Empowering pre-service teachers through inquiry
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DOI:
10.33612/diss.133327123

IMPORTANT NOTE: You are advised to consult the publisher's version (publisher's PDF) if you wish to cite from it. Please check the document version below.

Document Version
Publisher's PDF, also known as Version of record

Publication date:
2020

Link to publication in University of Groningen/UMCG research database

Citation for published version (APA):

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CHAPTER 1

General introduction

This chapter introduces the context, main aim and research questions underlying this thesis. It clarifies definitions and main concepts regarding pre-service teacher inquiry, as well as the applied framework of analysis. This general introduction concludes with an outline of the studies presented in this thesis.
Chapter 1

1 Introduction

Since about ten years, pre-service teacher research has been a compulsory component of the primary teacher education programme in the Netherlands. Over 90% of the pre-service teachers primary education attend a bachelor programme at a university of applied sciences, which are traditionally more focused on teaching than on research. Pre-service teacher research was introduced after the declaration of Bologna, which aimed to harmonise European higher education systems. Student research emerged as a suitable and popular way to teach and assess the core competences as described by the Dublin descriptors (Griffioen, 2014). Implementing research activities in the curricula of universities of applied sciences turned out to be complicated because these institutes lack research experience and culture (Verburg & Elen, 2013). In the Netherlands, research universities are focused on research and served as an example for curriculum design on research education in universities of applied sciences. In universities for applied sciences, teacher educators, who are often recruited because they have had successful teaching experience in primary schools, have had to learn to conduct research themselves, in addition to professionalize in teaching research skills and supervising student teachers’ research and inquiry (Geerdink et al., 2015). The pressure to improve research education was high, because the last accreditation round for primary teacher education in 2015 has focused on the quality of capstone projects, which are pre-service teacher research projects assessed by teacher educators with scoring rubrics on research reports. After all the institutes were accredited in 2015, the question ‘How can we implement research in our curriculum?’ has shifted to ‘Why did we implement pre-service teacher research? Do we get better teachers?’ Pre-service teacher research takes a great deal of effort and is time consuming and demanding (Maaranen, 2009; Reis-Jorge, 2007). It also takes time away from the more practical and more highly appreciated aspects of the curriculum (Dunn, Harrison, & Coombe, 2008; Joram, 2007), which raises the question, ‘What is the purpose and value of pre-service teacher research?’

The assumption is that knowing about research and conducting research oneself strengthens the quality of teaching. Teachers who use practitioner research as a professional learning strategy are encouraged to substantiate their actions with the scientific knowledge of others and are more aware of their own professional goals to improve practice (Darling-Hammond, 2017; Livingston & Flores, 2017; Menter, Peters & Cowie, 2017). Teacher education is assumed to play a crucial role in enhancing and
influencing pre-service teachers' affective and cognitive attitudes toward research and developing their research skills (e.g., Aspfors & Eklund, 2017; Maaranen, 2009; Munthe & Rogne, 2015; Van der Linden, Bakx, Ros, Beijaard, & Vermeulen, 2012). Internationally, attention to research in teacher education has been increasing for decades, largely because research literacy is assumed to constitute an important foundation for teachers' professional development (BERA-RSA, 2014; Sachs, 2016). Researchers agree that to meet twenty-first-century education challenges and increase educational quality, pre-service teachers must learn how to conduct research (Aspfors & Eklund, 2017; Hökkä & Eteläpelto, 2014; Menter, 2015), noting that it can give them confidence, skills and knowledge that will empower them as autonomous educators and also may increase their ability to innovate in their professional careers (e.g., Castle, 2006; Dunn et al., 2008; Reis-Jorge, 2005). In the past few years, a considerable number of studies about pre-service teacher research in various countries (e.g., Finland, Norway, Sweden, Romania, Portugal, the United Kingdom, the United States) have been published (e.g., Aspfors & Eklund, 2017; Cochrann-Smith, Barnatt, Friedman, & Pine, 2009; Flores, 2018; Gray, 2013; Ion & Lucu, 2016; Råde, 2019; Ulvik, Riese, & Roness, 2017). However, these studies all focus on the (post-)graduate level at research universities, in which experience with, knowledge of and attitudes toward research are different than at universities of applied sciences. These research universities generally aim to train academics who are able to create new knowledge by using sophisticated and complex research methodology. By contrast, less is known about pre-service teacher research in professional bachelor's degree programmes (for exceptions, see, Baan, Gaikhorst & Volman, 2019; Munthe & Rogne, 2015; Van der Linde et al., 2012).

In general, research on the effectiveness of teacher education pedagogy is rare. Most research is descriptive, involving one or two programmes, and is not focused on the impact of a specific pedagogy on pre-service teacher or teaching quality (Grossman, 2005; Van Veen 2013; for an exception, see Brouwer & Korthagen, 2005). An abundance of work exists on teacher education and its core practices (e.g., Grossman, Hammerness & McDonald's, 2009; Korthagen, 2010; Loughran & Hamilton, 2016); however, the effectiveness of these core practices as it relates to the quality of newly qualified teachers is not addressed. Although some studies indicate that pre-service teacher research can contribute to professional development (e.g., Darling-Hammond, Hammerness, Grossman, Rust, & Shulman, 2005), convincing empirical research that shows the effectiveness of specific teacher education pedagogies is still scarce (Van Veen, 2013).
Considering the many positive claims made about the value of pre-service teacher research and inquiry as a teacher education pedagogy and the lack of studies regarding its learning outcomes in a bachelor's degree programme, the main question of this thesis is as follows: What is the added value of pre-service teacher inquiry in primary teacher education?

2 Previous research

The past decades have witnessed worldwide growth in attention to practitioner research and the role of pre-service teacher research in teacher education. In Appendix A, we present an overview of previous research, identifying the focus, countries involved, main findings and methodology of these studies. We determined that although findings from master’s degree and post-graduate programmes in various countries can provide some insight into the contribution of practitioner research to professional development of (pre-service) teachers, a knowledge gap remains regarding pre-service teacher research in bachelor’s degree programmes for teacher education. Furthermore, this overview uncovered a variety of definitions and a confusion of concepts. Therefore, the next paragraphs define the essential concepts regarding pre-service teacher research in primary teacher education in the Netherlands.

When describing teacher education programmes, extant studies typically use the terms ‘research’ and ‘inquiry’ interchangeably (Munthe & Rogne, 2015). In our context, we prefer the term ‘inquiry’ to ‘research’, though the distinction between the two does not exist in Dutch. ‘Inquiry’ is a process of systematic, rigorous and critical reflection about professional practice, and the contexts in which it occurs, in ways that question taken-for-granted assumptions. Its purpose is to inform decision-making for action’ (Reid, 2004, p. 4). Inquiry involves educators pursuing their ‘wonderings’, as well as using theory behind practices and exploring alternatives systematically. By contrast, the use of a variety of quantitative and qualitative research methods, scientific, international literature and peer review, as well as the construction of advancing knowledge that is applicable to other researchers, is essential to research but optional for inquiry. The ability to conduct research is a requirement at master’s degree and doctoral levels (Munthe & Rogne, 2015). One of the major goals of teacher research is to contribute to the knowledge base of educational research (Hammerness, 2006; Zwart et al., 2015); therefore, the term ‘inquiry’ fits better with the aims of primary
teacher education. International literature about this topic though, often uses the term ‘research’ without giving a precise definition. Therefore, in this thesis the term ‘pre-service teacher inquiry’ is used for the studied Dutch context, but referring to international literature the term ‘pre-service teacher research’ is adopted. ‘Practitioner research and inquiry’ is conducted by teachers and other post-graduates, whereas ‘pre-service teacher research and inquiry’ is conducted by student teachers.

2.1 Purpose and value of pre-service teacher research and inquiry

The main aim of teacher education is to educate future-proof teachers who can manage groups of pupils and know what and how to teach. Ideally, these newly qualified teachers also know about learning and make decisions informed by own classroom and school evidence as well as by theory and research (Cochran-Smith & Lytle, 2009; Dana & Yendol-Hoppey, 2019). They have an inquiry stance, applying inquiry as a way of knowing about teaching, learning and schooling over the course of their professional life span (Cochran-Smith et al., 2009). An inquiry stance also entails being able to perform inquiry-based work; these teachers use literature or conduct practitioner research or inquiry to reflect on their own practices or those of their school organisation (Baan, Gaikhorst & Volman, 2018). Practitioner research and inquiry are forms of professional development that aims to understand and improve practices within the teacher’s own local context, from an insider perspective (Borko, Liston & Whitcomb, 2007; Cochran-Smith et al., 2009). Practitioner research offers a range of potential outcomes, such as improving teaching practice (e.g., Ermeling, 2010; Pareja Roblin et al., 2014), increasing teachers’ knowledge and understanding of students (e.g., Butler & Schnellert, 2012; Elm & Nordqvist, 2019; Jacobs, Yendol-Hoppey, & Dana, 2015) and fostering teacher empowerment and transformation (e.g., Dana & Yendol-Hoppey, 2019; Esposito & Smith, 2006). Learning how to conduct practitioner research or inquiry in teacher education can lead to inquiry-based working teachers who have critical, reflective and innovative attitudes, have a better understanding of scholastic culture, and contribute to a culture of inquiry at the school and classroom levels (Cochran-Smith & Lytle, 2009; Dobber, Akkerman, Verloop & Vermunt, 2012; Uiterwijk-Luijk, Krüger, Zijlstra & Volman, 2019). In line with prior literature (e.g., Aspfors & Eklund, 2017; Cochran-Smith & Lytle, 2009; Munthe & Rogne, 2015), we distinguish four inquiry competences:

1. Research knowledge, or a broad understanding of a body of knowledge about education and research, as well as underlying theoretical concepts (e.g.,
Dana & Yendol-Hoppey, 2014; Jacobs et al., 2015; Munthe & Rogne, 2015; Sachs, 2016).

2. Research skills, such as conducting a literature review; formulating a research question; choosing and using research methods; collecting data by, for example, observation or interview; drawing conclusions and using scientific language (Aspfors & Eklund, 2017; Kowalczuk et al., 2019; Munthe & Rogne, 2015).

3. Application of research in practice, which Earl and Katz (2006) interpret as being capable of ‘evidence-informed decision making’ that requires not conducting research per se but rather using research literature and findings to (re)design own teaching practice (Baan et al., 2019; Kowalczuk et al., 2019). Aspfors and Eklund (2017, p. 406) call this ‘research-related teaching’.

4. An inquiry habit of mind, originally defined by Earl and Katz (2006) as a way of thinking that values deep understanding, reserves judgements, has a tolerance for ambiguity, takes different perspectives and poses increasingly focused questions. Van der Rijst (2009), whose work is regularly cited in Dutch higher education policy, articulates six characteristics of an inquiry habit of mind: a tendency to be critical and a desire to understand, to share, to innovate, to know and to achieve.

The scientific literature has a variety of broadly similar descriptions and terms regarding the inquiry habit of mind, with many interpretations (e.g., Cochran-Smith & Lytle, 2009; Earl & Katz, 2006; Schön, 1986; Uiterwijk-Luijk et al., 2019). In general, the concept of the inquiry habit of mind is ill-defined in both literature and practice. In literature the term inquiry as stance is often used interchangeably with inquiry habit of mind (e.g., Jacobs et al., 2015; Uiterwijk-Luijk et al., 2019). However, Cochran-Smith and Lytle (2009), who introduced the concept of inquiry as stance as a way of looking, acting and having a habitual, continuous attitude to inquire, refer to an inquiry habit of mind as a part of an inquiry stance. When teachers take an inquiry stance, they act as reflective practitioners (Schön, 1986), pose questions or wonderings, use findings of previous research and scientific knowledge in their practice and share new insights from collected data (Dana & Yendol-Hoppey, 2019). An inquiry as stance is introduced as a counterpart to inquiry as project, which is shorter and finite. In this research, we
consider \textit{inquiry as stance} similar to the disposition of inquiry-based working teachers (Baan et al., 2018; Uiterwijk-Luijk, Krüger, Zijlstra & Volman, 2017), and an \textit{inquiry habit of mind} is a crucial component of it (Cochran-Smith & Lytle, 2009).

2.2 How to develop inquiry competences

Few studies focus on teaching pre-service teacher inquiry competences to undergraduates, compared with the volume of literature on teaching how to conduct research to graduate students (Dunn et al., 2008; Munthe & Rogne, 2015). In practice, the inquiry competences are intertwined; for example, it is not possible to apply previous research findings without using research knowledge. However, the distinction between the competences is functional with regard to teaching and learning related to pre-service teacher inquiry: Which teaching and learning activities should be implemented in the teacher education curriculum to achieve the intended learning outcomes? Previous research identifies teaching and learning activities assumed to be effective in engaging pre-service teachers in inquiry and developing inquiry competences. Regarding the competence \textit{research knowledge}, studies suggest the following activities: reading literature and familiarizing pre-service teachers with findings of previous research (e.g., Munthe & Rogne, 2015; Ulvik & Riese, 2016), technical training in research methodology (e.g., Aspfors & Eklund, 2017; Dunn et al., 2008; Reis-Jorge, 2005; Toom et al., 2010; White et al., 2016) and teacher educators’ use of research examples from practice and own research (Aspfors & Eklund, 2017; Munthe & Rogne, 2015; Toom et al., 2010; Van der Linde et al., 2012). \textit{Research skills} can best be learned by authentic learning tasks (Van der Linde et al., 2012), practical training in research methodology (Aspfors & Eklund, 2017; Dunn et al., 2008; Reis-Jorge, 2005; Toom et al., 2010; White et al., 2016) and an academic writing course (Munthe & Rogne, 2015; Rade, 2019). \textit{Application of research} in practice can be learned by practicing with small inquiries (Munthe & Rogne, 2015; Schulz & Mandzuk, 2005) or a capstone inquiry project, ideally including collaboration between universities and schools (e.g., Aspfors & Eklund, 2017; Cochran-Smith & Lytle, 2009; Schulz & Mandzuk, 2005; White et al., 2016). Finally, several authors describe teaching and learning activities to develop an \textit{inquiry habit of mind}: practicing with argumentation, decision making and justification while problem solving and reflecting on the process and outcomes of research and inquiry (Aspfors & Eklund, 2017; Dunn et al., 2008; Reis-Jorge, 2005; Toom et al., 2010; White et al., 2016); working in pairs or groups, as critical friends (Dobber et al., 2012; Van der Linde et al., 2012) and sharing
findings of pre-service teacher research by the organisation of formal conferences for pre-service teachers, teacher educators, teachers and school board members (Schulz & Mandzuk, 2005).

2.3 Perceived and actual learning outcomes

Most studies that report learning outcomes of pre-service teacher research and inquiry are based on self-reports collected by surveys or interviews. These data are typically perceived rather than actual learning outcomes. In general, these studies identify professional and personal development, including characteristics of an inquiry habit of mind, as important learning outcomes (e.g., Aspfors & Eklund, 2017; Niemi & Nevgi, 2014; Ulvik et al., 2017). Other studies mention learning outcomes such as research skills, such as analysing data, using a research cycle or academic writing as learning outcomes (e.g., Baan et al., 2018; Munthe & Rogne, 2015) and knowledge about research and professional knowledge on various educational topics (e.g. Gray, 2013; Kowalczyk-Wałędziak et al., 2019; Munthe & Rogne, 2015). Finally, several studies mention the application of previous research to improve practice as a learning outcome (e.g. Ion & Iucu, 2016; Niemi & Nevgi, 2014).

The few findings of actual learning outcomes of pre-service teacher research relate to research knowledge (Van der Linden et al., 2015), research skills and collaboration processes (Dobber et al., 2012) and the quality of research questions in combination with how pre-service teachers conceptualise and assess learning (Cochran-Smith et al., 2009). Actual learning outcomes regarding the contribution of pre-service teacher research to student teachers' professional development, including the quality of teaching (which is assumed to be core business in teacher education programmes), are lacking. The exact relationship between pre-service teacher inquiry and teacher quality is complicated. Teacher quality and teaching quality are closely related; teaching quality is assumed to be the most important indicator for teacher quality (e.g., Darling-Hammond, 2017). Teaching quality can be measured by observation systems, which are developed to understand and improve teaching and can be used to evaluate interventions (Bell et al., 2019). These observation systems are aligned with knowledge about effective teaching (e.g., Stronge's [2018] framework for effective teaching) and focus on the following visible knowledge and behaviours: professional knowledge, skills for instructional planning (including classroom management), skills for instructional delivery (including cognitive activation, differentiation, and learning strategies), assessment for learning, creation of an adequate learning environment and professionalism.
All are connected with key characteristics reflecting teacher’s dispositions, goals and beliefs that directly affect teaching effectiveness.

3 General aim and research questions

This thesis aims to gain insight into the contribution of pre-service teacher inquiry to self-reported changes in attitude, knowledge/insight, skills and expertise of pre-service teachers, along with more objective measured as well as perceived improvements in their professional practice. The curriculum model of Van den Akker (2013) formed the framework of analysis (see Figure 1.1). This model distinguishes three curriculum representations, each divided in two:

1. the intended curriculum, divided into ideal curriculum, or the vision (rationale) or basic philosophy underlying a curriculum, and formal curriculum, or intentions as specified in curriculum documents and/or materials;

2. the implemented curriculum, divided in perceived curriculum, as interpreted by its users (teacher educators), and operational curriculum, or actual process of teaching and learning,

3. the attained curriculum, divided in experiential curriculum, or learning experiences as perceived by learners (pre-service teachers), and learned curriculum, or actual learning outcomes.

Alignment among these three curriculum representations is important for a successful curriculum reform or improvement (Van den Akker, 2013). Therefore, analysis of this alignment regarding pre-service teacher research in the curriculum of teacher educations provides insight into the degree of success of its introduction. Moreover, to determine whether pre-service teacher inquiry would lead to better teachers, we analysed the relationships among the quality of pre-service teacher inquiry, teaching practice and perceptions of pre-service teacher inquiry.
The following four research questions guide this thesis:

1. What is the purpose and value of pre-service teacher inquiry in primary teacher education (in intended, implemented and attained curriculum)?

2. How is the development of pre-service teacher inquiry competences implemented in teacher education programmes?

3. What are the most important perceived and actual learning outcomes from pre-service teacher inquiry?

4. What are the relationships among pre-service teacher’s perceptions, quality of pre-service teacher inquiry and teaching quality?

Chapters 2–5 address these four questions (see Figure 1.1).
4 Methodological approach

In this dissertation (for an overview, see Figure 1.1), we have chosen to conduct mixed-methods research, because the research questions regarding the purpose and value of pre-service teacher inquiry in all three representations of the teacher education curriculum can be answered more in depth than with either a qualitative or quantitative research methodology alone. Combining qualitative and quantitative approaches provides a more complete understanding of the research problem than either approach alone (Creswell, 2014, 2016; Johnson & Onwuegbuzie, 2004).

In a document analysis to examine the intended curriculum (Chapter 2), we used qualitative research by systematically alternating between content analysis and thematic analysis, focused on finding patterns (Bowen, 2009). In the studies described in Chapters 3 and 4, we enhanced our interpretation of the quantitative results of a survey about perceptions of pre-service teacher inquiry by asking for more detail in a qualitative study using focus groups (e.g., Why did the pre-service teachers not expect to continue practitioner inquiry in a future job?) We combined quantitative data about the quality of inquiry and the quality of teaching with qualitative data on perception of the most important learning outcomes in Chapter 5.

Table 1.1 shows the number and distribution of participants of this thesis. Nineteen Dutch institutes for primary teacher education participated in our study. This number represents more than 75% of the country’s primary teacher education institutes. The data from the focus groups of both pre-service teachers and teacher educators of the eight universities of applied sciences showed saturation. We included an international comparison (the Dutch context versus an Australian context, in Chapter 4) as a response to Darling-Hammond’s (2017) call for educators from various countries, with their different contexts, to learn from one another about what matters and what works to meet the high expectations of learning for pre-service teachers and their students. In total, 375 pre-service teachers and 103 teacher educators completed the survey, 36 and 55 of whom, respectively, participated in the focus groups. Finally, we collected data on teaching and inquiry quality of all graduating pre-service teachers (N = 650) of one university of applied sciences over four years (2014–2018), which gives a reliable picture of the relationship between the quality of pre-service teacher inquiry and teaching in this programme.
Chapter 1

Table 1.1 Number and distribution of participants in the four studies.

<table>
<thead>
<tr>
<th>Study</th>
<th># Institutes</th>
<th># PSTs</th>
<th># TEs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study 1 (Ch. 2)</td>
<td>19 NL (out of 25 total)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Study 2 (Ch. 3)</td>
<td>8 NL</td>
<td>30 (FG)</td>
<td>359 (S)</td>
</tr>
<tr>
<td>Study 3 (Ch. 4)</td>
<td>2 NL</td>
<td>11 (FG)*</td>
<td>12 (S)*</td>
</tr>
<tr>
<td>Study 4 (Ch. 5)</td>
<td>1 NL</td>
<td>650 (QI/QT)</td>
<td>236 (S)*</td>
</tr>
</tbody>
</table>

PST = pre-service teachers, TE = teacher educators, NL = the Netherlands, AU = Australia, FG = focus group, S = survey, QI = quality of inquiry, QT = quality of teaching.

*Also included in Study 2

5 Outline of the thesis

This thesis follows a thesis-by-publications format. In effect, Chapters 2–5 have been published or submitted to peer-reviewed journals and can thus be read independently. As a result, some recurrence and overlap across chapters is inevitable. This first chapter is devoted to introducing the subject and the aims. Figure 1.1 (p. 18) shows an overview of Chapters 2–5, with a reference to the associated research questions and an illustration of the interdependence. The second chapter focuses on the purpose and value of pre-service teacher inquiry in the intended curriculum of primary teacher education in the Netherlands. We conducted a document analysis to investigate and compare the described aims in policy documents and the description of pre-service teacher research and inquiry activities in the Dutch teacher education curricula. From the findings, we formulated a definition of an inquiry stance (in Dutch, Onderzoekend vermogen) with six intertwined aspects. This chapter has been published in Pedagogische Studiën, a Dutch peer-reviewed journal. It has been written in Dutch, to ensure the readability for Dutch teacher educators and teachers in an effort to raise its practical value. It comes with an abstract in English.

Chapter 3 examines the implemented and attained curriculum in eight Dutch institutes for teacher education primary schools. We used a survey and organised focus groups with pre-service teachers and teacher educators to study their perceptions of pre-service teacher inquiry. This study sheds light on the implemented curriculum and a part of the attained curriculum, the experiential component.

For Chapter 4, we used a similar methodology to that in Chapter 3. This time we collected data on the implemented and attained curricula from two institutes for teacher education in Melbourne, Australia. We aimed to gain deeper insight into
the role of pre-service teacher inquiry by mapping the perceptions of pre-service teachers and teacher educators in two country contexts. We examined pre-service teacher research and inquiry in the Australian programme descriptions, attended and cooperated in workshops about research, asked pre-service teachers and teacher educators to complete the questionnaire about perceptions of pre-service teacher research, held interviews and organised focus groups. We compared these data with similar data from the Netherlands.

Chapter 5 presents our final study, in which we related perceptions of pre-service teacher inquiry to the quality of the final inquiry projects and the pre-service teaching quality. To do so, we offered the questionnaire about perceptions of pre-service teacher inquiry to all graduating pre-service teachers of one university of applied sciences for four years. We observed 80 pre-service teachers with the International Comparative Analysis of learning and Teaching (ICALT) instrument to determine the teaching quality and compared these findings with the assessment scores regarding teaching. We examined the relationship between the scores on the inquiry project and the assessment scores of teaching and determined four profiles with a cluster analysis.

The final chapter (Chapter 6) contains the main findings, general conclusions and a critical discussion of this dissertation, with attention to the scientific contribution, limitations and directions for future research. A discussion of implications for practice regarding pre-service research and inquiry, and development of an inquiry stance conclude this thesis.