstanding these caveats, in this section we present the findings of the review. We focus first on general issues relating to the curriculum for initial teacher education, including how it is or could be defined. We then provide vignettes of the curriculum for initial teacher education from a selection of countries, phases and subject areas. These case studies, which focus on Finland, Australia, Singapore, England, the Further Education and Skills sector, science education and school-led 'grass-roots' curricula, were chosen as illustrations of key issues which are potentially generalisable across contexts, and where there were substantial bodies of research. Finally, we draw together these issues to identify some key features of a successful curriculum for initial teacher education.

3.1 Defining the curriculum for initial teacher education

The term curriculum has multiple meanings and definitions, to variously consider aspects of subject content, pedagogy, delivery models, moral and ideological values and assessment (Kelly, 2009; Priestley, 2019). Ofsted's recent research (Harford, 2018) defines the school curriculum as:

- a framework for setting out the aims of a programme of education, including the knowledge and understanding to be gained at each stage (intent)...
- for translating that framework over time into a structure and narrative, within an institutional context (implementation)...
- and for evaluating what knowledge and understanding pupils have gained against expectations (impact).

From this a model has been developed which separates predictors of curriculum quality into those relating to intent and those relating to implementation (Table 2) (Ofsted, 2018). This conceptualisation enables analysis of individual schools' approaches to the curriculum.

Intent	Implementation
Rationale Ambition Concepts	Subject leadership Subject knowledge Equitable delivery Planning the progression model Breadth and depth Assessment

Table 2. Ofsted’s curriculum quality model for schools

A similar model of the curriculum might be possible for initial teacher education. In initial teacher education, the ‘intent’ may be to help teachers to develop quality and effectiveness in their practice and in their roles as teachers more generally (Hagger & McIntyre, 2000). Findings from our literature review suggest that ‘intent’ may in fact focus on the achievement of teacher standards and an idea of a uniform teacher ideal, and that this push for accountability and/or increased professionalisation (depending on one’s perspective) may be to the detriment of learners and teachers (Stevens, 2010; Page, 2015).

As ‘implementation’ relates to the curriculum for ITE, it might include approaches to the delivery of the curriculum and its management. The range of delivery models for ITE was considered in the Department for Education’s Carter review (Department for Education, 2015) and so these structural issues were not explored in this review, except where relevant to issues of the curriculum. The review made recommendations about ‘core content’ but not did conceptualise this content as a curriculum for ITE, instead focusing on the delivery of this content across ITE partnerships.

For initial teacher education, understanding the curriculum is complicated by the multi-layered nature of ITE. In comparison to teaching, teacher education is complex. The professional roles, practices and identities of teacher educators, whether in school or universities, are the subject of a growing body of research. Internationally, there is a wide acceptance that their role is central to ensuring the quality, knowledge and practices of student teachers (Leite, Dourado & Morgado, 2016; McGee, Cowie & Cooper, 2013; Mergler & Spooner-Lane, 2012; Chong, 2014). Teacher educators need to be confident in their knowledge of subject, knowledge of how to teach others the subject, and knowledge of how to teach others to teach (Field, 2012), while modelling how to be a teacher (Korthagen, Loughran & Lunenberg, 2005).

Any studies of the curriculum for ITE may therefore need to pay attention to the skills and knowledge of those who deliver it, and the curriculum for initial teacher education must deal with these 'interacting components' (Cameron, 2007 in McGee et al., 2013 p10), including subject knowledge and pedagogical skills and knowledge, and encompass ideas and practices relating to these overlapping layers of knowledge and understanding.

Philpott (2014) proposes a pedagogical approach to ITE, with three interacting processes (content, exemplification, meta-cognising) each of which contains different aspects of learning to teach (Table 3). Content is what is taught to student teachers, exemplification describes the pedagogical

processes by which it is taught, and meta-cognising includes the ways in which theory and practice can be integrated and understood.

Content (the what)	Exemplification (the how)	Meta-cognising (the beyond)
Assessment The nature of learning Inclusions Planning Pedagogy	Explicit modelling Debriefing practice 'Living the learning' Talking and thinking aloud Collaborative practice and co-teaching Didactic input	'Excavating the intuitive' Reflexivity Systematic enquiry 'Disturbing practice' Theorising practice Critique of theory and practice

Table 3. A generic pedagogy for initial teacher education (from Philpott, 2014)

Meanwhile, a comparative international study (Jenset, Kirsti & Hammerness, 2018) provides a useful framework for 'coursework grounded in practice' (Table 4). This recommends a series of opportunities which should be provided while studying ITE.

Plan for teaching and teacher role(s)	The extent to which candidates have opportunities in the class to plan lessons or units, to develop instructional materials and resources, etc.
Practice or rehearse teacher role(s)	The extent to which candidates have opportunities in the class period to practice, rehearse, or approximate elements of practice (e.g., practice leading a whole-class or small-group discussion)
Analyse pupils' learning	The extent to which candidates have opportunities to analyse pupils' learning
Include teaching materials, artefacts, and resources	The extent to which candidates have opportunities to use, discuss, or analyse artefacts or resources from real classrooms and teaching
Talk about field placement/student teaching experiences	The extent to which candidates have opportunities to discuss or relate what they are discussing or doing in class to their own fieldwork or student-teaching
Take pupils' perspective	The extent to which candidates have opportunities to do work that their pupils will or might do
See models of teaching	The extent to which candidates have opportunities to see their teacher educators explicitly modeling the kinds of practices discussed in class
See connection to national or state curriculum	The extent to which candidates have opportunities to read, review, critique, or analyse materials or resources specific to the national, state, or local context

Table 4. A framework for coursework grounded in practice (from Jenset et al., 2018)

These pedagogical models could be seen as curricula for initial teacher education. However, they lack specificity of subject knowledge and the development of professional identity (including what it means to be a teacher, such as their role in working with parents and other groups). We therefore

propose a working model for the curriculum for initial teacher education which contains three overlapping components):

- learning to teach, including issues such as behaviour management, inclusion, child wellbeing and psychology (both developmental and cognitive);
- learning to teach a subject, including issues of subject knowledge, subject pedagogies, curriculum, children’s misconceptions and assessment;
- learning to be a teacher, including issues such as reflection, professional development, working with parents, professional inquiry and understanding of school and educational practices.

In the discussion of our findings which follows, we illustrate aspects of these components and, in places, suggest aspects of the curriculum for ITE which sit outside them.

3.2 Examples of approaches to the curriculum for initial teacher education

In this section we present a series of vignettes describing the curriculum for initial teacher education in a selection of different contents, phases and subject areas. In writing these vignettes the dearth of specific literature on the curricula for ITE programmes has become clear, particularly for the English context where in there has been relatively recent substantial change in ITE systems. Perhaps as a result, while there is literature which obliquely addresses what should be part of an ITE curriculum and what this might look like, there is very little about what actually forms current ITE programmes.

It is evident that the curriculum for initial teacher education is influenced by teacher standards and by the school curriculum, and, in some examples, by the system of provision and delivery. Changes in systems of provision, in teacher standards and in the school curriculum lead to changes in the curriculum for ITE. Meanwhile, across many contexts, much published research is the outcome of studies carried out by groups with a particular interest, whether the inclusion of particular content, such as health (Byrne et al., 2012), technology (Sorensen et al., 2014) or religious education (Shane, et al., 2016), or a particular approach, such as lesson study (Cajkler et al., 2013). While this is not in itself negative, it does not necessarily help to build a generalisable model of what is effective.

Finland

The ITE system in Finland has been relatively stable over a number of years, and, in comparison to other countries there is a more coherent body of literature which describes the approach taken to ITE. As in many countries, initial teacher education is considered to be crucial in increasing the quality of education (Aspfors & Eklund, 2017). In contrast to some other countries, though, the system of initial teacher education is smaller, more homogeneous and contributes to teachers’ high status, trust and respect (Tirri, 2014). Large numbers of applicants are not accepted and retention is high (Malinen, Väisänen, & Savolainen, 2012; Hökkä & Eteläpelto, 2014). A limited number of universities provide initial teacher education, working in partnership with schools. All are committed to a research-based orientation towards teacher education (Krokfors, et al., 2011). The aim is to build a teaching profession which has an academically high standard of teachers who can act with autonomy, reflection and responsibility in decision-making (Hökkä & Eteläpelto, 2014; Aspfors & Eklund, 2017).

In Finland there is an understanding that student teachers often have difficulty connecting theory and practice because of a perceived remoteness of theory to teachers' practice (Tryggvason, 2009); the development of a research-based approach is a response to this. Teacher education focuses on the development of competencies through building of knowledge, skills, attitudes, values and personal characteristics, in order to empower teachers to act professionally and appropriately (Malinen, Väisänen & Savolainen, 2012).

Teacher educators, therefore, understand and use research on teaching and learning. They transmit theoretical and pedagogical aspects by using a variety of approaches and learning theories and supporting student teachers to reflect on their benefits and limitations (Tryggvason, 2009). Three content themes – pedagogical content knowledge, theories of education and understanding of practice – interact through a research-based approach in which student teachers engage with research, learn how to evaluate its outcomes and begin to carry out their own research (Tirri, 2014). Interestingly, emphasis is placed on teachers having tools to deal with sensitive moral and ethical issues, including taking responsibility for choices and working with different types of learner (Tryggvason, 2009; Malinen, Väisänen & Savolainen, 2012). The content of ITE includes studies of pedagogies, including teaching practice, the development of skills in planning, implementing, evaluating and developing teaching and learning processes, subject pedagogies, and wider issues such as communication, understanding school life and teachers' work, evaluating learning, promoting critical and reflective thinking.

Australia

Initial teacher education in Australia has been subject to a similar degree of upheaval as that in England, with Moon & Harris (2016) seeing this as a move towards increasing market orientation. Australian ITE generally operates at a state level, although all teachers in Australia must take a course accredited by the Australian Institute for Teaching and School Leadership (AITSL), and meet the Australian Professional Standards for Teachers (Figure 1) which came into force in 2012 (Nielsen et al., 2017). Darling-Hammond (2017) notes that these standards are aligned to a new national curriculum for schools.

- | |
|---|
| <ol style="list-style-type: none"> 1. Know students and how they learn 2. Know the content and how to teach it 3. Plan for and implement effective teaching and learning 4. Create and maintain supportive and safe learning environments 5. Assess, provide feedback and report on student learning 6. Engage in professional learning 7. Engage professionally with colleagues, parents/carers and the community |
|---|

Figure 1. Australian Professional Standards for Teachers

The accreditation standards from the AITSL, which were first issued in 2011, appear to operate as a curriculum for ITE, with a breakdown of the content (including, for example, how long various units should last) and the way in which these should be run, including how placements should work, how communication should take place and the number of days which student teachers should spend in school, formalisation of school/HEI partnerships, alongside wider concerns such as the 'identification

and provision of professional learning opportunities for supervising teachers' (AITSL, 2019 p16). Course providers are required to collect data on ITE students' attainment in order to maintain or gain accreditation.

The ITE curriculum in Australia therefore appears to be tightly governed by the AITSL standards for both course accreditation and teacher standards. In response, some Australian states (e.g. Victoria) have reformed their ITE programmes, abandoning the one-year graduate diplomas and replacing it with two-year Master of Teaching degrees for those with specialist undergraduate degrees (Moon & Harris, 2016; Darling-Hammond, 2017). This means that students will have completed five years of preparation, in comparison with those pursuing the undergraduate route who will have completed four years of study for a single degree qualification. The two-year Masters degree is a 'research-based clinical programme that integrates academic study with practical work in collaboration partnership schools. It is designed to develop graduates who have the professional capabilities to meet the needs of individual learners using data to plan and implement teaching interventions' (Darling-Hammond, 2017 p300).

Similar to the English context, the AITSL advocates for universities, schools and other providers to work closely together in partnership approaches to ITE (Yeigh & Lynch, 2017). This approach is seen in Victoria, where strong partnerships have come about via the formation of university-school clusters. These are funded by the School Centres for Teaching Excellence (SCTE) which aim to ensure that school placements for ITE students are 'more closely integrated with teacher education courses and with the life of the school' (Darling-Hammond, 2017, p300).

In 2004, a national Framework of Values Education was produced, along with grants to encourage explicit values education, based on the idea that education should build character which in turn raises self-esteem, a positive outlook and supports ethical choices and social responsibility. This change to the school curriculum has led to a need for teachers to express, support and model these values in their teaching, including qualities and values such as challenging egocentricism, demonstrating sensitivity, encouraging student expression, and promoting a supportive context for learning (Brady, 2011). This requires, therefore, a change in initial teacher education in order for new teachers to develop these dispositions, perhaps through their modelling by more experienced teachers (Mergler & Spooner-Lane, 2012).

Singapore

Numerous studies explore the success of education in Singapore (Deng & Gopinathan, 2016; Dimmock & Yong Tan, 2016). While little research explicitly explores the success or otherwise of the initial teacher education curriculum, an assumption could be made that ITE is a factor in Singapore's achievements. In Singapore, teaching is frequently highlighted by government officials as important to national welfare, teachers are celebrated through awards and ceremonies, and there are generous resource allocations for teachers' salaries, training and professional learning throughout their careers (Darling-Hammond, 2017).

The small scale of the system of initial teacher education in Singapore, and its single provider, means that a coherent approach with a tightly defined curriculum is possible. The stated aim of the programmes of ITE is to prepare students for a 'career as a teacher', by developing the knowledge and skills required of teachers to meet the demands and challenges of a 'dynamic' teaching career. Each route into teaching has a defined curriculum, available on the National Institute for Education's

website (National Institute of Education, 2019). For example, for the postgraduate diploma for secondary teachers, the curriculum is divided into four areas (National Institute of Education, 2018a), each containing a variety of modules for study (Table 5).

Curriculum area	Examples of content within the area
Education studies	Educational Psychology Pedagogical Practices Teacher-Student Relationship Singapore Kaleidoscope Technologies for Meaningful Learning Professional Practice and Inquiry Teaching and Managing Learners Assessing Learning and Performance Group Endeavours in Service Learning Effective Parent Engagement for Teachers The Social Context of Education in Singapore
Curriculum studies	The Teaching of Geography/Mathematics (for example)
Language enhancement and academic discourse skills	Practical Pronunciation for Teachers Communication Skills for Teachers
Practicum	Teaching Assistantship Teaching Practice

Table 5. Singapore’s curriculum structure for the secondary postgraduate diploma programme

The practicum has its own section in the curriculum, separate from education and curriculum studies. However, theory and practice are linked together in the delivery of ITE, with materials used to combine evidence-based professional knowledge with practical experience and there is a strong emphasis on mastering content and pedagogy, with the content areas aligned and designed to be mutually reinforcing (Rasmussen & Bayer, 2014; Darling-Hammond, 2017).

The curriculum for ITE is underpinned by attributes and values (Table 6) which conceptualise the role of the teacher in the 21st century (National Institute of Education, 2018b).

Singapore’s ITE system is subject to a quality management system which aims to both ensure minimum standards of quality and to improve quality over time (Chong, 2014). The framework provides an internal review mechanism for knowledge and information gathering, and capacity development. It contains four aspects: context, input, process and outputs, with goals and performance indicators to serve as professional benchmarks to identify strengths and areas for development.

Attributes of the 21 st century teaching professional	Examples
Learner-centred values	Empathy, belief that all children can learn, valuing of diversity
Teacher identity	Aims for high standards, enquiring nature, strive to improve, ethical
Services to the profession and community	Collaborative learning and practice, social responsibility and engagement
Skills	Reflective skills and thinking disposition, pedagogical skills, communication skills
Knowledge	Self, pupil, community, curriculum, multicultural literacy

Table 6. Singapore’s values, skills and knowledge model

Even within the relatively small scale of Singapore, new types of schools are emerging, such as those specialising in the STEM subjects, arts or sports. These schools are able to offer a different curriculum, and so this raises questions about the effectiveness of initial teacher education in preparing teachers to work in these different contexts (Tang & Justin Ke, 2014). These questions could be applied to other national situations, such as England, where there are many school types, and illustrate how the school curriculum may or should determine the ITE curriculum.

England

We now look at England, starting with an overview of studies into ITE across phases and then focussing on the phase-specific example of the Further Education and Skills sector. As we have said previously, little literature relating to initial teacher education in England refers explicitly to its curriculum. Perhaps there is a need for further research about ITE altogether, as it has become more politicised (Murray & Passy, 2014). As Philpott, writing in 2014, commented: England is 'at a crossroads for teacher education' (p14), pointing to a need for research and discussion around the role of teacher educators and the nature of initial teacher education itself.

The lack of research about the ITE curriculum might be a result of ongoing changes in policy around teacher education. For example, the teacher standards (Department for Education, 2013) may have become a 'performative tool' (Kennedy, 2016, in Mutton et al., 2017), leading to a focus on what teachers should be able to do rather than what they know (Wray, 2006), and perhaps inevitably, Ofsted has a role in 'shaping the nature of provision in teacher education' (Alexiadou & Essex, 2016). Meanwhile there are multiple routes into teaching, including undergraduate, postgraduate and school-based routes which have arguably 'privileged school-based experience per se (regardless of the nature of that experience and the processes of learning involved within it)' (Mutton et al., 2017, p15). Interestingly, these shifts in England towards school-centered routes may be in contrast to the situation in Scotland and Wales, where there are calls for closer collaboration between HEIs and schools (Mutton et al., 2017).

The diversity of routes into teaching means that there is a range of ITE providers in England, and so 'teaching about teaching is increasingly undertaken by different types of practitioners' (Philpott,

2014 p14). Teachers are increasingly taking on the role of teacher educators and mentors within school-based and university-based ITE programmes, and it is likely that who is responsible for teaching new teachers is as important as the content of the curriculum (Murray & Kosnick, 2011). However, multiple studies raise the need for better preparation and support for initial teacher educators and mentors (see, for example, Smith & Hodson, 2010; White, 2014).

Murray and Kosnick (2011) suggest that the following are essential components for ITE programmes:

- subject knowledge development;
- subject-specific pedagogy;
- evidence-based teaching;
- child and adolescent behaviour;
- behaviour management;
- assessment and differentiation;
- provision for students with SEND.

Teacher knowledge should be drawn from different sources; that is classroom-based practice and theory, through a joined-up, partnership-based approach between schools and universities. The amount of time spent in schools is not necessarily important, especially in the context of the curriculum (Mutton et al., 2017); rather it should be the 'quality of that experience and the nature of the 'clinical practice'' (p15), which could provide a place to experiment and learn, rather than being bound by workplace regulations and policies (Maandag et al., 2007). School placements are undoubtedly valued in general, but individual trainee teachers may have a less positive view of the value of their own experiences of practice (Raffo & Hall, 2006).

In some cases, partnerships between schools and universities may be unchallenging, with discussion between partners focussed on logistical issues rather than pedagogical approaches (Douglas, 2012), and with the school placement focussed more on daily practicalities than on critical reflection or analysis (Raffo & Hall, 2006; Stevens, 2010; Golding, 2015). A successful partnership should involve giving ITE students the chance to develop their classroom skills but also use to research evidence and student data to become involved in the processes of 'interpretation, intervention and evaluation, drawing on diverse sources of knowledge, including research evidence as well as student data' (Burn & Mutton 2013, p3).

In relation to the school phases, it may be important to consider the curriculum for ITE for primary teachers separately from that of secondary, in order to understand age- and subject-related issues (Murray & Passy, 2014). In relation to secondary teaching, trainee teachers (and school-based mentors) appear to value subject content knowledge more highly than pedagogical knowledge, which is valued more highly by initial teacher educators (Hayes et al., 2008). This means that trainee teachers may focus more on how to teach particular areas of content, rather than being clear about the aims and purposes of their teaching and learning how to respond to students' learning needs (ibid.).

In primary ITE, there can be an excessive focus on delivery of the school curriculum and preparation to be generalised, multi-subject teachers (Wray, 2006; Murray & Passy, 2014). This may be to the detriment of gaining understanding of key issues for primary education such as the relationship between subject knowledge and pedagogic knowledge, knowledge of teaching itself, child

development and responsive classroom decision-making (Wray, 2006; Murray & Passy, 2014; Rasmussen & Bayer, 2014).

Another issue specific to primary schools is the low (less than 20%) number of male trainees (Szwed, 2010). Some studies have considered barriers to recruitment and retention, but few explore male trainees' experience of ITE. A small-scale study of ITE (ibid.) suggests that a successful ITE curriculum may need to form a careful balance between acknowledging and supporting the minority male group, and giving them opportunities to learn together, but without excessively highlighting differences within the group. This study also suggested that opportunities for all trainees for critical reflection on their progress through the ITE programme are important.

The Further Education and Skills sector

The Further Education (FE) and Skills sector in England is diverse, covering colleges of Further Education, Sixth Form colleges, offender learning and the prison sector, and workplace learning in public and private sector organisations and charities. The sector provides a useful example of a system which is less regulated and less established its standards than the English schools sector. Compared to the schools sector, the sector is under-researched, especially in relation to teacher education (Noel, 2006; Thurston, 2010; Crawley, 2013; Springbett, 2018; Simmons & Walker, 2013). In line with this, there appears to be little research about what constitutes an effective curriculum for initial teacher education in the FE sector. However, a number of studies, which we explore below, raise questions about its effectiveness in the current environment.

The implementation of teacher standards has come to the FE sector more recently than in schools: in 2007 LLUK (Lifelong Learning UK) published mandatory units of assessment for initial teaching qualifications (Lucas, Nasta & Rogers, 2012). While the intention of the standards could be seen as a push towards increased professionalisation, their implementation has raised criticisms around, for example, a shift towards a perception of teaching as a bureaucratic process and a narrowing of opportunity in teacher education to make links between theory and practice (Maxwell, 2010; Orr & Simmons, 2010; Lucas, Nasta, & Rogers, 2012). Adding to this, in many teaching areas within the sector, professional bodies exert their own influence over requirements for initial teacher education (Olukoga, 2018).

Initial teacher education in the FE sector has tended to focus on the application of generalised pedagogies which can operate across subject boundaries, and on learning local professional practices (Lucas, Nasta, & Rogers, 2012; Maxwell, 2014). This suggests an alignment towards new teachers learning about becoming a teacher in the FE sector, perhaps at the expense of learning about subject specific pedagogical approaches. This lack of pedagogical discussion is in part an outcome of the diversity of the sector, and in part a result of the predominantly work-based learning system of the sector.

Many teacher educators in FE operate in dual roles as teachers and teacher educators (Noel, 2006), and many teachers in the sector complete their teacher education on a part-time basis while undertaking paid teaching (Orr & Simmons, 2010). The curriculum for initial teacher education is therefore related to the trainee teachers' workplace (Maxwell, 2014), and may lead to an imbalance of preparation for being a professional in the FE organisation where the trainee works against learning to teach a subject. The relationship between general and subject pedagogical knowledge is of course complex (Lucas, Nasta, & Rogers, 2012) but increased engagement with meaningful

subject-specific pedagogical discussion, constructed around increasing teacher autonomy and professional knowledge may be beneficial (Bostock, 2019; Orr, 2012).

Science education

As an example of how the curriculum for ITE operates in particular subjects, we focus here on science education, looking at studies from both England and internationally. The research around science teacher education demonstrates three key issues relating to the curriculum for ITE:

- the impact of the school curriculum and other standards on the ITE curriculum;
- the importance of developing subject specific pedagogical knowledge;
- the impact of wider societal issues which teachers are expected to address.

As we have mentioned elsewhere, in countries where changes have been made to the school curriculum, a change to the ITE curriculum appears to follow. For example, in the USA, the introduction of the Next Generation Science Standards (Next Generation Science Standards, 2019) has led to teacher educators reviewing their programmes in terms of how well they prepared teachers to understand and implement the standards (Hanuscin & Zangori, 2016). The introduction or revision of teacher standards has a similar effect, with the intention often being to control and thereby improve the quality of the ITE curriculum (see, for example, Cofré et al., 2015).

In Australia, national standards include a requirement for teacher education programmes to emphasise priority areas, such as literacy, numeracy, classroom management, special educational needs, indigenous education and ICT. However, while around three-quarters of early career teachers felt that their ITE programme had been helpful overall, they did not feel it was beneficial in terms of teaching students from different cultural backgrounds, managing classroom activities or working effectively with parents or guardians (Treagust, et al., 2015).

Many science teachers, especially those working with children in younger age groups, lack confidence in their subject knowledge and rely on familiar pedagogical approaches (Herbert & Hobbs, 2018; McKinnon et al., 2017; McCauley et al., 2015). However, ITE programmes may focus on generic educational approaches rather than subject specific pedagogies and content knowledge. Often this is due to a lack of time in a teacher education programme aiming to address the needs of all curriculum areas (Azam, 2018).

The effect of this is that trainees may lack opportunities to increase their subject knowledge, to reflect on their understanding of and attitudes towards science, and to acquire a full repertoire of competencies and skills (Herbert & Hobbs, 2018; Leite, Dourado, & Morgado, 2016). The curriculum for ITE should therefore ensure that teachers are given support to develop conceptual understanding (Herbert & Hobbs, 2018). The ITE curriculum can model what is expected of the trainees as teachers, and of the children they work with as learners (Mach & Mach, 2018; Cofré et al., 2015).

In Australia, initial teacher educators have freedom to separate or integrate science subject and pedagogical units; this is complemented by generic education studies including child development, learning theory, curriculum, assessment, educational research and reflective teaching (Treagust, Won, Petersen, & Wynne, 2015). A helpful study of initial teacher education for teachers of science in elementary schools builds a model of the curriculum, implemented by a particular provider

(McKinnon, Danaia & Deehan, 2017). The model integrates scientific practices, investigations and activities with knowledge of science and science education:

- Current body of scientific knowledge
- Knowledge of content, beliefs about purpose
- Scientific misconceptions
- Science and technology syllabus
- Cooperative learning and instructional strategies

Pedagogical content knowledge runs throughout the model, with each component being instrumental in developing student teachers' understanding of how to teach their subject.

Science education provides an example of how initial teacher education may be affected by a need to address wider societal and educational issues. As examples, there are calls that initial teacher education should support new science teachers to:

- make better use of technology in their teaching (Barak, 2017; Sorensen et al., 2014);
- address issues of religion as they relate to science (Shane, et al., 2016);
- understand how to handle a 'superdiverse' classroom (de Carvalho, 2016).

These issues are not necessarily specific to science; similar issues apply to all teachers and in other subject areas. The interesting point is how initial teacher education can be used as a battleground for groups with particular interests.

The development of 'school-led' and 'grassroots' ITE curricula

Much of the literature we have reviewed has been focused on the ITE curriculum and this practice has been located in higher education institutions. However, in both the USA and in England, recent ITE curriculum development has occurred either through a looser partnership with HEIs (Ellis & McNicholl, 2013) or in opposition to it (Kretchmar & Zeichner, 2016). The site of development has been in school and the developments have been led by teachers or school-based teacher educators, often working with educational charities such as Teach for America or Teach First.

This movement has been strongly influenced by the work of E.D. Hirsch and interpretations of this work by Michael Young. Curriculum models draw on learning theory from cognitive psychology, often citing the work of Daniel Willingham as a major influence (for example, see Willingham, 2002). Approaches to classroom practice use the work of Doug Lemov's classroom routines as a starting point, and individual secondary subject curriculum development is encouraged, acknowledging differences between disciplines (Counsell, 2011).

UK government policy that supported free schools and multi-academy trusts to develop their own individual curriculum models has led to the same organisations developing their own models of initial teacher education. This is often described as 'knowledge rich' (see for example the Pimlico-London SCITT (The Pimlico-London SCITT, 2019). The content of the Early Career Framework (Department for Education, 2019) may also have an influence on a school-based initial teacher education curriculum. This emphasises the importance of a carefully sequenced school curriculum and defines learning from a cognitive science perspective. Professional development from these perspectives has been critiqued (see Ellis et al., 2019) but is likely to continue to be influential in future initial teacher education developments in a school-led system.

3.3 Desirable features of a curriculum for initial teacher education

In many countries, questions are raised in the literature about the adequacy of the ITE curriculum in its preparation of teachers for the reality of teaching, particularly in relation to issues of being a professional teacher such as working with parents and understanding how to support children with diverse needs (Kozina, 2013). In Portugal, a study (Flores & Fernandes, 2014) shows that, although students were positive about teaching practice and teacher educators, several areas for improvement were identified, including:

- clearer connections between courses/modules;
- better coordination between departments as well as between the university and school;
- a theory/practice gap;
- duplication of content;
- more guidance and better feedback from teacher educators;
- lack of coordination between second year courses and their needs while on teaching practice;
- workload balance across the years of study.

Given the adherence in many systems to teacher standards and the school curriculum, it is not surprising that teacher education may be more reactive than proactive, adopting a transmission model of learning (Stevens, 2010; Lovat et al., 2011), with a continual refining of approaches, often in response to government aims (Alexiadou & Essex, 2016; Darling-Hammond, 2017). This reactivity may lead to a stifling of fluidity of thinking (Stevens, 2010).

As with many other studies advocating for change, writing about New Zealand, Gilbert (2013) suggests that a 'step change' in teaching is needed for a 'viable 21st century public education system' (p106-7), requiring a different 'orientation to knowledge and learning' (p108). He suggests five competences are required from the teaching profession:

- exceptional content knowledge, not so that they can pass this on to students, but so that they can collaborate with others to create new knowledge, and both justify and communicate it;
- to know about learning in terms of brain development, as well as theory and practice around learning, as well as seeing themselves as learners;
- skills in facilitating the development of students, mentoring, coaching and counselling;
- leadership and management skills;
- to be able to think beyond the 'the one-size-fits-all, everyone must fit the system, difference = deficit model' (p112) to one that encourages 'multiplicity, diversity and difference' (p112).

Similarly, in a response to the 2011 'Teaching Scotland's Future' report, Franchi (2016) espouses a 'liberal pedagogy of ITE' (p152), which appears to embrace the widening of the knowledge base of ITE students, with the grounding of teaching preparation in theory, developing 'higher order thinking skills and enquiry-based approaches' (p152).

As we have described, there are some studies which offer features of successful ITE programmes, although many of these do not explicitly name the curriculum as such but do explore the content of ITE programmes and its mode of delivery. For example, Darling-Hammond (2006b in Darling-Hammond, 2014) gives a list of features of ITE systems that tend to produce well-prepared teachers:

- a common, clear vision of good teaching that permeates all coursework and clinical experiences, creating a coherent set of learning experiences;
- well-defined standards of professional practice and performance that are used to guide and evaluate coursework and clinical work;
- a strong, core curriculum, taught in the context of practice, grounded in knowledge of child and adolescent development and learning, an understanding of social and cultural contexts, curriculum, assessment, and subject matter pedagogy;
- extended clinical experiences – at least 30 weeks of supervised practicum and student teaching opportunities in each program – that are carefully chosen to support the ideas presented in simultaneous, closely interwoven coursework;
- extensive use of case methods, teacher research, performance assessments, and portfolio evaluation that apply learning to real problems of practice;
- explicit strategies to help students confront their own deep-seated beliefs and assumptions about learning and students and to learn about the experiences of people different from themselves;
- strong relationships, common knowledge, and shared beliefs among school- and university based faculty jointly engaged in transforming teaching, schooling, and teacher education.

From these studies, one might build a list of content which forms a successful ITE curriculum. To support this, we end this section by considering three specific features of the curriculum for ITE which appear to be highly valued in the literature across geographical, phase and subject contexts:

- a joined-up approach to theory and practice;
- integrated inclusivity;
- a research-informed approach.

A joined-up approach to theory and practice

As we have discussed elsewhere, classroom practice is widely regarded as being vital in initial teacher education, and so this ‘tethering of practical knowledge and experience to theory’ (Percy & Troyan, 2017) needs to be a **well-integrated** part of the ITE curriculum. Effective classroom experience gives trainee teachers opportunities to bring together theory and practice, which Darling-Hammond (2014) calls ‘a good part of the magic of teaching’ (p547). Wæge and Haugaløkken (2013) found that concurrent teaching of theory and practical classroom experience helped students to see links between theory and practice, so that student teachers were able to use the theory they had learned in the classroom. Practical classroom experience is consistently identified by student teachers and early career teachers as the most important part of their training, but this should be balanced with a reinforcing of the importance of theory (Kozina, 2013).

However, the lack of a joined up, coherent approach between courses and teaching practice has been highlighted by many researchers (for example, Darling-Hammond 2006; Flores & Fernandes, 2014), identifying the need to strengthen and make explicit links between university and classroom experience (Flores & Fernandes, 2014; Darling-Hammond, 2006; Percy & Troyan, 2017). Questions remain, therefore, about how best to link theory and practice and the most appropriate times and processes by which to support teachers to develop the ability to link their experiences of practice to theory (Wæge & Haugaløkken, 2013).

Integrated inclusivity

The curriculum for initial teacher education should prepare teachers to address the needs of all students in order for them to engage and learn and to engage with schools to excellent practice and pedagogical approaches (Darling-Hammond, 2014). Initial teacher education can act as 'an important agency' (Alexiadou & Essex, 2016, p15) in promoting inclusion in the classroom, albeit one that may be limited by a deficit model at the centre of policy frameworks and understandings of inclusion in school policies and practice, with new teachers going into practice with a positive outlook towards inclusion (Goddard & Evans, 2018).

However, in other parts of this review, the need for teachers to understand how to work with diverse student groups has been discussed as a potential lack in the ITE curriculum. Ideas about inclusion may be 'grafted onto the course as distinct set of activities', forced into the programme (Alexiadou & Essex, 2016, p16), rather than being integrated into all its ideas and principles. This is not to suggest a focus on unnecessary differentiation or on the use of particular pedagogical approaches, but to highlight that, currently, there appears to be a lack of awareness in pre-service teachers in terms of effective ways of differentiating instruction where appropriate (Flores & Fernandes, 2014).

A research-informed approach

A 2014 report by the British Education Research Association and the RSA (BERA-RSA, 2014) suggests four ways that research can influence ITE programmes:

- the content of teacher education programmes may be informed by research-based knowledge and scholarship;
- research can be used to inform the design and structure of teacher education programmes;
- teachers and teacher educators can be equipped to engage with and be discerning consumers of research;
- teachers and teacher educators may be equipped to conduct their own research.

When teaching is based on research, students are equipped to 'learn qualitative, quantitative and mixed research methods and to practise research through well-defined activities and assignments from the beginning of their studies.' (Toom et al., 2010, p333). Healey (2000) summarises this scholarly approach to teaching as:

- being familiar with the latest ideas in one's subject;
- being informed by current ideas for teaching that subject;
- evaluating and reflecting on teaching practice and the student learning that results;
- involves communicating and disseminating the teaching and learning practices of one's subject;
- investigating questions related to how students learn within a discipline.

Initial teacher education programmes could provide teachers with understanding and knowledge of research, and opportunities to participate in Masters level programmes, as in Finland, where there is an expectation that teachers will become active researchers. The ability to provide programmes which achieve this may depend on the degree to which the initial teacher educators themselves are research-active (Munthe & Rogne, 2015), and so the ability to engage in research may be limited by the number of staff who are confident in encouraging or using a research-based approach to ITE. Student teachers appear to be most interested in and aware of staff research towards the end of

their time in ITE (in universities) and when the students themselves were undertaking a research project (Healey et al., 2010). In terms of being taught by visibly research-active teacher educators, student teachers identified benefits including greater enthusiasm and motivational capacity of staff (Elken & Wollscheid, 2016). Where possible, therefore, teacher educators could act as role models in terms of being both teachers and researchers, and be knowledgeable about current research, active in research themselves and ready to engage students – both trainee teachers and school students – in research (Smith, 2011).

Healey (2005, p187) gives guidance to developing a curriculum for ITE that links research and teaching, including:

- bringing data and findings from staff research into the curriculum;
- developing students' appreciation of research in the discipline;
- developing students' research skills (explicitly, in addition to other disciplinary and generic skills);
- using assignments that involve elements of research processes (e.g. literature reviews, bidding for grants, drafting bids or project outlines, analysing existing project data, presenting at a 'conference');
- using teaching and learning processes that simulate research processes (e.g. project-based modules, dissertation modules, problem-based learning);
- giving students the opportunity to work on research projects alongside staff (e.g. as a research assistant);
- giving students first-hand experience of commercial consultancy (e.g. as an 'intern', as work-based learning, as a consultant assistant or as a supervised consultant).

However, although there are good reasons for teachers and teacher trainers to look to research for both practice and professional knowledge and to take part in research, it 'does not necessarily follow that *all* teachers should be expected or required to engage in research as a matter of course' (Winch et al., 2013 in BERA-RSA, 2014, p21). Toom et al. (2010) suggest that the ideal situation is when teaching and research are integrated and cohesive to produce 'pedagogically-thinking, reflective and inquiry-oriented teachers' (p339), through a curriculum which links teaching and research (Healey, 2000).

4. Conclusions

Relatively little research has been published into the curriculum for initial teacher education as we are defining it for the purposes of this review: the content of what is taught by providers and intended to be learned by initial teacher education students. A shared definition of curriculum as applied to ITE does not have wide currency and ITE content literature does not review ITE programmes as a whole. There is apparently a greater focus on meeting professional standards than on designing a coherent curriculum.

The literature reviews components of the ITE curriculum such as practice and professional learning, the importance of research literacy and use of evidence, and the differing ways standards or competencies may be used to design a curriculum. Subject content, pedagogy, delivery models, values, ideology and assessment have all been investigated, but there are few examples of evaluations of initial teacher education curricula, with the exception of Australian ITE curricula (AITSL, 2019), and a forthcoming evaluation of the Teach First curriculum in England.

We can however, come to some conclusions about three main factors within our definition of the curriculum: the importance of coherent approaches to subject learning; to learning to teach; and to learning to be a teacher.

All sources stress the importance of subject learning, but this is realised in different ways in different jurisdictions. There are disagreements in the emphasis on the site of subject learning in the literature. Learning via practice and in practice is stressed in much of the literature, but equally there is much evidence that orientation to specific subjects and individual subject pedagogies is more important than apprenticeship-style learning in professional settings.

There is less common ground in learning to teach, with differing approaches in curriculum guidance in different age phases of education. The majority of evidence points to the importance of evidence-based approaches to teaching and learning, but this varies between age phases. Primary ITE courses are noteworthy as direct guidance is given to teaching approaches in reading (such as specifying the use of systematic synthetic phonics in the English Teaching Standards), whereas reviews of subject-specific curriculum such as History privilege approaches specific to the subject developed by independent subject specialists (Counsell, 2011).

'Progress' appears to be seen as a move towards more subject-specific pedagogy and away from generic teaching and learning. This has been expressed as a move away from equipping teachers (and in turn school students) with general skills such as enquiry, creativity and information searching, and a move towards a recognition of difference between individual subjects, difference in age phase contexts, and embedding of specific evidence-based teaching and learning approaches in pedagogy (such as approaches promoted via the EEF toolkit).

Issues of professionalism and identity in learning to be a teacher, including the use of evidence and learning from reflection, are all referred to as important aspects of initial teacher education content, although the presence of teacher standards or initial teacher education standards does not always support the development of a coherent curriculum. ITE providers are able to divide the responsibility for acquiring competence between partners, and to measure competence at the end of a programme, rather than assess the development towards competence in a staged progression.

Finally, there is much discussion in the literature of different models of delivery and routes into teaching. This suggests a need for flexible approaches which take account of teachers' own backgrounds, experience and the diversity of provider and school environments. In other words, the curriculum for ITE needs to be differentiated in order to effectively prepare teachers for their future roles.

Recommended questions for research

We end this review by suggesting some questions for further research which could support building a shared understanding of an effective curriculum for initial teacher education.

- What are the advantages and disadvantages of a tightly structured curriculum for ITE?
- In what ways do learning to teach, learning to teach a subject and learning to be a teacher interact in the curriculum for ITE?
- How should the curriculum differ across different phases and subjects?
- Does the curriculum for ITE effectively prepare teachers to be a professional teacher, such as understanding how to identify and take responsibility for their further development needs?
- How can the curriculum for ITE better address an inclusive approach which values students and teachers with diverse backgrounds, experiences and needs?
- In what ways does the route into teaching influence the ITE curriculum?
- How important is the role of the teacher educator in designing the curriculum?
- Could the provision of professional development opportunities help teacher educators to better understand and design their curriculum?

There is not, of course, a single solution to the curriculum for ITE which will suit all schools, subjects, phases and teachers. However it is clear that there is much still to be understood about how initial teacher education can build a curriculum which meets the needs of new teachers. The review of the research we provide here and the additional research questions suggested offer suggestions to help build this understanding.

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