



RESEARCH REPORT

Developing Scholarship and Research Skills: Interrogating the Literature on Subject Specialist Trainee Teachers' Desirable Features

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Abstract

Context: This study was conducted by the Secondary School Subjects Special Interest Group (SSS-SIG) at Nottingham Trent University. It focused on improving Initial Teacher Education (ITE) programs for secondary subject teachers in England, with the aim of influencing both the university's own programs and regional/national policy. The inquiry addressed the need to better understand the key characteristics expected of secondary Postgraduate Certificate in Education (PGCE) trainees across various subject specialisms.

Aims: The research sought to develop scholarship and research skills among early-career teacher educators and investigate the desirable traits of trainee teachers in secondary education. Key aims included understanding the balance between subject knowledge and pedagogical skills, identifying how these expectations vary across different subjects, and using this insight to inform course design and revalidation processes within ITE programs.

Methods: A systematic literature review was employed, following a structured process of question development, literature search, data extraction, and thematic analysis. The research team analyzed studies related to secondary PGCE courses using academic databases and compiled the results into a thematic framework. Tools such as PRISMA diagrams and literature matrices were utilized to document and compare findings across subject areas.

Findings: Seven key themes emerged, highlighting the importance of balancing subject knowledge and pedagogical skills, the challenges of designing generic teacher education programs, the effectiveness of subject knowledge enhancement courses, the development of practical teaching skills, and the role of reflection and mentorship. Additionally, the interplay between mentorship and school-based experiences was found to be crucial for trainee development, with different expectations observed across subjects.

Implications: This study suggests that teacher education programs need to carefully balance subject-specific and pedagogical training. Other teacher educators might reflect on the importance of incorporating reflective practices, mentorship, and subject-specific approaches into PGCE courses. It also emphasizes the value of integrating theory with practice through enhanced school-based learning opportunities.

Keywords: secondary teacher education, initial teacher education, teacher subject knowledge, pedagogical skills, mentorship, reflective practice

Context

This research was conducted by the Secondary School Subjects Special Interest Group (SSS-SIG) within the Nottingham Institute of Education (NIOE) at Nottingham Trent University. The SSS-SIG brings together early career researchers from different secondary subject specialisms, mirroring the structure of the university's Initial Teacher Education (ITE) programs. Participants included teacher educators specialising in Design & Technology, Science, English, Computer Science/Business, and Mathematics.

The study focused on secondary Postgraduate Certificate in Education (PGCE) courses in England and aimed to inform quality improvement and revalidation processes for ITE programs, both within the NIOE and potentially influencing regional and national policy.

Motivation, focus and questions

The rationale for this inquiry stemmed from several interrelated factors:

- A recognised need to develop scholarship and research skills among early career teacher educators within the NIOE.
- Awareness of declining teacher numbers and recruitment challenges in secondary education, as highlighted by recent Department for Education (2024) and National Foundation for Educational Research reports (2024).
- A desire to better understand the similarities and differences between trainee teachers across various secondary subject specialisms.
- The need for evidence-based insights to inform course design and revalidation processes for ITE programs.

The inquiry focus was on teacher educators' perceptions of the key features or characteristics expected of trainee teachers by the end of their secondary PGCE course, across different subject specialisms. This aligned with the NIOE's strategic goals of building an academic culture with impact and ensuring teaching practices are research-informed.

The study drew on theoretical concepts related to subject knowledge, pedagogical knowledge, and their integration in teacher education. Key frameworks included Shulman's (1986) notion of pedagogical content knowledge and more recent work on the interplay between subject-specific and general pedagogical skills in teacher development.

The overarching research question was:

- What are teacher educators' perceptions of the features of a secondary subject teacher by the end of the secondary PGCE course?

Sub-questions explored across specific subject areas:

- What are design and technology teacher educators' perceptions of the features of secondary design and technology trainee teachers by the end of a PGCE course in England?
- What are English teacher educators' perceptions of the features of secondary English trainee teachers by the end of a PGCE course in England?
- What are mathematics teacher educators' perceptions of the features of secondary mathematics trainee teachers by the end of a PGCE course in England?
- What are Science teacher educators' perceptions of the features of secondary Science trainee teachers by the end of a PGCE course in England?

The anticipated mechanism for change was that by systematically reviewing existing literature on this topic, the research team would develop a more nuanced understanding of subject-specific and general pedagogical expectations for trainee teachers. This knowledge could then inform course design, interview processes, and teaching approaches within ITE programs.

Success criteria included:

- Completion of a comprehensive literature review
- Identification of key themes related to trainee teacher development across subject areas
- Generation of insights to inform course quality improvement and revalidation processes
- Development of research skills among SSS-SIG members
- Dissemination of findings to inform broader ITE practice and policy

Inquiry plan and activities

The inquiry followed a systematic literature review approach, conducted in several phases:

- Research question development: The team used the Joanna Briggs Institute's revised PICO formulation (2024) to develop a precise overarching research question and sub-questions.
- Search strategy development: Search terms and inclusion/exclusion criteria were established to focus the review on the most pertinent studies related to secondary PGCE courses in England.
- Literature search and selection: A comprehensive search was conducted using academic databases (e.g., EBSCO, ERIC) and additional texts identified by team members. A PRISMA diagram was used to document the selection process.
- Data extraction and synthesis: Key information from selected studies was extracted and organised into a literature matrix.
- Thematic analysis: The research team identified recurring themes across the literature related to trainee teacher development and expectations.
- Report writing: A detailed report summarising the findings was prepared, organised by key themes identified in the literature.

The team created several tools to support the inquiry process, including a PICO outline table defining the Population, Phenomenon of Interest, and Context for the study; a PRISMA diagram to visualise the literature selection process, and a literature matrix for organising and comparing key information from selected studies

Ethical considerations and relationships

While this study did not directly involve human participants beyond the research team, several ethical considerations were addressed:

- Research integrity: The team followed established guidelines for systematic literature reviews to ensure a rigorous and transparent process.
- Confidentiality: While specific institutions were not named in the final report, care was taken to anonymise any potentially identifying information from the reviewed literature.
- Responsible use of resources: The project utilised internal funding (Seedcorn Funding) and aimed to maximise the impact of this investment by planning for multiple dissemination outputs.

- Professional development: The project explicitly aimed to support the research skill development of early career academics, aligning with ethical principles of nurturing new researchers.
- Potential impact: Consideration was given to how the findings might influence future ITE practices and policies, with a commitment to responsible interpretation and application of the results.

The project aimed to benefit learners (both trainee teachers and their future students) by improving the quality and relevance of ITE programs. Colleagues within the NIOE and potentially the broader ITE community could benefit from the insights generated about subject-specific and general pedagogical expectations for trainee teachers.

Findings

The literature review yielded seven key themes related to teacher educators' perceptions of the features expected in secondary subject teachers by the end of their PGCE course:

- Subject Knowledge vs. Pedagogical Knowledge: A central debate in teacher education concerns the balance between deep subject matter expertise and pedagogical skills. Studies like Gower & Capel (2004) and Tynan et al. (2014) emphasised the importance of strong subject knowledge, while others like Sorensen et al. (2012) and Rushton et al. (2021) highlighted the crucial role of pedagogical skills. The consensus suggests that effective teacher education programs should integrate both elements.
- Challenges of Generic Teacher Education Programs: Research by Douglas (2011) and Atkinson (2011) highlighted the difficulties in designing one-size-fits-all programs that adequately address the diverse needs of trainees across various subject disciplines. This theme underscores the importance of considering subject-specific approaches within broader teacher education frameworks.
- Effectiveness of Subject Knowledge Enhancement (SKE) Courses: Studies like Inglis et al. (2015) provided evidence for the positive impact of targeted SKE courses in boosting trainee teachers' subject knowledge and teaching preparedness, particularly in science subjects.
- Developing Pedagogical Skills: Multiple studies, including Douglas (2011) and Rushton et al. (2021), offered insights into strategies for developing practical teaching skills. These ranged from subject-specific mentorship to engagement with educational research and reflection on teaching experiences.
- Importance of Reflection: Research by Gower and Capel (2004), Rushton et al. (2021), and Gaciu et al. (2017) emphasised the value of reflective practices in teacher development. Reflection was seen as crucial for helping trainees adapt their teaching to different subjects and contexts, and for continuous improvement of their practice.
- The Interplay of Mentorship and School-Based Learning: Studies highlighted the transformative impact of both mentorship (Rushton et al., 2021; Douglas, 2011) and practical school-based experiences (Corney & Reid, 2007) on trainee teacher development.
- Content and Pedagogy Integration: Research by Corney & Reid (2007), Inglis et al. (2015), and Atkinson (2011) underscored the importance of seamlessly connecting subject-specific knowledge with effective teaching methods. This integration was seen as crucial for enhancing teaching effectiveness and student learning outcomes.

These findings suggest that teacher educators expect secondary PGCE graduates to possess a complex blend of subject knowledge, pedagogical skills, reflective capabilities, and the ability to integrate these elements in practice. While some features (like the importance of reflection) appear consistent across subjects, others (such as the specific balance of subject vs. pedagogical knowledge) may vary by discipline.

Changes to practice

Based on the findings, several potential changes to practice in Initial Teacher Education (ITE) programs can be considered:

- (1) Tailored Subject-Specific Approaches: Develop more nuanced, subject-specific components within PGCE programs to address the unique needs and challenges of different disciplines, as highlighted by Douglas (2011) and Atkinson (2011).
- (2) Enhanced Integration of Subject and Pedagogical Knowledge: Design coursework and practical experiences that explicitly connect subject matter expertise with effective teaching strategies, drawing on insights from Corney & Reid (2007) and Inglis et al. (2015).
- (3) Expanded Use of Subject Knowledge Enhancement (SKE) Courses: Consider implementing or expanding SKE offerings, particularly in subjects where trainees may have weaker foundations, based on the positive outcomes reported by Inglis et al. (2015).
- (4) Strengthened Reflective Practice: Incorporate more structured opportunities for reflection throughout the PGCE program, potentially including reflective journals, peer discussion groups, or action research projects, as supported by findings from Rushton et al. (2021) and Gaciu et al. (2017).
- (5) Enhanced Mentorship Programs: Develop more robust mentorship structures that account for subject-specific needs while also fostering general pedagogical skills, informed by research from Douglas (2011) and Rushton et al. (2021).
- (6) Increased School-Based Learning: Consider expanding practical teaching experiences and ensuring closer integration between university-based learning and school placements, drawing on insights from Corney & Reid (2007).
- (7) Research-Informed Teaching: Encourage greater engagement with educational research among trainee teachers, potentially through reading groups or small-scale inquiry projects, as suggested by Rushton et al. (2021).

These proposed changes aim to create more holistic and effective ITE programs that better prepare secondary teachers for the complexities of their subject-specific and general pedagogical roles.

Reflective evaluation on the process

The inquiry process offered several valuable insights and learning experiences for the research team:

Strengths:

- The systematic literature review approach provided a robust foundation for understanding the current state of knowledge in the field.
- Collaboration within the SSS-SIG allowed for diverse perspectives from different subject specialisms, enriching the analysis.

- The use of a research assistant helped manage the workload and provided an additional perspective on the literature.

Challenges:

- Balancing the broad scope of the research question with the need for subject-specific insights proved challenging at times.
- Time constraints, particularly given the teaching commitments of team members, posed some difficulties in coordinating the research effort.
- Synthesising findings across diverse subject areas and methodological approaches in the reviewed literature required careful consideration.

Learnings:

- The importance of clear, well-defined research questions in guiding a literature review became evident throughout the process.
- The value of collaborative research in building a community of practice among early career researchers was a key takeaway.
- The process highlighted the complexity of teacher education and the need for nuanced, subject-sensitive approaches.

For future similar inquiries, the team might consider:

- Narrowing the focus to allow for deeper exploration of specific aspects of teacher education
- Allocating more time for collaborative analysis and interpretation of findings
- Incorporating primary research (e.g., interviews with teacher educators) to complement the literature review

The project has helped team members develop valuable skills in systematic literature review, thematic analysis, and collaborative research. It has also deepened their understanding of the complexities involved in preparing secondary subject teachers.

Next steps

Building on this initial literature review, the SSS-SIG has identified several potential next steps:

- **Data Collection Tool Development:** Design a research instrument to gather primary data on teacher educators' perceptions of trainee teacher features, informed by the themes identified in the literature review.
- **Ethics Submission:** Prepare and submit a research ethics application for a follow-up study involving direct engagement with teacher educators.
- **Primary Research:** Conduct interviews or surveys with teacher educators to validate and expand upon the literature review findings.
- **Further Analysis:** Compare the primary research findings with the literature review results to identify areas of alignment or divergence.
- **Course Design Implications:** Work with ITE program leaders to translate the research insights into concrete recommendations for course content and structure.
- **Dissemination:** Share findings through:
 - Internal school/department meetings
 - The university Blog and Digest

- ITE focussed Annual Conference
- A potential journal publication (targeting BERA 2025)
- Continued Professional Development: Support team members in using this research experience to inform their teaching practice and potentially support applications for senior fellowship of the HEA.
- Expand Collaboration: Consider involving ITE partnership schools more directly in future research to gain additional perspectives on trainee teacher development.
- Longitudinal Study: Explore the possibility of a longer-term study tracking how perceptions of key trainee teacher features evolve over time or translate into early career teaching practice.

By pursuing these next steps, the SSS-SIG aims to build on the foundation laid by this literature review, generate new insights into effective secondary teacher education, and continue developing as a collaborative research community within the Nottingham Institute of Education.

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