

Inquiry-based learning in history education: Exploring teachers' beliefs, knowledge and use of technology, and preparing future teachers for implementation in class

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VOORWOORD

“I am lost without my Boswell.”

Sherlock Holmes, *A scandal in Bohemia*

Dit proefschrift gaat over het gebruik van onderzoekend leren door geschiedenisleraren. Een van de centrale vragen is dan ook: *Waarom* doen deze onderwijsprofessionals eigenlijk wat ze doen? Uit wat volgt, zal blijken dat de vraag gemakkelijker gesteld, dan beantwoord is. In die zin sluit de bovenstaande verwijzing naar *the great detective*, die de meest onmogelijke mysteries probeert op te helderen, beter aan bij dit proefschrift dan misschien wel op het eerste zicht lijkt.

Nog steeds in overeenstemming met het thema van dit proefschrift, moeten we, om Holmes' uitspraak beter te begrijpen, de geschiedenis induiken. James Boswell (1740-1795), landheer van het Schotse Auchinleck, is vooral gekend om zijn beroemde biografie over de Engelse schrijver Samuel Johnson. Met *my Boswell* verwijst Holmes dus naar John H. Watson, zijn trouwe compagnon de route, die de auteur zou zijn van de verhalen over Sherlock Holmes (althans volgens de canon van de verhalen).

Analoog met de uitspraak van Holmes, zijn een aantal mensen onontbeerlijk geweest bij de totstandkoming van dit proefschrift. Hoewel het praktisch onmogelijk is om iedereen te bedanken die op de een of andere manier heeft bijgedragen, zijn er toch een aantal mensen die ik in het bijzonder wil bedanken.

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1

General introduction

CHAPTER 1

General introduction

“Before we start to investigate, let us try to realize what we *do* know, so as to make the most of it, and to separate the essential from the accidental.”

Sherlock Holmes, *The Adventure of the Priory School*

ABSTRACT

This first chapter serves as a general introduction to the dissertation, offering a framework that allows to situate its contents. The chapter’s first section presents a theoretical framework on the topic central to the dissertation: history teachers’ use of inquiry-based learning (IBL). Through four sub-sections, it explains how attention to IBL in has gradually been increasing in research on history education, and provides more information on the theoretical conceptualization of IBL in history, IBL’s current state in the history classroom, and the effectiveness of professional development that aims to stimulate the use of IBL in history. Next to providing an overview of these topics, the sub-sections also outline the research challenges that are tackled by this dissertation. Building on this theoretical framework, the second section describes the research objectives. The general objective of this dissertation is to investigate and stimulate history teachers’ use of IBL, and can be further split up into a number of research objectives that fall within three domains of study: (1) theory on the cognitive processes involved in IBL in history, (2) teachers’ current use of IBL in practice, and (3) the effectiveness of professional development with regard to IBL in history. In addition, the second section explains how the research objectives are translated into specific research designs, and gives an outline of the dissertation’s chapter structure, including the chapters’ interrelatedness. Finally, the third section discusses the dissertation’s relevance in terms of theory, practice, and policy.

1. THEORETICAL FRAMEWORK

1.1. On teaching and learning history

1.1.1. *Developments in history teaching*

History is a school subject that has traditionally been regarded as a relatively straightforward matter of learning what happened in the past (Lee, 2004). From this particular perspective,

history teaching becomes a daunting undertaking to cover the vast expanse of history, and all of the potentially significant stories it contains (VanSledright & Limón, 2006). Often, the history textbook then becomes the foundation on which teachers build their curriculum (Bain, 2006), resulting in instruction that routinely invokes lectures, textbook work, homework, and tests (Monte-Sano, 2011). When taught as such, history differs from other school subjects only in the facts covered (Bain, 2000), and generally gives the impression that it is a static body of names and dates (Lee, 2005), or merely a collection of inert and disconnected facts (Hartzler-Miller, 2001). Throughout the past decades, however, this traditional view of history teaching has been heavily criticized as the result of a series of societal, pedagogical, and historiographical developments (Booth, 1994; Wilschut, 2010).

On the societal level, rapid technological progress and globalization have led to living and working environments that increasingly call for non-routine cognitive competences (Autor, Levy, & Murnane, 2003), such as problem-solving, critical thinking, and information and media literacy (Partnership For 21st Century Skills, 2009). In relation to this, some have argued that history teaching predominantly driven by a goal to transfer a collective memory of the past contributes little to the preparation of democratic citizens, who must be able to reason with information and draw their own conclusions (Laville, 2004; Seixas, 2000).

On the pedagogical level, work on the classification of educational objectives led to increased attention to the development of higher-order thinking skills, such as analyzing, synthesizing, and evaluating information, which require significantly greater cognitive effort compared to lower-order thinking skills, such as remembering and comprehending (Bloom, Engelhart, Furst, Hill, & Krathwohl, 1956). In addition, the advent of constructivist learning theories resulted in a vision of learning as an active process, in which knowledge cannot be simply transferred, but is instead constructed by learners through a process of meaning making (Perkins, 1999). As a result, constructivist theories generally cast learners in an active role, through instructional activities that present authentic tasks, engage in problem-solving, and foster reflective practice, in order to attain a deep understanding (Jonassen, 1994). Based on these pedagogical frameworks, textbook-driven history teaching has often been criticized for failing to engage students in complex reasoning activities (Stearns, 2000).

On the historiographical level, Lee (2004) points out that what happened in the past is never a given. This is because a historical information source can offer no more than a partial representation of the past; even though it may contribute to an understanding of a past event, it can never explain the event as a whole (Wineburg, 1994). In addition, historical information sources are often incomplete, and do not necessarily present a reliable account of events. This may be especially true when events are controversial or complex (Rouet, Marron, Perfetti, & Favart, 1998). It is for these reasons that historical accounts are not simply written, but instead constructed by historians (Wilson & Wineburg, 1993). More

specifically, Kuhn, Weinstock, and Flaton (1994) explain how historical accounts are created through a process of theory-evidence coordination, in which the historian analyzes and interprets the evidence to construct multiple theories (e.g. in his book about the fall of the Roman Empire, Demandt (1984) proposed about 210 possible explanations). The main task of the historian is then to evaluate each theory against both evidence and possible alternatives. Even though it is thus possible to narrate the same evidence in radically different ways, not all accounts of the past are equally valuable (Cronon, 1992). In short, the work of the historian is not so much a matter of knowledge accumulation, but rather of discrimination and informed judgement (Spoehr & Spoehr, 1994). As such, academic historians have generally disapproved of so-called traditions of archivism in school history, which promote a belief that history is a science based on the amassing of objective facts (S. Greene, 1994).

Together, the developments on these three levels have resulted in a call for history education that is more in line with the discipline of history (Monte-Sano, 2011). Radical views expressed by scholars such as Levstik (1996) suggest that this requires a shift from ‘a story well told’, to ‘sources well scrutinized’, with the latter referring to learning activities where students pose questions, collect and analyze sources, struggle with issues of significance, and ultimately build their own historical interpretations. More moderate views, however, have correctly pointed out that a story- and source-based approach are not necessarily incompatible, as stories may be helpful in providing the basic representations of history for the student (Perfetti, Britt, Rouet, Georgi, & Mason, 1994). From this perspective, stories must be understood and grounded, meaning that students must be able to evaluate the claims that historical accounts make, as well as the evidence on which these claims rest (Lee & Ashby, 2000). As such, the central issue for modern history education lies in striking a balance between stories and sources, and clarifying the relationship between these two facets of history (Haydn, 2011). Throughout the past decades, several scholars have attempted to shed more light on this central issue.

According to Lee and his colleagues (Ashby, Lee, & Shemilt, 2005; Lee, 2004; Lee & Ashby, 2000), a distinction can be made between substantive knowledge and second-order knowledge. Substantive knowledge refers to the content or substance of history, or the ‘who, what, where, when, and why of history’ (Lee, 2004). Second-order knowledge, in contrast, denotes a layer of knowledge that lies behind the production of the actual content of history. More specifically, it involves conceptual understanding of ideas such as evidence, cause and effect, and change over time, which are used to organize knowledge of the past (Lee, 2005).

Building this work, VanSledright and Limón (2006) redefine the concepts of substantive and second-order knowledge as respectively ‘first-order’ and ‘second-order’ substantive

knowledge, or the central components of historical understanding. To this, they add the concept 'strategical knowledge', which, moving beyond understanding, refers to the application of a body of specific practices or reasoning processes for investigating the past, such as, for example, assessing the status of sources, or constructing evidence-based arguments. Likewise, more recent work by Havekes, Arno-Coppen, Luttenberg, and van Boxtel (2012) distinguishes between 'knowing' and 'doing' history. The former is mainly concerned with facts and concepts, while the latter refers to reasoning activities that are used to answer a historical question. In short, the research literature thus suggests that a disciplinary approach to history education focuses not only on acquiring strong substantial knowledge, but also involves learning to use this information to reason about issues in the past or present (van Drie & van Boxtel, 2008).

1.1.2. Introducing inquiry-based learning

The facilitation of active reasoning about history is generally connected to inquiry-based learning (IBL). This instructional approach engages students in investigations that emphasize the practices of academic inquiry in which it has its origins (Hmelo-Silver, Duncan, & Chinn, 2007). Given this resemblance to the work of historians, researchers have generally regarded IBL as a vital means of learning of learning about the discipline, both as means and as ends (Levy, Thomas, Drago, & Rex, 2013).

Research has suggested that, compared to more traditional, expository, instructional approaches, IBL is more effective in developing students' scientific reasoning abilities (Kuhn, 2010). Even so, the effectiveness of IBL has been subject to discussion over the past decades (e.g. Kirschner, Sweller, & Clark, 2006; Mayer, 2004). The main criticism is that, when left to their own devices, students generally fail to reach the desired results due the heavy cognitive load imposed by complex inquiry activities (Kirschner et al., 2006). Yet, on the other hand, a number of recent meta-analyses has indicated that, when students do receive sufficient support, IBL does in fact lead to higher student achievement (Alfieri, Brooks, Aldrich, & Tenenbaum, 2011; Furtak, Seidel, Iverson, & Briggs, 2012; Lazonder & Harmsen, 2016).

Next to the effectiveness of IBL in general, several studies have specifically focused on the effects of IBL in history. From a first experiment, Wiley and Voss (1996) concluded that, through reading multiple information sources and providing arguments in answer to a historical question, students learned history as well, or even better, compared to students who read a textbook chapter. In particular, students in the more inquiry-like condition had the best understanding of causal and explanatory relationships. A second experiment by Wiley and Voss (1999) confirmed these findings and indicated that, compared to students reading a textbook, students in a more inquiry-like condition wrote more integrated and causal essays on the topic of study, and also performed better on inference and analogy

tasks. More recently, a large-scale study by Reisman (2012), on the effects of a history curriculum incorporating IBL, found a positive impact on students' historical reasoning abilities and mastery of factual knowledge. In addition, students were also more capable to transfer the newly acquired historical reasoning strategies to contemporary issues.

Before further delving into the exact nature of IBL in history, it is important to note that, over the years, several misconceptions have arisen with regard to this topic. It is therefore important to first set straight these misunderstandings, which have often muddled conversations on IBL in history.

First, there is a popular belief that secondary school students are not yet ripe for conducting IBL-activities, because their psychological development has not yet reached the intellectual stage required for successfully carrying out such activities (Moisan, 2010). Research, however, has shown that limits on students' abilities to engage in IBL are set not so much by cognitive factors, but rather by instructional factors, such as the teaching style and subject knowledge of the teacher, or the use of accessible information sources (Booth, 1994). In this respect, findings of project CHATA (i.e. Concepts of History and Teaching Approaches), a UK-based research project on progression of children's ideas of historical inquiry and historical explanation, show that some 8-year old students have a more advanced conceptual understanding of history than that of many 14 year-olds (Ashby et al., 2005). Under the right conditions, and with proper support, students are therefore able to conduct their own investigations into the past (Monte-Sano, 2011).

Second, IBL is not a panacea to history teaching. Although the instructional approach certainly does have its merits, Wils (2009) points out that a narrative history that discusses the many ways in which the past may be interpreted may equally contribute to an in-depth understanding of history. In addition, Barton (2005) argues that some topics may lend themselves better to IBL compared to others, seeing that some historical topics can be simply conveyed by the teacher, while others may require more thorough study to reach a complex and nuanced understanding.

Third, some have criticized IBL for putting a one-sided emphasis on the use of skills, while neglecting knowledge of history (see e.g. Haydn, 2011). Yet, as Lee (2011) points out, skills tend to be operations that can be carried out mechanically, through repeated practice, while IBL requires reflection and judgment. In addition, Martin and Monte-Sano (2008) make a convincing argument that the dichotomy between knowledge and 'skills' is in fact a false one, as inquiry competences are not acquired in a vacuum, but are always applied to particulars and specifics about the past.

Fourth, and last, the goal of IBL in history is not to have students become mini-historians, who carry out inquiries that are at the same level of the work by academic historians (Perfetti et al., 1994). Obviously, it is simply not possible to carry out the kind of archival research that

historians do without possessing a sufficient body of knowledge (Willingham, 2010). When historians tackle a question about the past, they generally have extensive prior knowledge of the existing literature, and the approaches taken by previous historians. In addition, they also possess a high level of technical expertise necessary for deciphering sources. Secondary school students, in contrast, have neither of both (Wils, 2009). As such, the main goal of IBL should be understood as facilitating a ‘disciplinary way of thinking’ about a historical question (Bain & Mirel, 2006).

1.2. Conceptualizing inquiry-based learning in history

The literature on inquiry-based learning (IBL) helps to clarify how classroom inquiries incorporating a disciplinary way of thinking about history can be understood. Generally speaking, it is possible to identify five core attributes of IBL. During IBL-activities, students (1) engage in disciplinary questions, (2) analyze evidence to respond to questions, (3) form explanations on the basis of evidence, (4) connect explanations to disciplinary knowledge, and (5) communicate and justify explanations (Wiley et al., 2009). Although these core attributes remain unchanged across different fields of study, IBL’s actual form varies depending on the specific nature of a domain (Bransford, Brown, & Cocking, 2000). As Levy et al. (2013, p. 394) explain: “Like the scientist, the historical investigator must consider various approaches to a problem, but unlike the scientist, the historian cannot reenact the topic under investigation. Like the reflective linguistic investigator, the historian explores the intended meaning behind words, but unlike the linguist, the history researcher must look at a variety of sources before constructing an explanatory narrative” (for more information on the process of theory-evidence coordination in history, see section ‘1.1.1. Developments in history teaching’).

An attempt to provide a more concrete framework for IBL in history requires some effort, as researchers have referred to the concept using different terms, such as ‘documents-based lesson’ (Reisman, 2012), ‘historical inquiry’ (Hartzler-Miller, 2001; Poitras & Lajoie, 2013), ‘historical problem solving’ (Wineburg, 1991a), or ‘doing history’ (Barton & Levstik, 2011; Seixas, 1999). Some have also used terms such as ‘historical thinking’ or ‘historical reasoning’ to refer to IBL (e.g. J. Greene, Bolick, & Robertson, 2010), but this choice of terms is rather debatable, seeing that these are commonly used to refer to active reasoning with historical information, which can also be stimulated through learning activities other than IBL (van Drie & van Boxtel, 2008).

Several studies have provided varying descriptions of IBL in history. Most recently, Levy et al. (2013) defined this instructional approach as: “the exploration of historical questions through the examination of various sources of evidence, which can include documents, photographs, film, art and other artefacts (p. 393)”. Yet, this definition does not appear to

be sufficient, as it leaves the door open for pseudo-inquiries, where answers to a question can be literally found in the materials (Wils, 2009). In other cases, such pseudo-inquiries reduce the investigation to a technical matter of finding out which source is the most impartial and complete, all the while neglecting that subjectivity is not the same as untruthfulness, or that relevance actually depends on the question under study (Van Nieuwenhuysse, Wils, Clarebout, Draye, & Verschaffel, 2015). Fortunately, other research work has provided more comprehensive definitions. For instance, Barton (2005) describes IBL as an “open-ended investigation [that] involves using evidence to build supportable accounts of the past [...] Evidence comes in part from original sources, but it can also come from those usually classified as secondary (p. 751)”. Similarly, Reisman (2012) described IBL as a set of activities where students “interrogate, and then reconcile historical accounts” (p. 86), which “shed light on the historical question from different perspectives” (p. 90). To summarize, this research work suggests that IBL in history revolves around (1) an open-ended historical question, which drives the investigation of (2) multiple information sources representing different perspectives on the topic, (3) through a process of knowledge transformation that synthesizes the information into an argumentative account.

The exact nature of IBL within history can be further clarified through research investigating the cognitive processes that underlie it. At the general level, a distinction can be made between reasoning ‘about’ documents, a process in which each piece of information is evaluated, and reasoning ‘with’ documents, which refers to using and organizing information from multiple sources (Rouet, Britt, Mason, & Perfetti, 1996). On the more specific level, this undertaking becomes somewhat complicated, as most studies use their own specific framework and terminology (e.g. De La Paz & Felton, 2010; Hicks, Doolittle, & Ewing, 2004; Perfetti et al., 1994; Poitras & Lajoie, 2013; Wineburg, 1991, 1994, 1998). A review by van Drie and van Boxtel (2008) attempted to move forward the field, by outlining a number of key processes, including: (1) asking historical questions, about historical phenomena and the sources that give information about the past, (2) use of sources, through the evaluation, selection, interpretation, and corroboration of information, in relation to the historical question at hand, (3) contextualization, or finding the appropriate historical context, in order to interpret events in accordance with that context, and (4) argumentation, which consists of putting forward a claim, supporting it with sound arguments and evidence, and taking into account possible counterarguments. Each of these activities draws on a jargon of substantive (e.g. peasant, feudalism, Richard III) and second-order (e.g. reliability, cause and effect, change over time) concepts.

Still, it can be argued that some of the descriptions provided by this review study are quite broad, while other research has in fact provided more detailed accounts of particular reasoning activities. For instance, while the framework by van Drie and van Boxtel (2008)

provides a relatively general account of source evaluation, De La Paz and Felton (2010) make an important distinction between ‘considering the author’ (e.g. author details, date of creation), and ‘critiquing the source’ (e.g. evidence, factual errors, missing information). To give but another example, Wineburg (1998) notes how historians actively process information, by asking questions, specifying gaps in their knowledge, and making connections to prior knowledge. Yet, most of these activities are not touched upon in the description that van Drie & van Boxtel (2008) give with regard to the asking of historical questions. These arguments demonstrate that, despite recent research efforts, some of the theory on reasoning during IBL in history remains fragmented across the literature. As such, additional efforts are required to construct an integrative framework that may give a more comprehensive overview of the cognitive processes involved in IBL in history (**research challenge 1**).

1.3. Inquiry-based learning in the history classroom

1.3.1. Discrepancy between history education policy and practice

In line with research emphasizing the potential that inquiry-based learning (IBL) holds to history education, policy makers across several Western countries have incorporated goals of reasoning with historical information within the secondary school curriculum (van Drie & van Boxtel, 2008). For example, the U.S. national standards for history (National Center for History in the Schools, 1996) maintain that: “Properly taught, history develops capacities for analysis and judgment. It reveals the ambiguity of choice, and it promotes wariness about quick, facile solutions which have so often brought human suffering in their wake. [...] It trains students to detect bias, to weigh evidence, and to evaluate arguments, thus preparing them to make sensible, independent judgments, to sniff out spurious appeals to history by partisan pleaders, to distinguish between anecdote and analysis”. In the same way, the history standards within the United Kingdom state that students should develop and demonstrate “understanding of how evidence is used rigorously to make historical claims, discerning how and why contrasting arguments and interpretations of the past have been constructed [as well as] the ability to create their own structured accounts, including written narratives, descriptions and analyses” (Department for Education, 2014).

The situation is similar in the context of Flanders (Belgium), which forms the backdrop for this dissertation. In particular, the rationale behind the attainment goals set by the government is that: “The purpose of secondary education is also to have students become proficient in applying domain-specific methods. [...] Due to the specificity of the domain, namely, the past and its relation to the present, critical study of sources is fundamental. This is done by locating, organizing and selecting, analyzing, connecting (comparing), and

evaluating varied materials. Throughout this process, hypotheses are formulated, interpretations of others are evaluated, and a personal explanation is advanced.” (Curriculum, 2002). In line with findings that students’ ability to engage in IBL is not so much developmental, but something that can be trained from an early age on (for more information on this misconception surrounding IBL, see section ‘1.1.2. Introducing inquiry-based learning’), the basic assumptions behind the attainment goals for history also note that: “Students in secondary education should be familiarized with the principles of this investigative method as soon as possible. Indeed, the development of their historical consciousness requires a progressive attainment of skills and attitudes with regard to looking up, processing and presenting information” (Curriculum, 2002).

However, research has pointed out that large discrepancies might exist between the ‘ideal curriculum’, as presented by educational policy makers, and the ‘taught curriculum’, as instructed by teachers (Carr & Harris, 2009). In this respect, research on the status of IBL in history, which is mainly US-based, suggests that IBL is seldom practiced in most classrooms (Barton & Levstik, 2003; Hartzler-Miller, 2001; VanSledright & Limón, 2006). Yet, the situation appears to be different in Europe. The large-scale ‘Youth and History’ survey, which was organized in 27 (mostly European) countries, indicated that Western European countries, such as Belgium, France, and England all scored high with regard to attention to the study of sources in history learning (von Borries, 2000).

However, this image of history education in Western Europe, and Belgium in particular, may be somewhat misleading. According to De Wever, Vandepitte, and Jadoulle (2011), history teaching in Belgium is generally characterized by a discourse-discovery model, which gradually introduces a set of sources that students have to investigate to acquire the content of the lesson. More often than not, however, classroom practice is one of sources that are one-sided, not too complex, and studied one by one under the teacher’s guidance. Similarly, Van Nieuwenhuysse et al. (2015) argue that, even though Flemish textbooks widely question sources, a lot of these questions are purely content-related, or merely ask students to mechanically apply a set of questions for determining the reliability of the source.

The finding that history teachers seldom engage their students in real IBL is quite unexpected. This is mainly because it has often been argued that, nowadays, with the advance of educational technology, teachers are better equipped for dealing with challenges that complicate the organization of authentic, student-centered inquiries (see e.g. Cuban, 2001). In relation to this, several studies have shown how technology can support historical reasoning processes (e.g. Higgins, Mercier, Burd, & Joyce-Gibbons, 2012; Saye & Brush, 2002; van Drie, van Boxtel, & van der Linden, 2006). For example, Saye and Brush (2002) report how a combination of storyboard templates and hyperlinks to different information sources helps students to reconcile conflicting accounts, and form their own narrative. Another

example can be found in the work of Higgins et al. (2012), who suggest that multi-touch tables with a shared display and zoom function stimulate student dyads to jointly seek and discuss clues in a historical inquiry task, instead of dividing the work.

The finding that history teachers do not appear to use technology to facilitate IBL is especially perplexing because recent large-scale studies have indicated that the majority of today's teachers actually do hold positive beliefs about the use of educational technology for improving students' learning (European Commission, 2013), and in fact use technological tools to engage students in project work (OECD, 2014). Seeing that studies on ICT in history have mainly focused on different uses of technology in the history classroom (e.g. Haydn, 2011; Haydn & Barton, 2007), there is unfortunately little research on history teachers' actual use of technology in the classroom. Thus, the question of how history teachers use technology, if not for facilitating IBL, remains largely unanswered (**research challenge 2**).

1.3.2. History teachers' knowledge of the discipline and inquiry

In line with the finding that there is significant variation in history teachers' use of inquiry-based learning (IBL), most of the research has focused on the question as to why some history teachers implement IBL-activities, whereas others do not (see e.g. Barton & Levstik, 2003; Hartzler-Miller, 2001; Hicks, 2005; Martell, 2013; McCrum, 2013; McDiarmid, 1994; Van Hover & Yeager, 2003; Vansledright, 1996).

A popular explanation is that the teachers implementing IBL simply have more knowledge of history. This does not mean that they know more about historical facts, but rather that they have a deeper and more accurate understanding of how historical knowledge is constructed (Barton & Levstik, 2003). This kind of theories of how individuals come to know about history are also often referred to as (domain-specific) epistemological understanding (Buehl & Alexander, 2002; Hofer & Pintrich, 1997; Muis, Bendixen, & Haerle, 2006). In the case of history, a general distinction can be made between a positivist view, which emphasizes the objective inference of facts from sources, and a constructionist view, which stresses the influence of the historian on the selection and interpretation of evidence (Bouhon, 2009; Maggioni, VanSledright, & Reddy, 2009; McCrum, 2013). The evidence provided by some studies suggests that teachers holding a positivist view tend to focus more on knowledge acquisition, whereas those with a constructionist view appear to favor inquiry activities (Bouhon, 2009; McCrum, 2013).

However, others have argued that, even when teachers are familiar with inquiry and the methods relevant for teaching it, they may still choose not to incorporate IBL into their lessons (Barton & Levstik, 2011). For example, McDiarmid (1994) found that, despite having developed complex beliefs after having taken a historiography course, student teachers kept on associating good teaching with good stories. This led the author to conclude that:

“changes in understanding of historical knowledge appear compartmentalized, cut off from students’ beliefs about teaching and learning history” (p. 179). In another study, VanSledright (1996) describes the case of Martha, a veteran history teacher with over 14 years of teaching experience and a PhD in history. Contrary to all explanations, this teacher’s instruction focused on transferring an authoritative account of history, instead of promoting student inquiry. In a very similar study, Hartzler-Miller (2001) follows David, a beginning student teacher whose performance in a previous study on teachers’ content knowledge was exemplary. Much like the study by Vansledright (1996), the results show how this teacher’s notion of best practice meant conveying a broad and conceptual narrative based on historical scholarship.

Although it is thus debatable whether teachers’ epistemological understanding of history has much influence on their choice to implement IBL in the classroom, several scholars have argued that this kind of understanding is nevertheless an important precondition to designing learning activities that provide accurate representations of history and historical inquiry to students (Bain & Mirel, 2006; Martin & Monte-Sano, 2008; Yilmaz, 2010). In other words, teachers’ epistemological understanding is likely to hold an important influence over their conceptions of IBL in history. This is especially important, as several studies found that a significant part of teachers may hold quite naïve ideas about history. For instance, Yilmaz (2010) found that not only novice teachers, but also experienced teachers, often did not touch upon the interpretative nature of history when explaining the characteristic features of history as a discipline. Similarly, McCrum (2013) found that somewhat less than half of a group of student teachers held fairly positivist beliefs about history, stressing the importance of an empiricist methodology to guard against subjectivity.

Apart from their epistemological understanding, teachers’ conceptions of IBL in the classroom also appears to be determined by more concrete ideas about historical inquiry. Based on an exploratory study with fifteen history teachers, Yeager and Davis (1996) identified three distinct views of historical inquiry, including (1) ‘history as entertainment’, regarding inquiry as a process that draws mainly on reading comprehension, where information is generally selected based on interest and readability, (2) ‘history as a search for accuracy’, representing an approach that chiefly focuses on judging preciseness and the extent to which information can be corroborated, and (3) history as a construction of meaning, or the most historian-like approach, which involves a review of source information, comparison of different accounts, and a search for sub-text and missing information. This finding confirmed a hypothesis made earlier by Wineburg (1991b), who, upon finding that students were often not able to successfully engage in inquiry, speculated that this might be due to some of their teachers not being familiar with inquiry as well. Another case study by

Bohan and Davis (1998) later provided further evidence for this statement, showing that pre-service history teachers were generally unable to take an analytical approach to sources.

Finally, research suggests that teachers' conceptions of IBL in the classroom may also depend on certain contextual features. In this regard, Haydn (2011) notes how history teachers are often pressed for time, and therefore have to make hard choices about what to include in their lessons. As such, Wils (2009) argues, a desire to make progress through the material may cause some teachers to simplify historical inquiry for their students. Similarly, other contextual factors, like the available resources (Husbands, 2011) or student ability (Moisan, 2010) might also play a role in how history teachers conceive of IBL.

Although each of the factors outlined above thus appears to hold an influence over history teachers' conceptions of IBL, research has so far investigated them separately, rather than in unison. Yet, a comprehensive approach to the topic, which takes each factor into account, could shed more light on exactly how teachers' conceptions of IBL are given shape (**research challenge 3**).

1.3.3. History teachers' beliefs as drives of inquiry-based learning

An alternative explanation for the variation in teachers' implementation of inquiry-based learning (IBL) in history can be found in their beliefs about teaching the subject (Barton & Levstik, 2003). In essence, a belief is 'a proposition which may be consciously or unconsciously held, is evaluative in that it is accepted as true by the individual, and is therefore imbued with emotive commitment' (Borg, 2001, p. 186). This means that, unlike knowledge, beliefs are not necessarily based on evidence, but may very well defy logic (Richardson, 1996).

In entangled domains such as teaching, Nespor (1987) explains, individuals generally resort to beliefs, instead of knowledge, to coordinate their behavior. As such, some have described beliefs as 'intuitive screens', which act as a lens through which teachers interpret new information, and organize their work (Goodman, 1988). Over the years, this theory has been confirmed by a number of review studies that have shown that teachers' beliefs usually reflect the nature of the instruction that they provide to students (see e.g. Fang, 1996; Kagan, 1992; Pajares, 1992). Furthermore, it appears that, as teachers' experience in classroom increases, their beliefs grow richer and more coherent, into a personal pedagogy or beliefs system (Kagan, 1992). The earlier a belief is incorporated into this belief system, the more difficult it is to alter. As a result, teachers tend to hold on to beliefs that have since long formed the basis for their work, even in the face of overwhelming evidence pointing out the contrary, while newly acquired beliefs are particularly vulnerable (Pajares, 1992).

According to Barton and Levstik (2003), the reason why some teachers do not organize IBL in their classrooms can be found in beliefs that are oriented towards controlling students

behavior and covering content. There is some evidence to support this statement. For instance, some authors (e.g. Hartzler-Miller, 2001; Vansledright, 1996) have concluded that central exams requiring students to memorize disconnected information generally hold a strong message for teachers' practice. In addition, Van Hover and Yeager (2003) found that beginning teachers' history teaching is closely related to concerns about behavior management, and doubt about their students' ability to engage in IBL. Finally, Hicks (2005) notes how beginning teachers' instruction is often driven by "an active desire from within to pass down, to recreate for others what worked well for them" (p. 35).

Several studies provide an explanation for this last finding. According to McDiarmid (1994), history teachers' beliefs about teaching are largely shaped by their own experiences with expository teaching during their long careers as students. Likewise, Virta (2002) notes how memories of charismatic teachers generally shape student teachers' beliefs about teaching and the role of the teachers, with student teachers generally accepting, or even praising, the old-fashioned methods of teachers who did not need modern methods to stimulate student enthusiasm. These findings bring to mind the tenets of social learning theory, which proposes that "most of the behaviors that people exhibit are learned, either deliberately or inadvertently, through the influence of example" (Bandura, 1971, p. 5). Within the context of teacher training, Lortie (1975) coined this phenomenon as 'apprenticeship of observation', arguing that the thousands of hours that pre-service teachers have spent observing and evaluating their former teachers are responsible for many of the preconceptions they hold about teaching.

So far, however, research investigating history teachers' beliefs has generally adopted a qualitative, exploratory approach (e.g. Hartzler-Miller, 2001; Hicks, 2005; Van Hover & Yeager, 2003; Vansledright, 1996), rather than building on a comprehensive framework on teachers' subject-specific beliefs. In this regard, the literature suggests that a distinction can be made between three constitutive components of beliefs systems, consisting of beliefs about the (1) subject of study, (2) self, and (3) social context (Op 't Eynde, De Corte, & Verschaffel, 2002; Schoenfeld, 1983). As of yet, the differential impact of these constitutive components on history teachers' use of IBL is still largely unclear, even though this could provide important information for initiatives aiming to promote the use of IBL during the history lesson by changing teachers' beliefs (**research challenge 4**).

1.4. Preparing history teachers for inquiry-based teaching

When it comes to changing beliefs and practice, work by Yeager and Wilson (1997) suggests that teacher training is the most significant factor in encouraging history teachers attention to inquiry-based learning (IBL), building on previous work suggesting that the reason for history teachers' omission of inquiry partly lies with how they have been taught the subject

during teacher training. Teacher training and professional development (PD) are therefore regarded as key factors for bringing IBL into the history classroom (Martin & Monte-Sano, 2008).

A significant body of research has attempted to identify the features of effective PD programs (e.g. Darling-Hammond & McLaughlin, 1995; Desimone, 2009; Garet, Porter, Desimone, Birman, & Yoon, 2001; Penuel, Fishman, Yamaguchi, & Gallagher, 2007). In this regard, one of the most popular frameworks is that of Desimone (2009), which outlines five core features of PD, including (1) content focus, (2) active learning, (3) coherence, (4) duration, and (5) collective participation. However, a recent review by Kennedy (2016) shows that lists of effective PD design features are rather unreliable predictors of success. One of the most interesting findings is that a PD program that ignored all of the guidelines by Desimone (2009) was in fact among the most effective programs. Offering an alternative explanation for the effectiveness of particular PD programs, the findings suggest that such programs were generally offered by individuals or groups “who had a long history of working with teachers, were very familiar with teachers and the problems they face, and based their programs on their own personal experience and expertise” (p. 973). In other words, the success of a PD program appears to depend mainly on its practical value for teachers (Doyle, 2006).

One approach that is particularly emphasized by PD research with regard to IBL, is immersion of teachers in IBL, either through authentic or modeled inquiry (see the review by Capps, Crawford, & Constanas, 2012). Drawing on social learning theory (for more information, see section ‘1.5. History teachers’ beliefs as drive of inquiry-based teaching’), the main rationale behind this approach is that, in order to get teachers to organize IBL in their classrooms, they first of all need to work through a substantive amount of content in a way that mirrors this pedagogical approach (McDermott, 1990). The aim is thus to provide teachers with ‘good practices’, in the hope that this will help them to adjust their teaching (Struyven, Dochy, & Janssens, 2010). However, an overview of good practices alone is not sufficient for reaching sustainable change, as teachers’ behavior is mainly driven by their beliefs about the subject (for more information on the power of beliefs, see section 1.3.3. History teachers’ beliefs as drive for inquiry-based teaching) . Unfortunately, it remains yet unclear how immersion into inquiry might exactly influence history teachers’ beliefs with regard to IBL (**research challenge 5**).

Within the field of history education, PD research maintains that teachers should first of all possess a deep knowledge of the content and discipline of history (for more information on this kind of knowledge, see section ‘1.3.2. History teachers’ knowledge of the discipline and inquiry’), as this knowledge is indispensable for creating experiences that help students learn history (Bain & Mirel, 2006; Martin & Monte-Sano, 2008). As such, content

courses should not be regarded as mere academic exercises, but rather as building blocks for teachers' pedagogy. More specifically, they form the basis of teachers' ability to 'frame and represent history' (Monte-Sano & Budano, 2013); to select and organize topics of study, and to communicate to students the nature of historical knowledge, the structure of history as a discipline, and historical ways of thinking.

Once this precondition is satisfied, PD programs can start to show teachers how to use their knowledge to configure their classrooms for IBL (Bain & Mirel, 2006). The end goal is an ability to 'transform history'; to use content and disciplinary knowledge to create IBL-activities that target the development of students' historical understanding (Monte-Sano & Budano, 2013). Next to possession of the necessary pedagogical knowledge, this requires teachers to carefully identify, address, and build on students' ideas about history (Seixas, 1994).

Building on this framework, several studies have attempted to prepare teachers to engage their students in reasoning with historical information. Overall, these studies indicate that PD can positively influence teachers' intention to organize IBL in their classrooms (Fehn & Koeppen, 1998; Levy et al., 2013; Martin & Monte-Sano, 2008; Seixas, 1998; Yeager & Wilson, 1997). However, findings by Yeager and Wilson (1997) also show that, after having taken part in PD, teachers tend to incorporate IBL in varying degrees, or interpret the approach in different ways (for more information on teachers' conceptions of IBL, again see section '1.3.2. History teachers' knowledge of the discipline and inquiry'). In relation to this, it appears that the school context, with influences such as colleagues' expectations, content coverage requirements, and students' ability, often has a negative impact on teachers' ability or willingness to implement innovative approaches such as IBL (Fehn & Koeppen, 1998).

Unfortunately, the effects of PD on history teachers' use of IBL still remain relatively unclear. As Peck (2014) has noted: "In terms of PD programs focused on teaching history specifically, research is spotted and limited in its conclusions" (p. 250). One of the main reasons is that studies on the topic have generally neglected to systematically assess teachers' beliefs (also see Capps et al., 2012), so that relatively little is known about how PD development may influence this important predictor of their behavior in class. In addition, it is still not entirely clear exactly what kind of conceptions of IBL might surface right after teachers have followed a training (**research challenge 6**).

2. AIMS, DESIGN, AND STRUCTURE

2.1. Domains of study and research objectives

The literature review outlined in the previous section makes it clear that research on history teachers' use of inquiry-based learning (IBL) covers three distinct study domains, including:

(1) the theoretical conceptualization of IBL in history, (2) history teacher's use of IBL in practice, and (3) professional development (PD) promoting the use of IBL in history. Based on the research challenges that were outlined through the literature review, a number of research objectives (RO) can be formulated within to these three domains of study.

- **RO 1.** To construct and validate an integrative framework of cognitive processes involved in IBL in history.
- **RO 2.** To investigate secondary school history teachers' use of IBL within their classrooms. This research objective is split up into three sub-objectives.
 - **RO 2a.** To examine the relation between history teachers' conceptions of IBL in history, and their epistemological understanding of history, knowledge of historical inquiry, as well as the context in which they work.
 - **RO 2b.** To study the influence of beliefs about the subject, self, and social context on history teachers use of IBL.
 - **RO 2c.** To explore history teachers' use of technology to support learning activities, and IBL in particular.
- **RO 3.** To examine the effectiveness of PD with regard to IBL in history, within the context of pre-service teacher education. This research objective is split up into two sub-objectives.
 - **RO 3a.** To determine the effects of immersion in an IBL-environment on pre-service history teachers' beliefs.
 - **RO 3b.** To measure the effects of an introductory training program with regard to IBL on pre-service history teachers' beliefs and work in practice.

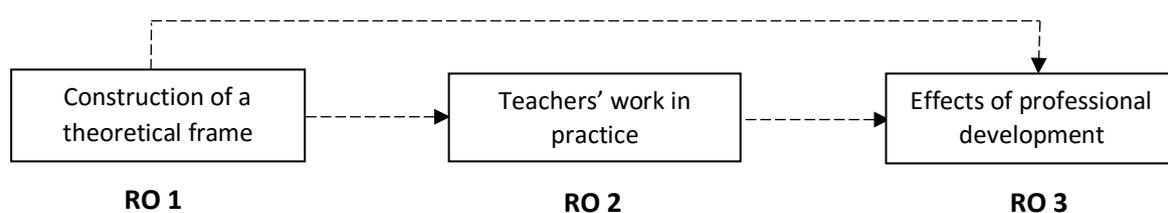


Figure 1. Research objectives on history teachers' use of inquiry-based learning

As illustrated by Figure 1, the three domains of study, and the corresponding research objectives are closely related to one another. First, the construction of an integrative theoretical framework on reasoning during IBL in history can contribute toward an examination of the current implementation of IBL in classrooms, and teachers' knowledge of IBL in particular, but can also provide PD initiatives with a clear outline of reasoning during IBL. Second, an investigation of IBL's current implementation in classrooms, and how this is,

for example, influenced by teacher's beliefs, may help to determine concrete goals or points of attention for PD programs.

2.2. Methodology

2.2.1. Research design

So far, research on teachers' use of inquiry-based learning (IBL) has generally been characterized by a tradition of qualitative, often exploratory research designs (e.g. Fehn & Koeppen, 1998; Hartzler-Miller, 2001; Hicks, 2005; Levy et al., 2013; Martell, 2013; Martin & Monte-Sano, 2008; McCrum, 2013; McDiarmid, 1994; Monte-Sano, 2011; Van Hover & Yeager, 2003; Vansledright, 1996; Yeager & Wilson, 1997; Yilmaz, 2010). With a few exceptions (e.g. Bouhon, 2009; von Borries, 2000), there is almost no quantitative research on the topic available. This presents a significant methodological challenge to studies aiming to take a quantitative approach to topics such as teachers' beliefs about history, as there exist almost no valid quantitative instruments for measuring variables related to history teachers' use of IBL

Contrary to most of the previous research on the topic, this dissertation is not bound by a qualitative research paradigm, but instead selects the research design that is most fitting for a particular research objective, regardless of whether this is a quantitative, qualitative, or mixed methods approach. The findings that are presented and discussed within this dissertation are based on six studies (i.e. chapter 2-7), of which three use a qualitative approach, two use a quantitative approach, and one uses a mixed methods approach. Table 1 provides a methodological overview of these empirical chapters, in terms of research objectives, sample, research design, data collection, and analysis.

RO 1 concentrates on the cognitive processes associated with IBL in history, and therefore calls for a qualitative research design that allows to carry out a detailed investigation of individuals' cognitive activity. The study investigating this research objective (**chapter 3**) starts with the construction of an analysis framework based on a review of studies on reasoning during IBL in history, which were published during the past 25 years. This framework is then tested against data from a think aloud assessment that engaged 20 in-service history teachers in an inquiry task. To be more specific, the data are analyzed through a summative content analysis, which focuses on quantifying, counting and comparing qualitative content (Hsieh & Shannon, 2005).

RO 2 is examined using a combination of qualitative and quantitative designs, through four studies that each focus on a particular sub-objective of this research objective.

RO 2a is concerned with teachers' conceptions of IBL in history, of which the richness may be best captured using a qualitative research design. In a first study (**chapter 2**), semi-

Table 1

Methodological overview of the dissertation's empirical chapters

Chapter	RO	Teachers	Design	Data collection	Analysis
2	2a	in-service	QL	semi-structured interviews (N=22)	directed and conventional content analysis (Nvivo) pattern recognition
3	1 + 2a	in-service	QL	literature review think-aloud assessment (N=20)	literature review summative content analysis (Nvivo) pattern recognition
4	2b	in-service	QN	survey (N=526)	exploratory and confirmatory factor analysis (SPSS, R) structural equation modeling (R)
5	2c	in-service	QL	semi-structured interviews (N=22)	directed content analysis (Nvivo)
6	3a	pre-service	QN	pre-posttest questionnaires (N=302)	exploratory and confirmatory factor analysis (SPSS, R) multilevel modeling (MLwiN)
7	3b	pre-service	MM	pre-posttest questionnaires (N=54) lesson plans and reflection tasks (N=36) semi-structured interviews (N = 26)	analysis of variance and t-tests (SPSS) conventional content analysis (Nvivo)

Note. QL: qualitative design, QN: quantitative design, MM: mixed methods design

structured interviews are conducted to explore 22 in-service teachers' epistemological understanding of history, and conceptions of IBL in history. The interview data are analyzed using a combination of directed and conventional content analysis. Whereas the first approach uses a theoretical framework based on the available literature, the second derives coding categories directly from qualitative data (Hsieh & Shannon, 2005). The data are further investigated through pattern recognition, using graphs that position each case on axes corresponding to different positions with regard to the constructs under study. This analysis also takes the context in which teachers work into account. The second study (**chapter 3**) complements the first through data on 20 of these teachers' performance during the inquiry assessment that was used to investigate RO 1. Here, these data are used to investigate, again through pattern recognition, the relation between teachers' knowledge of historical inquiry, epistemological understanding of history, and conceptions of IBL in history.

RO 2b addresses the differential impact of components of in-service teacher beliefs on their use of IBL in the history classroom, and therefore demands a quantitative research approach. This research objective is investigated through a survey study (**chapter 4**) incorporating several newly designed scales that allow to capture teachers' beliefs about the subject, self and social context, as well as their actual implementation of IBL. Based on the responses of 526 in-service history teachers, these scales are validated through exploratory and confirmatory factor analysis. The outcomes of these scales are subsequently used to estimate a structural equation model of the influence of teachers' beliefs on their use of IBL-learning activities. In addition, this structural equation model also takes additional variables into account, such as teachers' epistemological understanding, highest obtained degree, and time available for teaching history each week.

RO 2c considers history teachers' use of ICT. Given the dearth of research on the topic, a qualitative, exploratory approach appears to be the best choice for tackling this research objective. The corresponding study (**chapter 5**) is based on semi-structured interviews with 22 in-service history teachers. In what follows, the data are interpreted and classified using a directed content analysis approach.

RO 3 focuses on measuring the effectiveness of professional development (PD), and therefore uses either a quantitative approach, or a mixed methods approach combining quantitative with qualitative methods.

RO 3a centers around the effects of immersion in IBL-activities on teacher beliefs. This objective is examined through an intervention study (**chapter 6**) adopting a pre-posttest questionnaire design to measure the intervention's impact on 302 pre-service history teachers' beliefs about the self and subject. Newly designed scales are validated based on the outcomes of the pretest, and then used to estimate a multilevel model of the difference scores between the pre- and posttest. An analysis of responses to open questions in the posttest,

followed by additional multilevel modeling, is used to further investigate whether the impact of the intervention differs across participants.

RO 3b covers the effects of an introductory training on IBL in history on pre-service teachers' beliefs and work in practice. Again, this objective is investigated through an intervention study (**chapter 7**) that explores effects on 54 student teachers' beliefs through a pre-posttest questionnaire, but also examines work in practice through a conventional content analysis of 36 student teachers' lesson plans and reflection papers, and semi-structured interviews with 26 student teachers.

2.2.2. Research context

A further look at Table 1 shows that the empirical chapters can be situated in two research contexts. The first is that of secondary school history, with in-service teachers as the participants, whereas the second context is that of teacher education, with pre-service teachers as the participants. Seeing that most of the research objectives underlying the first four empirical chapters are concerned with history teachers' use of inquiry-based learning (IBL) in class, the choice for in-service history teachers is logical. In comparison, the question can be asked as to why the fifth and sixth empirical chapter, which address the effectiveness of professional development (PD) initiatives, are not also situated within the context of secondary school history.

The main reason is that, while PD of in-service teachers is of course both important and relevant, initial teacher training that stimulates the use of IBL in history may have a more powerful impact in the long term. Bearing in mind findings that teachers' ideas about teaching and learning are the most malleable at the beginning of their career, subsequently becoming more resistant to change each time teachers draw on them (Pajares, 1992), initial teacher training may have a greater and longer-lasting impact compared to PD of experienced teachers. As such, the fifth and sixth empirical chapter specifically focus on how initial teacher training may promote the use of IBL in history.

2.3. Structure

This dissertation consists of eight chapters, of which six present the results of empirical studies. Figure 2 gives an overview of the structure of the dissertation, and in particular of the relations between individual chapters.

Chapter 1 provides a general introduction to this dissertation. It presents a theoretical framework on history teachers' use of inquiry-based learning (IBL), and outlines a number of research challenges that will be tackled by this dissertation. In what follows, an overview of the research objectives and design are presented, next to the structure of the dissertation. Finally, the relevance of the dissertation is also discussed.

Chapter 2 uses semi-structured interviews to make an in-depth study of 22 history teachers' conceptions of inquiry-based learning (IBL), and to investigate its relation to teachers' epistemological understanding of history, and the context in which they work. Epistemological understanding is operationalized based on the framework of Maggioni and her colleagues (Maggioni, VanSledright, & Alexander, 2009; Maggioni, VanSledright, & Reddy, 2009), while distinct teacher conceptions of inquiry-based learning (IBL) in history are derived from the data. Teachers' working context is operationalized as the study tracks in which they teach. The relation between each of these three constructs is investigated using a pattern recognition approach, which positions individual cases on several axes corresponding to the constructs under study. These relationships are further investigated through an in-depth investigation of three characteristic teacher cases. This chapter is published in *Teaching and Teacher Education*.

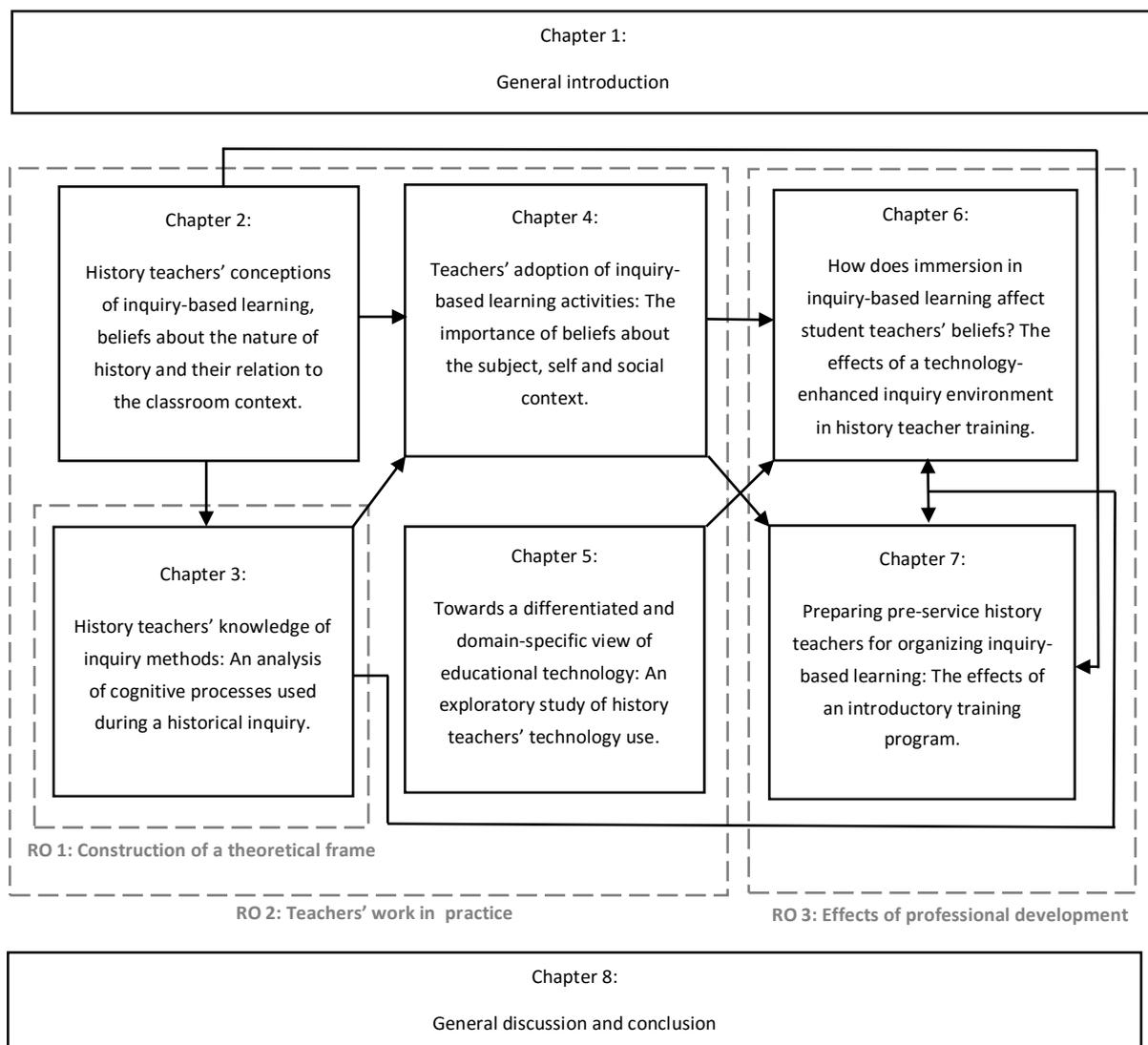


Figure 2. Structure of the dissertation.

Chapter 3 starts with a review of research on reasoning during IBL in history, in order to construct an integrative framework of the cognitive activities involved in this kind of activity. This framework is used to assess the performance of 20 teachers, on an inquiry task on the English Peasants' Revolt (1381), through think-aloud protocols. An analysis of the data provides an overview of individual teachers' performance with regard to each of the cognitive processes outlined by the framework, as well as the overall attention teachers pay to each of these processes. The data also suggest a typology of teachers' knowledge of historical inquiry, which is further examined through three characteristic teacher cases. As all of the participating teachers also took part in the study reported in **chapter 2**, part of the data of this previous study are re-used to examine the relation between teachers' knowledge of historical inquiry, and respectively epistemological understanding of history, and conceptions of IBL in history. This chapter is described in an article in press in the *Journal of Teacher Education*.

Chapter 4 reports the findings of a large-scale survey on the effects of 526 teachers' beliefs about the subject, self, and social context on their use of IBL-activities during the history lesson. Based on a review of the literature, these beliefs are operationalized as: teachers' orientation to history teaching, self-efficacy with regard to IBL, perceived student ability to engage in IBL, and contextual hindrances to IBL. Based on the findings from **chapter 2** and **chapter 3**, several variables that might influence these beliefs are also taken into account, and include: epistemological understanding of history, highest obtained teaching degree, and the study track in which teachers work. Finally, the study uses several instruments developed by Bouhon (2009) to provide an overview of the goals and approaches that history teachers tend to favor the most. This chapter is submitted for publication in the *Journal of Teacher Education*.

Chapter 5 describes an exploratory study on 22 history teachers' ICT use, which was investigated through semi-structured interviews. The findings shed more light on history teachers' rationales for using technology, types of technology use, and factors inhibiting the use of technology. In what follows, teacher use of technology is evaluated based on a framework that draws on earlier work advocating a differential (e.g. Ertmer, 1999; Maddux & Johnson, 2006) and domain-specific (e.g. Haydn & Barton, 2007) approach to teachers' use of technology. The article presenting this chapter is in press in the *British Journal of Educational Technology*.

Chapter 6 involves an intervention study with 302 pre-service history teachers, who collaborated in dyads on an inquiry assignment concerning the English Peasants' Revolt (1381), while working within a technology-enhanced learning environment that offered support for the inquiry. The design of this environment is based on **chapter 5's** framework on differentiated on domain-specific use of educational technology, together with the framework of cognitive processes during IBL in history, presented in **chapter 3**. Pre-and-posttest

questionnaires are used to measure pre-service teachers' orientation to history teaching, as operationalized by **chapter 4**, and self-efficacy for conducting a historical inquiry. The results of this questionnaire are then used to find out whether the intervention results in a significant change in student teachers beliefs', and to further examine whether the intervention has a similar impact on all students. This chapter is submitted to *Instructional Science*.

Chapter 7 investigates the effects of an introductory training on pre-service history teachers' beliefs and work in practice. Beliefs are operationalized as conceptions of IBL, based on the findings of **chapter 2**, and self-efficacy for organizing IBL-activities in class, as operationalized in **chapter 4**. After following a training of which the design is in part based on the findings of **chapter 2** and **chapter 3**, 54 student teachers were required to organize an IBL-activity during one lesson of their teaching internship. Changes in teachers' beliefs are examined through pre-posttest questionnaires, while their work in practice is examined through student teachers' lesson plans. Together with the pre-posttest questionnaires, student teachers' responses to two reflection tasks and a semi-structured interview help to further clarify their approach to IBL in practice. This chapter is published in *Teaching and Teacher Education*.

Chapter 8 provides a general discussion and conclusion with regard to this dissertation's findings, providing a synthesis of how these findings add to the existing literature on the topic. The chapter also discusses the studies, and subsequently provides several directions for future research. Finally, the implications of the findings are discussed.

3. RELEVANCE

This dissertation is relevant to both theory and practice related to teaching and learning history, but may also inform policy that aims to improve history education.

On the theoretical level, five major contributions can be identified. First, the introduction of an integrative framework of cognitive processes involved in inquiry-based learning (IBL) in history will advance the field by synthesizing findings that were previously fragmented across the literature into a unified theoretical overview. Second, the investigation of history teachers' conceptions of IBL and use of IBL-activities in class, in relation to variables such as teachers' epistemological understanding, knowledge of historical inquiry, working context, and subject-related beliefs, can further theoretical understanding of why history teachers' vary in their use of IBL. Third, the framework on differentiated and domain-specific use of technology, and its application to the field of history in particular, will provide a theoretical basis for research that aims to examine the relative quality of teachers' technology use. Fourth, the research on the effectiveness of professional development (PD) related to IBL in history, with regard to teachers' beliefs and work in practice in particular, will increase current knowledge of how

such initiatives can contribute to a more wide-spread implementation of IBL in history classrooms. Fifth, the design of a number of scales to capture teachers' subject-related beliefs and use of inquiry-based learning will be an important methodological contribution to a research field that has so far been characterized by mainly qualitative approach.

On the practice level, the contributions follow on from those at the theoretical level. First, the theoretical framework of cognitive processes associated with IBL in history can help both pre- and in-service teachers to become more familiar with the kind of reasoning that is typical to IBL in history, and to make systematic assessment of students' ability to engage in such activities, in addition to mapping the errors common to students' work. Second, the findings on how teachers' conceptions of IBL and their use of IBL in class is given shape, will offer to PD a frame for discussing and reflecting on these topics with teachers, but also provides specific points of attention that can act as design principles to the composition of PD initiatives. Third, the framework on differentiated and domain-specific use of technology may assist teachers in both creating and evaluating technology-enhanced learning activities in the classroom. Fourth, the work on the effectiveness of PD with regard to IBL in history will further inform the design of PD initiatives, by offering an evidence-based approach to stimulating the use IBL in the history classroom. Fifth, the instruments that will be designed to measure teachers' beliefs and use of IBL-activities may also be used to determine the baseline for concrete PD initiatives.

On the policy level, the research on history teachers' work in practice will provide an overview of what is currently going on in the history classroom, particularly with regard to the implementation of IBL, and can therefore help in making an informed decision on future PD or curriculum reform. In relation to this, the dissertation's contributions on the practical and theoretical level may also help to decide on the concrete directions of initiatives organized at the policy level.

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2

History teachers' conceptions of inquiry-based learning, beliefs about the nature of history, and their relation to the classroom context

This chapter is based on:

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CHAPTER 2

History teachers' conceptions of inquiry-based learning, beliefs about the nature of history, and their relation to the classroom context

ABSTRACT

The present study provides a comprehensive picture of history teachers' conceptions of inquiry-based learning (IBL), based on interviews with 22 secondary school teachers. The results indicate that, although most teachers' beliefs about the nature of history were conducive to teaching historical reasoning, their conceptions of IBL often remained limited to critically evaluating information, instead of using the available information to conduct inquiries into the past. Furthermore, teachers' conceptions of IBL appeared to be strongly connected to the context in which they worked. Based on these findings, several implications for supporting history teachers' adoption of IBL are discussed.

1. INTRODUCTION

School history's purpose and content have long been subject to heavy debate. In the U.S., Evans (2004) described the subject's long succession of curriculum reforms as a clash between different pedagogical and ideological movements. The extent to which each of them could bring their ideas to bear, appeared to depend mainly on the social and political climate: whereas a move towards traditional curricula was often observed during times that could be labeled as more conservative, more liberal times appeared to create an environment that was instead favorable to inquiry- or issue-based curricula (Evans, 2006). The situation seems to be similar in European countries, such as England, Germany and the Netherlands, where a study of curriculum developments led Wilschut (2010) to conclude that, apart from pedagogical considerations, the course of history teaching is often directed by politics and society.

In contrast to the often divided and fluctuating public opinion, research on history teaching agrees that, for students to develop a deep understanding of the subject, history lessons must strike a balance between *knowing and doing history* (Havekes, Arno-Coppen, Luttenberg, & van Boxtel, 2012). In addition to cultivating and building onto students' frameworks of the past, teachers are called on to involve their students in disciplinary thinking and to improve their understanding of how historical knowledge is constructed (Lee & Ashby, 2000). Central to this approach is a premise that knowledge in history is something that needs to be grounded (Haydn, 2011), with proponents arguing that a basic understanding of the way

history works is necessary to make sense of what teachers, historians or others might say about the past (Lee, 2005).

According to Ashby (2005), the concept of evidence is fundamental to an understanding of history, as it supports the ability to make claims based on information sources about the past. More specifically, it can be argued that the key to historical understanding lies in grasping the discipline's interpretative nature. In history, the meaning of sources can vary depending on the questions that are asked, and the ideas that one brings to the investigation (Monte-Sano, 2011b). Yet, this does not mean that sources are investigated haphazardly, as historians have been found to use a number of heuristics, such as situating information within the historical context in which it was produced (see also Wineburg, 1991). Accounts of the past are then constructed by carefully weighing different arguments and interpretations against each other (Kuhn, 1991).

Efforts to develop students' understanding of these ideas have underlined the importance of *inquiry-based learning* (IBL) activities (e.g. Bain, 2005; Barton & Levstik, 2011; Monte-Sano, 2011a), which require students to form their own conclusions about the past, based on an analysis of sources (Levy, Thomas, Drago, & Rex, 2013). Next to providing opportunities to build deep knowledge of the content (Wiley & Voss, 1999), such activities enable teachers to involve students in disciplinary thinking and develop their ideas about the discipline (Hartzler-Miller, 2001). However, as Lee (2011) cautioned, this does not mean that students should be expected to do work at the same level of historians, but rather that they should acquire and learn to apply a conceptual understanding of how we know, explain, and give accounts of the past.

Although research in different countries has paid considerable attention to developing history teachers' pedagogical content knowledge (e.g. Husbands, 2011; Monte-Sano, 2011b; Seixas, 1998), it has frequently overlooked their conceptions of IBL. Furthermore, the findings presented in earlier work on this topic are generally inconsistent (see sections 2.1, 2.2, and 2.3). As such, more information is needed, especially as a review by Kagan (1992) suggests that "a teacher's beliefs tend to be associated with a congruent style of teaching that is often evident across different classes and grade levels" (p. 66). The present study therefore aims to uncover the status of IBL in history teachers' ideas about the subject, which can help to inform future research and educational practice at an international level.

2. RESEARCH ON HISTORY TEACHERS' BELIEFS

Teachers' beliefs have been described as a body of suppositions, commitments and ideologies (Calderhead, 1996), and have generally been regarded as distinct from knowledge due to their strong affective and evaluative nature (Pajares, 1992). More recently, however, it has been argued that, rather than existing separate from knowledge, beliefs constitute a particular form

of personal knowledge (Murphy, 2000). As teachers' experience in classrooms increases, their beliefs grow richer and more coherent, into a personal pedagogy or belief system (Kagan, 1992), which is generally resistant to change (Brousseau, Book, & Byers, 1988), and determines teachers' perception and behavior (Goodman, 1988). According to Nespor (1987), the reason why beliefs play such a major role in teachers' behavior, is that they are particularly well-suited for dealing with the ill-defined and complex problems that often characterize the context where teachers work.

Research indicates that teachers' thought and action are mainly driven by strong beliefs about what constitutes relevant content and how it should be taught (Gess-Newsome & Lederman, 1999). As such, beliefs about the subject matter of history are of prime importance for understanding teachers' instruction (Yilmaz, 2010). A broad distinction can be made between (1) *beliefs about the nature of history*, including propositions about knowledge and knowing within the field, and (2) *beliefs about teaching history*, or ideas about learning goals and effective instruction. (Kagan, 1992). Some studies have also investigated the (3) *interplay between these two types of beliefs* (e.g. Bouhon, 2009; Hartzler-Miller, 2001; McDiarmid, 1994). Furthermore, due to their socially constructed nature, teachers' beliefs are strongly intertwined with (4) *contextual influences*, such as those exerted by students, parents and the school (Fang, 1996). It is clear that each of these four research topics can contribute to an understanding of history teachers' conceptions of IBL. They provide the theoretical basis for the present study, and are further explored through a review of studies that were carried out in a variety of countries.

2.1. Beliefs about the nature of history.

Teachers' ideas about knowledge and knowing in history, also referred to as (domain-bound) epistemological beliefs (Muis, Bendixen, & Haerle, 2006), center around the roles of evidence and interpretation within the discipline (Yilmaz, 2010). In line with research on how epistemological beliefs influence reasoning (e.g. King & Kitchener, 1994; Kuhn, Cheney, & Weinstock, 2000), studies on beliefs about the nature of history have often adopted a developmental perspective, advancing from a right-or-wrong view to a view of knowledge as constructed and contextual, rather than regarding epistemological ideas as a system of independent beliefs (e.g. Schommer, 1990). According to Wilson and Wineburg (1993), the different perspectives that have been found overlap with distinct conceptualizations of history that academia has adopted over the past decades. For instance, Bouhon (2009) distinguished between positivist beliefs, emphasizing a neutral, distant and objective report of historical facts, and constructivist beliefs, which argue that facts are inevitably interpreted by historians, in the construction of a personal narrative of the past. Adding a third type of beliefs to the continuum, Maggioni, VanSledright and Reddy (2009) identify teachers' beliefs as: (1)

objectivism, maintaining that history has no need of interpretation, but must stick to the evidence; (2) *subjectivism*, which insists that all of history is an interpretation, and that there is no real evidence of the past; or (3) *criticalism*, proposing that history is an interpretation, but should nevertheless be grounded in evidence and arguments. Similarly, McCrum (2013) found that teachers held either reconstructionist, constructionist or postmodernist beliefs.

Although the frameworks clearly overlap, findings across different countries have often been inconsistent. Whereas Bouhon (2009) noted that secondary school teachers carried both positivist and constructivist beliefs, Maggioni, VanSledright and Alexander (2009) reported that most of them agreed with criticalist statements, and disagreed with objectivist statements. In contrast, McCrum (2013) found that different types of beliefs were almost evenly spread across student teachers.

2.2. Beliefs about the teaching of history.

When it comes to teachers' beliefs about instruction, McCrum (2013) reported a broad distinction between teacher-centered beliefs, which emphasize the transmission of content knowledge, and pupil-centered beliefs, focusing on students' reasoning skills. Earlier, Evans (1994) had outlined 5 types of history teachers: the story teller and cosmic philosopher, respectively focusing on stories about the past and patterns or grand theories; the scientific historian and relativist, stressing inquiry to improve understanding of either competing interpretations of history or present day issues; and eclectic teachers, displaying the characteristic of two or more of the other categories. Similarly, Bouhon (2009) described three types of teacher beliefs: (1) *exposition-recital*, viewing instruction as an act of transmitting historical knowledge; (2) *discourse-discovery*, which focusses on knowledge acquisition and the training of critical thinking skills; and (3) *apprenticeship-research*, aimed at building historical consciousness and an understanding of historical research.

Consistent with the previous section, findings across different educational systems are not always in agreement. According to McDiarmid (1994), student teachers equated good teachers to those that tell good stories. Virta (2001) also found that most student teachers were rather reluctant to consider student-centered learning as a real alternative for teaching history. In contrast, McCrum (2013) reported that about half of the student teachers participating in her study held student-centered beliefs. Likewise, Bouhon (2009) found that secondary school teachers were almost evenly distributed across the exposition-recital, discourse-discovery, and apprenticeship-research categories.

2.3. Interplay between these two types of beliefs.

Most of the previous research suggests that teachers' beliefs about the nature of the history are somehow connected to their beliefs about how the subject should be taught. For example,

the work of Husbands (2011) suggests that history teachers' instruction is in part determined by their overall conception of history as a discipline, which is in turn connected to their knowledge of content and historical concepts like evidence, change, and causality. More specifically, Bouhon (2009) found that positivist beliefs had a positive effect on instructional beliefs that emphasized the teaching of content knowledge, and a negative one on beliefs that centered around investigating the past within the classroom. Likewise, McCrum (2013) found that student teachers with modernist beliefs were more inclined to focus on knowledge acquisition. However, McDiarmid (1994) still found that, even when student teachers' beliefs about the nature of history had changed after taking a historiography course, their ideas about teaching the subject remained unchanged.

2.4. Contextual influences.

As the primary function of teachers' beliefs is to make sense of the context in which they work (Nespor, 1987), contextual factors, such as the complexities of classroom life, exert a powerful influence on teachers' beliefs (Fang, 1996). For instance, studies have indicated how both the school's history curriculum, as well as educational standards and central exams, often lead to a need to cover the content and thus limit teachers' actions (e.g. Hicks, 2005; Van Hover & Yeager, 2003; VanSledright, 1996). The available resources also seem to play a role, together with teachers' beliefs about students' abilities (Husbands, 2011). In this light, some have reported how beliefs that students are incapable of engaging in IBL were even able to override teachers' beliefs (Moisan, 2010; Van Hover & Yeager, 2003). Finally, these problems are often exacerbated by the limited amount of time that is generally available for teaching history (Haydn, 2011).

3. AIM OF THE PRESENT STUDY

Although researchers across different countries are becoming increasingly interested in history teachers' beliefs, there exists little research that has simultaneously considered each of these four topics when examining teachers' beliefs about history. The present study aims to provide a more comprehensive overview of teachers' conceptions of IBL in the classroom, by investigating teachers' epistemological and instructional beliefs, in relation to each other as well as to the teaching context. Thus, the main research questions are:

- What are teachers' beliefs about the nature of history?
- What are teachers' goals and views with regard to teaching history, and particularly, IBL?
- How are both types of teachers' beliefs related to one another?
- In what way are teachers' beliefs about IBL related to the context in which they work?

4. DESIGN AND METHOD

In the following section, the design and method of the study are explained more in detail. In addition, more information is given about the context of the research.

4.1. Recruitment

This study was part of a larger research project in Flanders (Belgium) about secondary school history teachers' beliefs and competences related to IBL (see also Voet and De Wever, in press). Invitations to participate in the study were sent out to schools in the region of East-Flanders and then further distributed across other Flemish regions by pedagogical counselors, who were tasked with providing instructional support to history teachers. To avoid a selection bias, invitations did not mention IBL, and the study was presented as focusing on teachers' beliefs about history in general. Furthermore, only teachers with at least three years of experience in teaching history were allowed to participate, to ensure that each participant had had a number of opportunities to reflect on his or her beliefs in light of the reality of the classroom. As such, the study did not explore the beliefs of beginning teachers. Next to this, only teachers working in grade 4 (average student age: 15-16 years) were allowed to participate, as the attainment goals for grade 3 and 4 are the first in secondary school to put a strong focus on students' acquirement of historical reasoning skills (Flemish Government, 2014). The fact that each of the teachers taught student groups of a similar age made it also possible to compare the cases against each other. Registrations were closed after 12 days, when more than 20 teachers had responded to the call to participate. Prior to their participation, all teachers were asked to give their consent, after being informed that the collected data would be kept confidential. It was explained that the data would be used for research purposes only, and that results would be rendered anonymous for publication.

4.2. Participants

In total, 22 teachers participated in the study. Their mean age was 43 years (SD: 11 years) and their mean experience in teaching history was 15 years (SD: 8 years). Eleven teachers were male, and eleven were female. Five teachers held a bachelor degree of a three-year teacher training program at university college, focused on learning to teach history and one or two other school subjects. This degree enabled them to teach in the lower and middle grades of secondary education (grade 1 to 4). Seventeen other teachers held a degree of a four-year master in history at university, introducing them to academic history. In addition, these teachers had obtained a certificate of a one-year teacher training, preparing them to teach in the middle and higher grades of secondary education (grade 3 to 6). One of these teachers had also achieved a PhD in history. The finding that most teachers had received specific training for teaching history, is in line with the outcomes of a more recent large-scale study

with secondary school history teachers in Flanders, as is the mean of teaching experience reported here (see also Voet and De Wever, 2017). Finally, all but two of the teachers taught history in different schools. Depending on the study track to which their school belonged, teachers instructed either one or two 50-minute school periods of history during each week of the school year. Within the context of the present study, tracks including two periods of history placed an emphasis on broad general education, whereas those offering one hour of history combined general with technical subjects (for more information on history education in Flanders, see also De Wever, Vandepitte, & Jadoulle, 2011).

4.3. Data collection

Teachers' beliefs are generally examined indirectly, because teachers are often unaware of their beliefs and therefore may find it difficult to describe them (Kagan, 1992). Qualitative research methods, such as interviews, are commonly used to capture teachers' beliefs and appear to be particularly promising for capturing their richness (e.g. McCrum, 2013; Yilmaz, 2010). As such, a semi-structured interview was carried out with each of the participants. On average, the interviews lasted about 90 minutes. Teachers' beliefs about the nature of history were explored through questions drawn from debates within historiography, including: 'Is there a difference between a historical theory and an opinion?' and 'How can contrasting conclusions in historical research be explained?' Their beliefs about IBL in history were mapped through questions about learning goals and teaching activities, and in particular those related to developing a disciplinary understanding. Examples include: 'Are there similarities between school history and historical research?' and 'What should students know and be able to do?' Next to this, teachers were asked to describe which contextual factors supported or obstructed the implementation of IBL activities in the classroom. For the complete interview protocol, see Appendix A.

4.4. Analysis

All interviews were recorded, transcribed and then analyzed using NVivo 10, following a content analysis approach (Neuendorf, 2002). Based on previous studies investigating history teachers' beliefs (e.g. Maggioni, VanSledright, & Reddy, 2009; Yilmaz, 2010), a theoretical framework was developed to code the data, including as its main categories: beliefs about the nature of history, beliefs about the teaching of history, and contextual influences (An overview of the coding scheme can be found in appendix B). Multiple re-readings of the transcripts resulted in a number of sub-codes (e.g. beliefs about the nature of history covered such sub-categories as: goals of historical research, general nature of history, nature of knowledge, research methods and procedures, and criteria for evaluating knowledge). Units of meaning, which could consist of a word, sentence or even a whole paragraph expressing a single

thought, were chosen as the unit of analysis. Following the advice of Miles and Huberman (1994) for interpreting large amounts of qualitative data, three matrices were compiled based on the final coding, to support interpretation of the contents of each code, as well as the relationship between codes. These matrices contained a summary of each teacher's (1) beliefs about the nature of history, (2) beliefs about the teaching of history, and (3) perceived contextual influences. By classifying the contents of these matrices (e.g. different positions regarding the scientific nature of history, the roles of evidence and interpretation, the importance of teaching knowledge versus research skills, the role of inquiry in the classroom), a profile was constructed for each teacher, positioning individual teacher cases on two axes: one included three types of epistemological beliefs (see Maggioni, VanSledright, & Reddy, 2009), whereas the other contained three types of instructional beliefs that surfaced during data analysis. "In some cases, however, teachers' statements throughout the interview contained traces of different types of beliefs. Although it was considered that teachers' conceptions might borrow from more than one of the types of beliefs that were specified, a dominant perspective generally stood out upon further analysis of the statements in question. Still, these teachers appeared to hold more moderate beliefs compared to others.

4.5. Validity and reliability

In order to decrease the chance of teachers responding in a socially desirable way, the interviewer started each session by explaining that he was particularly interested in their personal beliefs about and approach towards the subject and, as such, that there were no right or wrong answers. Furthermore, the assurance that all data would be kept confidential helped to create a context in which teachers could talk freely about their ideas and actions, without fear of negative repercussions. During the analysis, inter-rater agreement was calculated to check the reliability of the results. Each of the teachers' transcripts was reviewed by another researcher, who independently assigned them a position on the two axes. Percent agreement between both analyses was 81.82% (18 out of 22 cases) for beliefs about the nature of history, and 90.91% (20 out of 22 cases) for beliefs about the teaching of history, and in both cases did not violate the 80% threshold as advocated by Riffe, Lacy and Fico (1998). The cases of which interpretations differed were usually those that held a number of statements hinting at different types of beliefs. In order to resolve disagreement, both parties presented their arguments for assigning teachers to a particular position (as there was a possibility that the other researcher might have overlooked relevant information), and then continued to discuss the interpretation of the data. Similar to the original analysis, both researchers took into account the possibility that more than one type of beliefs might govern teachers' thinking, but agreed upon the presence of one dominant perspective after discussing each case.

5. RESULTS

In this section, the findings are presented in two parts, combining a quantitative with a qualitative approach to the data, in order to make their interpretation less subjective (Chi, 1997). The first part presents an overview of the findings across teacher cases, whereas the second part tries to further explain these findings by offering a detailed description of three illustrative teachers' cases.

5.1. Overview of teacher cases

In this first part of the result section, each of the four research questions are answered using findings across teachers' cases. By using the whole dataset, the goal is to provide a comprehensive overview of teachers' beliefs about the subject.

5.1.1. RQ1: Teachers' beliefs about the nature of history

When talking about the general nature of history, all teachers emphasized its scientific character, arguing that good history is both empirical and rigorous, which means that it should provide a detailed description of the past that is grounded in an analysis of historical information. There appeared to be some differences between teachers' exact beliefs about this scientific nature, as six teachers were convinced that history is as much a science as chemistry or physics, whereas sixteen others maintained that history is also somewhat of an art. Closer investigation revealed that these differences mainly depended on whether teachers emphasized either the following of a scientific approach or coping with uncertainty in their description of the discipline. For example, teacher 20 explained that: "It is a science, because you have to follow a number of strict historical methods. Through these historical methods, you reach conclusions of which you know up front that they are subjective.", while teacher 7, felt that: "It should be more of a science, but the sources are incomplete. It is not like the hard sciences. You cannot formulate a hypothesis that can be tested by everyone and yield the same results every time."

Of all teachers, three stood out because they gave explanations that differed significantly from current scholarly thinking on history. Teacher 1 solely referred to history's connection with hard sciences, proposing that: "It is a science and is increasingly becoming a science, because we use DNA-research, radiography for paintings...". In contrast, teacher 9 believed that history is a science because evolutions within the domain of science are also a part of history. To illustrate this, he argued that: "You can see a very interesting evolution in ship-building, starting with unwieldy ships that couldn't transport much. And then they started to think, whether this is science or not... I think it is, to make a ship go faster, to increase its carrying capacity..." Finally, teacher 18 noted that: "Historians probably use libraries and

archives.”, but then had to admit that he knew very little about the way in which historians carried out their work.

Based on teachers’ answers to the questions about historiography, it was possible to categorize their cases across three types of beliefs about the nature of history. Table 1 presents an overview of the findings. (1) A majority of 17 teachers were identified as *criterialists*, who believed that historians reconstruct the past through an interpretation of sources, by making personal judgments about the information. At the same time, criterialist teachers stressed that this interpretative work does not grant historians the freedom to spread whatever stories they want, but that the plausibility of a historical account should be evaluated using different criteria, such as the quality of the research methods, the value of the evidence and the soundness of arguments. Next to these basic criteria, some teachers also had their own ideas, like teacher 21, who stated that: “I also think it is particularly dangerous when a topic has been studied for years by only one person, because I believe that, on your own, you cannot do research as well as a team.”

Table 1

Teachers’ beliefs about the nature of history

Type	Characteristics	N teachers
<i>Criterialist</i>	Personal choice and judgment play an important role in conducting historical research and forming conclusions, but clear criteria exist to judge the plausibility of accounts.	17
<i>Objectivist</i>	Interpretation does or should not play a role in history, other than filling up gaps between sources. History is akin to a quest for the truth about the past.	3
<i>Subjectivist</i>	Historical accounts should be based on evidence, but it is not possible to say which explanation is more plausible, as this is ultimately a matter of opinion.	2

Interestingly, the five remaining teachers included the three teachers who provided rather distinct explanations for the scientific nature of history. (2) Three out of five (1, 3 and 18) were categorized as *objectivists*, who believed that interpretation should be reduced as much as possible when investigating the past, and generally referred to the discipline as a quest for the historical truth. As such, these teachers generally attributed conflicting visions between historians to a lack of sources, mistakes, or hidden agendas. To give an example, teacher 3 said that: “It is okay to be creative in the way you present your research, but it has to be the

truth. If you tell a story, you should tell people that it's just that, a story." (3) The remaining two teachers (9 and 18), were classified as *subjectivists*. They agreed that historians should start their work from evidence, but were at the same time convinced that history is ultimately a matter of opinion. In general, they claimed that it is impossible to know how things really went in the past, or argued that the truth has many layers. As teacher 8 put it: "It is better to look for the account that fits best with our own ideas. I think that is better. But the one more plausible than the other? I think that is a matter of personal feeling."

5.1.2. RQ 2: Teachers' beliefs about the teaching of history

When talking about their beliefs regarding history teaching in general, teachers commonly stressed the development of a historical consciousness, allowing students to situate phenomena in time and explain them. The majority of the teachers spontaneously expressed an aversion to learning a multitude of facts and data, and instead emphasized an understanding of history. As teacher 5 argued, "We had to know who Clovis was, and had to be able to sum up all Roman kings. They will forget it anyway, it is nonsense and has no use." In the same sense, some also remarked how history education had gone through an evolution over the past years, and how they were increasingly expected to cut down on knowledge transferal, to make more room for the active development of understanding and skills.

Yet, teachers' talk about the learning goals related to history suggested that 'knowing history' still dominated their thinking about the subject, as a large majority of the goals that were mentioned referred to learning about what had happened in the past. First of all, seventeen teachers argued that students should learn about the historical roots of today's society to better understand the present. Illustrating this, teacher 13 said that: "For example, Colbertism, or protection of the inland economy under Louis XIV, is still seen today in the European Union." In addition, thirteen teachers thought that history was part of a general education, and that students should learn the story about the past to become more familiar with their own culture. The third goal, which was mentioned by twelve teachers, did not refer to the content of history, but stressed the development of a critical attitude. As teacher 3 explained: "This is also a part of history education, because when students look up information about the past, they often accept it unquestioningly." Citizenship education was a fourth goal, stated by eleven teachers, who believed that students should learn the history of their country, as a part of becoming an active citizen. For instance, teacher 8 believed that: "You should know your country and its politics, economy and policy, to be able to participate. You could say that you do not care about it, but what are you doing here, then?" Seven teachers also noted that one of their main goals for teaching was to increase students' interest in history. What was most remarkable, however, was that only three teachers talked about

familiarizing students with the constructed nature of history, or the basics of historical research.

Similar to teachers' beliefs about the nature of history, three belief sets could be discerned among their conceptions of IBL in history. An overview of the findings is presented in Table 2. (1) In the minds of a small group of two teachers (1 and 17), IBL was reduced to reading and *understanding*. These teachers expected their students to be able to process additional information related to the lesson topic on their own, and saw IBL mainly as a means to increase students' content knowledge. Teacher 1 argued that: "It is part of transferring the knowledge, that is how I use it. For example, I give them descriptions of the different stages of how bread is made, and then ask students to put them in the right order. That is often difficult for students today, so I let them look up the information. That is also a kind of inquiry." (2) Sixteen teachers stressed that IBL should mainly focus on comparing and critically *evaluating*, so that students learn how to determine the trustworthiness of information sources. Curiously, they were not inclined to connect this to other aspects of historical research, such as formulating research questions and determine which information is valuable. Teacher 7 noted that: "We should not expect too much, but they should be able to criticize sources, pretty much basic skills. When a politician says that crime has risen, they should spontaneously ask which data he has used." (3) Only four teachers expressed that IBL should center around *investigating*, or learning to solve a problem by asking questions, analyzing information, and forming arguments. Teacher 14 explained that: "They should be able to conduct their own inquiries, meaning that they have to ask questions and find appropriate information sources, both historical and historiographical, although I will still point them in the right direction."

Table 2

Teachers' conceptions of IBL in history

Type	Characteristics	N teachers
<i>Investigating</i>	IBL is about solving problems, by generating questions, analyzing information and forming arguments.	4
<i>Evaluating</i>	The goal of IBL is learning how to critically evaluate information, to determine which information is correct.	16
<i>Understanding</i>	IBL activities are reduced to processing and comprehending information that further explains the lesson topic.	2

5.1.3. RQ 3 and 4: The interplay between teachers' beliefs and contextual influences

Figure 1 plots teachers' beliefs about IBL against their beliefs about the nature of history. As can be seen in the graph, objectivist and subjectivist teachers, who were found to mainly focus on understanding or evaluating information, appeared to have more narrow conceptions of IBL compared to criterialist teachers, who emphasized either evaluating or investigating information. However, there were still considerable differences within each category. For instance, only a small number of criterialist teachers viewed IBL activities as full investigations, whereas most of these teachers mainly regarded it as the critical evaluation of evidence.

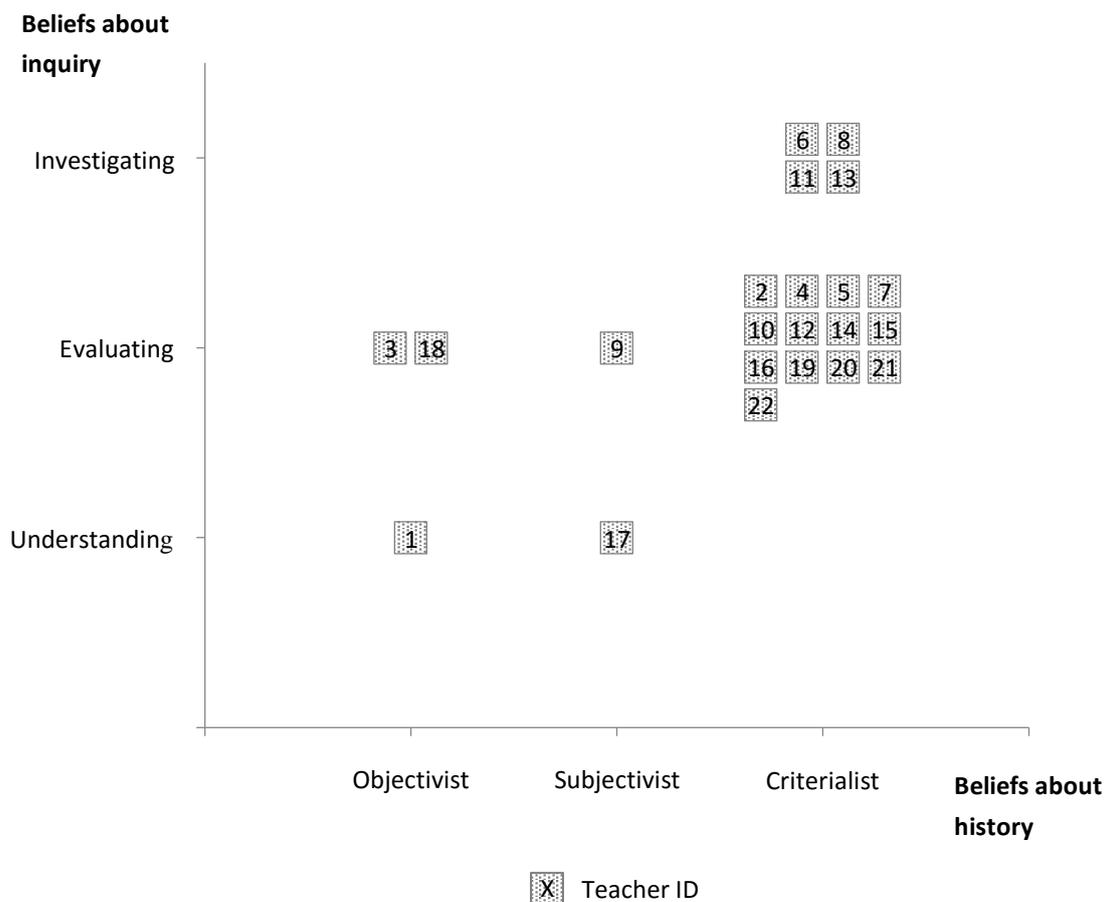


Figure 1. Teachers' beliefs about the nature of history appear to influence their conceptions of IBL

Figure 2 adds the context where teachers worked to the graph. Some teachers worked in general study tracks, which put an emphasis on general education and aim to prepare students for higher education. In these study tracks, the curriculum provided two 50-minute periods during each week to teach history. Several other teachers instructed history in technical study tracks, which combine general education with technical subjects, and prepare students to take

on a specific profession (although students can also choose to enter higher education). In contrast to the other teachers, teachers in technical study tracks only received one 50-minute period to teach history during each week. Finally, a small number of teachers worked in both types of study tracks, having one 50-minute period for history in some of their classes, and two 50-minute periods in other classes.

The graph suggests that this teaching context can also be linked to the differences between teachers, and particularly within the group of criterialist teachers. More specifically, criterialist teachers who were inclined to organize full investigations taught in two-period classrooms, whereas all criterialist teachers instructing history in one-period classrooms fell within the category of evaluating information. Thus, having more time available for teaching history seemed to stimulate these teachers to consider full historical inquiries. Next to the context where teachers worked, the analysis also took their degree and teaching experience into account, but these did not appear to be connected to the remaining differences.

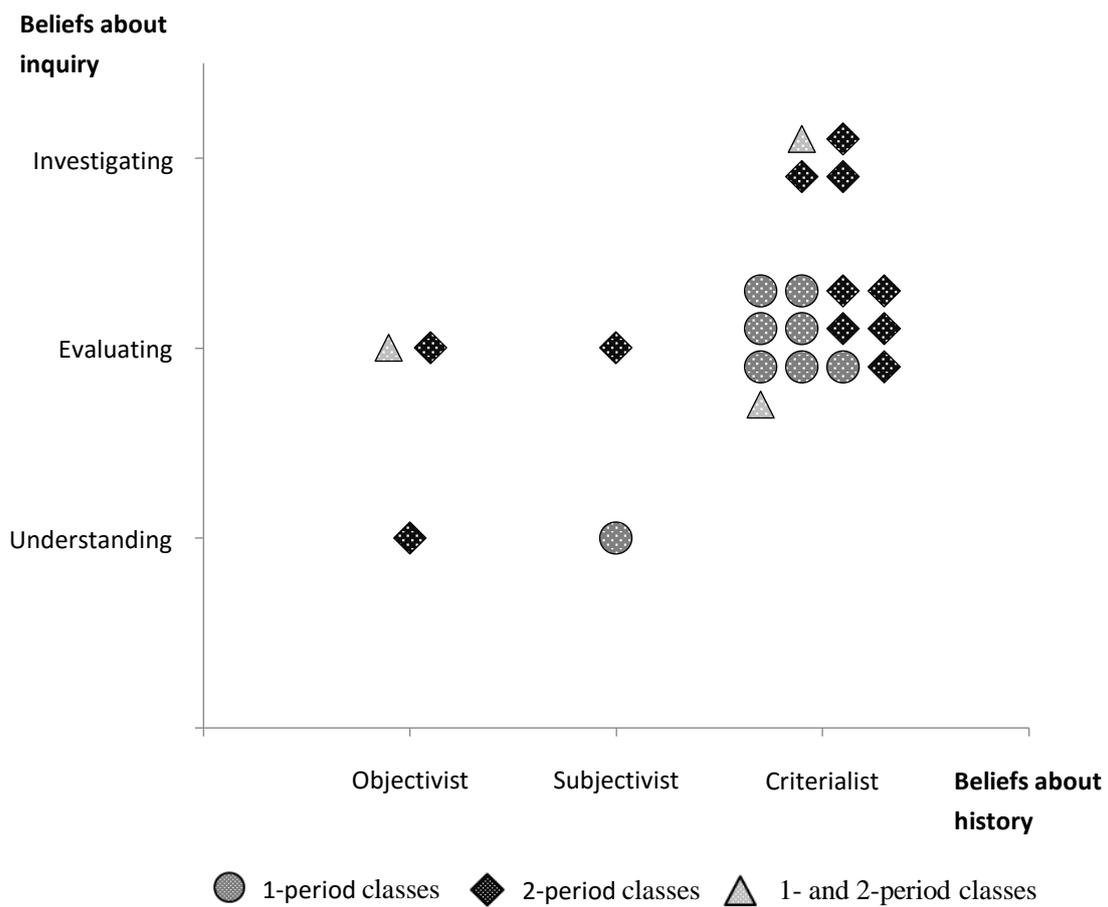


Figure 2. Contextual influences can also be linked to teachers' beliefs about IBL.

During the interview, the teachers also mentioned a number of contextual factors that obstructed the implementation of IBL activities in their particular teaching context.

Similar to the findings related to teachers' ideas about learning goals, the first two – and most frequently cited – issues indicate that knowing history appeared to dominate teachers' thinking about the subject. In line with what Figure 2 suggests, the time available for teaching history was the largest problem, and was brought up by 18 teachers. These teachers often argued that setting students to work takes up a lot of teaching time. However, as teachers further talked about this issue, it became clear that a need to cover the content was the real issue for most of them. For example, teacher 15 stated that: "If you still have to cover another chapter, you need to go a little faster. Not by really going faster, of course, but by dropping student work." A second important issue that was mentioned by 17 teachers, was that students have insufficient procedural knowledge to conduct full inquiries, and generally deliver poor results. Trying to explain this, teacher 12 argued that: "They really find it difficult, because they are simply used to getting everything presented to them."

The next two issues suggested that a significant part of the teachers also found it difficult to implement full investigations in the classroom. A group of 12 teachers said that they had trouble with organizing IBL activities or lacked the necessary pedagogical knowledge to do so. As teacher 5 put it: "I know how to do it myself, but how to handle it with students is another matter." A fourth issue, also mentioned by 12 teachers, was related to finding 'good' information sources. In particular, these teachers maintained that it is not easy to find and adapt sources to students' level. Although textbooks generally contain a fair amount of sources, most teachers disapproved of using them. As teacher 21 expressed: "These fragments are so obvious that you can answer the accompanying questions at first glance. Whereas you should teach students that, sometimes, you have to read a lot before finding the answer somewhere in between."

Finally, 11 teachers also experienced difficulties due to students' limited knowledge about historical concepts and terminology, and 9 teachers believed that students were not keen on carrying out their own inquiries. Classroom infrastructure, and in particular the availability of computers for looking up information, appeared to be only a minor issue, and was mentioned by no more than 3 teachers.

5.2. An in-depth look at three illustrative cases

In this second part of the results section, an in-depth description of three characteristic teacher cases is used to further clarify the findings of the previous section. These cases were selected because they were particularly illustrative of the distinct views that teachers held about the nature of history and IBL, as well as differences between these beliefs. By presenting

these three cases, the aim is to provide further insight into variations among teachers' beliefs about history education, as well as how these come to exist.

5.2.1. Teacher 1: Objectivism - IBL as understanding

Teacher 1 was 50 years old and held a degree of master in history. Overall, he had about 16 years of experience in teaching secondary school history. Although he started out teaching in technical schools with one-period classrooms, he had spent most of his career teaching history to two-period classrooms in general study tracks.

When this teacher talked about history's general nature, he described it as an endless pursuit of the correct representation of the past. This quest for truth, he believed, was marked by continuous scientific progress, made possible by the discipline's use of increasingly sophisticated tools developed by hard science. In addition, teacher 1 maintained that: "A good historian is the one who is best able to present the truth, that is the most important. Those are the ones that make the news." He explained that historians should take care to discard their own ideas as much as possible, and although it was understandable that some of them would use innovative ideas to sell their work, he cautioned that they should at the very least inform their audience about what parts are their own interpretations. As such, he was convinced that, if they did their work right, historians would inevitably draw the same conclusions as the ones before them. Thus, conclusions could only change when new evidence presented itself.

Teacher 1's view of history as an accumulation of knowledge appeared to result in a firm belief that history education was about transferring this knowledge to students. As the teacher put it: "This may be very traditional, but to me, history is knowledge. You may agree or disagree, but this means that history education comes down to acquiring knowledge or a certain baggage." Although the focus lay on the transfer of content knowledge, students were not expected to remain passive in the classroom. The teacher explained that: "My history teaching is similar to MTV, full of short and powerful activities, with a lot of variation. I use group work, 5-minute movie fragments, lectures, but none of them longer than 10 minutes." Still, due to his preoccupation with content knowledge, the teacher paid little attention to historical reasoning skills. He stated that the process of creating historical knowledge was only briefly covered during the first lesson, and regarded IBL activities mainly as a means to let students actively process the lesson content. Spending additional time on the investigation of historical information was out of the question, as the teacher argued that: "I have to cover the story from 1500 to 1815, so then I would have to cut a lot of the content." In addition, teacher 1 was convinced that students first had to learn the content before attempting to conduct inquiries, stating that previous attempts at IBL had always failed due to students' lack of content knowledge.

In short, the case of teacher 1 clarifies why objectivist teachers were generally less inclined to cover historical reasoning skills in their classroom (see Figure 1). Teacher 1 appeared to have little familiarity with the constructed nature of history, and, instead, regarded historical research as a process of knowledge accumulation that is driven by scientific progress. As a consequence, his ideas about history teaching focused solely on transferring the content. In line with the finding that the context also had an important impact on teachers' educational beliefs, the case of teacher 1 demonstrates how several factors further strengthened his beliefs about history teaching. The fact that time for teaching history was limited, gave teacher 1 the impression that it was a matter of choosing between theory and practice, and led him to the conclusion that the teacher's task is to make sure that students at least get the content. This belief was further reinforced by disappointing student results during the teacher's previous experiences with IBL, which had convinced him that students' success related to IBL was mainly determined by their content knowledge.

5.2.2. Teacher 9: Subjectivism – IBL as evaluating

Teacher 9 held a bachelor degree, which enabled him to teach the subjects of history, English, and economics. He had worked as a history teacher during the first five years of his teaching career, and, after a few years of teaching other subjects, had again been teaching history for the past five years. His school offered a number of general study tracks, meaning that each of his classes had two periods of history each week.

This teacher described a good historian as someone who creates an account of the past based on a comparison of numerous information sources, but did not add any criteria for identifying good historical research. Instead, he argued that, although historical accounts are based on sources providing information about the past, they are inevitably biased. As part of his explanation, he said that: "I just told my students about a historical fact, but, in reality, I gave it color through my choice of words, which could have put it in an either positive or negative light." To teacher 9, history was largely a matter of opinion. As such, determining the plausibility of a historical theory was, above all, a matter of personal belief and feeling. Clarifying his reasoning, he stated that: "We cannot really know the past because we did not live in it. You can try to understand it, but you cannot really know it. I do not believe that is possible."

His belief that history is largely matter of opinion, seemed one of the reasons why teacher 9 put a heavy emphasis on developing a critical understanding when he talked about the aims of history education. He maintained that: "The most important goal is that they learn to think critically about everything that is presented to them, instead of uncritically accepting things. Knowledge is important, but critical thinking skills are even more important. However, you need knowledge to be able to think critically." As such, the teacher was in favor of an approach

that combined storytelling with question-asking and assignments in which students had to critically examine information sources. The teacher explained that: “Sometimes we analyze an information source, but it depends on the lesson and on the available sources. If we are able to talk about a source from time to time, I think that is enough.” The teacher also felt that he did not have much time to let students examine information sources, as his colleagues expected him to cover the textbook by the end of the year. In some instances, he was also reluctant to do so, as he felt that most students did not know how to analyze a source, even when he presented them with a step-by-step plan.

Similar to the case of teacher 1, the case of teacher 9 can explain why subjectivist teachers do not pay full attention to historical reasoning skills in their classroom (see Figure 1). Teacher 9’s beliefs about history as making up one’s own opinion appeared to result in a focus on developing critical thinking skills and covering the content of history, as he thought that the latter was fundamental for being able to think critically. Apart from the evaluation of information sources, he paid little attention to other historical reasoning skills. The fact that he was unable to name a number of criteria for distinguishing good historical research further suggests that he was not completely familiar with the work of historians. As was the case with teacher 1, contextual influences, such as students’ difficulties with applying procedural knowledge during previous IBL activities, or the fact that teacher 9’s colleagues expected him to cover all of the content, may have been another reason why this teacher paid less attention to historical reasoning skills, apart from the evaluation of information.

5.2.3. Teacher 11: Criterialism - IBL as investigating

Teacher 11 was 41 years old, and had been teaching history for 16 years. She started her studies at university, but was unable to obtain a master degree. She then went to university college, and got a bachelor degree, preparing her for teaching history, English, and geography. Like teacher 1 and 9, she instructed history in two-period classrooms, in a school that provided general study tracks.

As teacher 11 talked about history, she stressed the importance of facts, but at the same time realized that historical accounts cannot be created with facts alone. As she put it: “The fact are black or white, and you cannot change them, but you always have to interpret them. Interpretation is inevitable and highly personal. However, I think that every interpretation should be grounded in good arguments, so that you are able to affirm your conclusions.” As such, she believed that there exist clear criteria for making a distinction between historical accounts. Above all, she believed that a historian must subject each information source to a number of critical questions, an approach that she referred to as the historical method. After she had finished explaining her ideas about history, she remarked that: “I often think about

what history is to me, and how I can teach it to my students in a way that is interesting to them. That is something I think about every day.”

That teacher 11 appeared to spend a lot of time thinking about the subject, seemed to encourage her to center her teaching around historical reasoning skills. She stated that: “Although students should have a basic knowledge about what happened in the past, being able to recount these historical facts cannot be the end goal. They should be able to do something with them. They should be able to draw interpretations, to reach conclusions based on certain information sources.” Contrary to what might be expected, she also believed that lectures were still an important part of history, as her experiences had shown her that she could really captivate students with vivid narratives about the past. However, she clarified that lectures should never be limited to the content, stating that: “During my lectures, I try to demonstrate how students should do the work. For example, if you receive this source, then you need to do this or that.” Similar to the other teachers, teacher 11 also felt that the time for teaching history was scarce, but maintained that IBL is really something that teachers have to make time for, and that she did not feel obliged to cover every chapter in her textbook. In the same way, she noted that students sometimes have difficulties with certain aspects of inquiries, but then remarked that these often disappear with extra training or additional help from the teacher.

To conclude, the case of teacher 11 illustrates the finding that only some of the criterialist teachers were inclined to conduct full investigations in their classrooms (see Figure 1). The case demonstrates how teacher 11's frequent reflection on the subject resulted in an emphasis on teaching historical reasoning skills. However, this did not make her lose sight of the story of the past, as she argued that more teacher-centered approaches, like storytelling, were still very important to history. As such, her thoughts about teaching history reflected a delicate balance between knowing and doing history. What was most remarkable, however, was that this teacher experienced the same negative contextual influences as the other teachers, but appeared to have found a way around them, and did not allow these barriers to deflect her from carrying out full investigations with her students.

6. DISCUSSION

The present study sought to explore teachers' conceptions of inquiry-based learning (IBL), through an investigation of (1) beliefs about the nature of history, (2) views regarding history education, and IBL in particular, (3) the interplay between these two types of beliefs, and (4) contextual influences. In this section, the findings are discussed and compared to earlier research on teachers' beliefs.

In line with previous work, it was found that teachers' beliefs about the nature of history could be categorized across three different types: objectivism, subjectivism and criterialism

(see Maggioni, VanSledright, & Reddy, 2009). Most of the participating teachers appeared to hold criterialist beliefs, stressing that although historical accounts are based on an interpretation of evidence, there exist clear criteria to judge their plausibility. In contrast, only a few teachers exhibited objectivist or subjectivist beliefs, respectively emphasizing a neutral report of the facts, or an inability to judge accounts that are regarded as mere opinions. Within this smaller group, teachers' ideas about the general nature of history often deviated from current academic assumptions, suggesting that these teachers might not have been very familiar with scholarly work in history. These findings are important, as teachers can only teach students about disciplinary thinking if they themselves have a solid understanding of the nature of history (Martin & Monte-Sano, 2008). As such, it appears that most teachers' beliefs about the nature of history were conducive to an instructional approach that focusses on learning to reason with historical information. This conclusion is similar to the findings of Maggioni, VanSledright and Alexander (2009), but contrary those of other studies (e.g. McCrum, 2013). Possibly, this contrast might be explained by differences between teacher education programs, and, more specifically, the degree to which they focus on issues in historiography (Yilmaz, 2010).

When it comes to teachers' beliefs about instruction, the most common learning goals seem to indicate that most teachers' ideas about the subject were governed by a focus on content knowledge, even though many of them were in favor of a student-centered approach. Next to this, there were considerable differences between teachers' conceptions of IBL. It was possible to separate teachers' beliefs into three categories. For most teachers, IBL in history remained limited to a critical evaluation of information sources, in order to determine whether information was trustworthy or not. Only a few teachers considered doing full historical inquiries, and connected a critical evaluation of sources to a particular research question, and other historical reasoning skills, such as formulating arguments. For another small group, however, IBL was mainly another, more student-centered, way to help students process and understand the story of the past. In general, the latter group paid little attention to historical reasoning skills, or the constructed nature of history in general. To summarize, these results do not reflect a dominance of teacher-centered beliefs in history teachers' thinking about the subject, in contrast to earlier research (e.g. McDiarmid, 1994; Virta, 2002). They are, however, similar to more recent findings suggesting that teachers are generally inclined to focus on the content of history, rather than the way in which this body of knowledge is constructed (Van Nieuwenhuysse, Wils, Clarebout, Draye, & Verschaffel, 2015). What is most worrisome, is that the present study indicates that most history teachers' conceptions of IBL misrepresent the practices of inquiry that lie at the core of the discipline. As such, engagement in IBL may give their students the false impression that historical

reasoning is mainly a matter of looking up information, or mechanistically assessing the reliability of sources.

Compared to previous research (e.g. Bouhon, 2009; McCrum, 2013), the results provide further evidence that teachers' beliefs about the nature of history are connected their beliefs about teaching. In particular, an in-depth look at three of the cases indicated how varying beliefs about the nature of history led to different teaching approaches, focusing on transferring knowledge about the past, developing critical thinking skills while relating the story of the past, or combining narratives and demonstrations with opportunities for training historical reasoning skills. At the same time, however, there also appears to be a certain disconnect between a significant group of teachers' beliefs about learning and teaching, and their own beliefs about the discipline. It is, for instance, peculiar that although most teachers held criterialist beliefs and described history as a scientific discipline, only a few of them mentioned learning goals that focused on the development of historical reasoning skills. As McDiarmid (1994) suggests, a possible explanation might be that teachers are, to some extent, prisoners of their own experiences during their time as students, which are generally dominated by observations of history lessons that were primarily content-oriented.

Furthermore, the results provide an indication of the power that contextual influences hold over teachers' beliefs about their subject. Part of the differences between teachers' conceptions of IBL could be linked to the study tracks in which they worked, next to their beliefs about the nature of history. In short, the results suggest that teachers in general study tracks, who taught history for two 50-minute periods each week, were more inclined to organize full historical inquiries, compared to teachers working in technical study tracks, where the curriculum provided only one 50-minute period for teaching history. This may be due to the limited amount of time that teachers in technical study tracks had to cope with, but may also have had something to do with differences between the student population in general and technical study tracks. Next to this, it appears that differences between teachers' conceptions of IBL could further be related to the extent to which each of them felt obstructed by a number of contextual factors, such as curriculum demands, students' abilities, or the availability of instructional materials. This seems all the more likely, as the case of teacher 11, who was in favor of conducting full classroom investigations, showed that she experienced the same issues as the other teachers, but appeared to have found a way to cope with them.

Finally, a number of limitations remain with regard to the present study. The first one is that participants were not selected randomly, but that they were the first teachers to respond to the call for participation, and thus may have been particularly concerned with the teaching of their subject. It is possible that this study therefore presents the thoughts and ideas of a group of the most innovative history teachers, even though the results seem to indicate that this is not the case. The second, and most important limitation is that, next to the interviews,

no other form of data collection was organized. Although previous studies about teachers' beliefs were able to reach viable conclusions based on interviews alone (McCrum, 2013; Yilmaz, 2010), it would be particularly interesting if future research could compare insights gained through interviews with observations of teachers' classroom behavior, or an analysis of the learning materials that teachers use within their classroom. This would, for example, allow researchers to check for the possibility of a social desirability bias occurring in teachers' answers to interview questions. Furthermore, as the present study is mainly explorative in nature, more large-scale research could help to validate these findings.

Nevertheless, the present study shows that teachers' conceptions of IBL are connected to their beliefs about the nature of history and the context in which they work. By taking an integrative approach to four research topics that have often been investigated separately, the study provides a more comprehensive framework of history teachers' conceptions of IBL, which can guide future research.

7. IMPLICATIONS AND FUTURE RESEARCH

The present study investigated history teachers' beliefs about IBL, while also considering general beliefs about the subject, as well as contextual influences. The results support two main conclusions, that are of relevance to both teacher educators and educational policy makers in the national context, but might also inform researchers and government agents at an international level.

Firstly, the findings suggest that, although most teachers' beliefs about the nature of history appear conducive to teaching students about the ways in which historical knowledge is constructed, they are generally not considering inquiry-based learning activities that draw on a range of historical reasoning skills. In addition, a significant number of teachers mentioned a lack of pedagogical knowledge and difficulties with organizing inquiries as issues obstructing them from implementing IBL in their classroom. Therefore, teacher education programs should take care to evaluate whether the teaching of historical reasoning skills and organization of IBL activities are sufficiently covered by the courses that are offered to future history teachers. In this light, recent work on developing history teachers' pedagogical content knowledge (e.g. Bain, 2006; Monte-Sano, 2011b) could serve as a framework for developing a balanced approach that pays attention to both knowing and doing history.

Secondly, the findings indicate that influences within the school context, such as the history curriculum, collegial interactions, or students' abilities, also play an important role when it comes to teachers' thoughts and ideas about teaching the subject. As such, further development of teachers' beliefs should not be seen as the sole responsibility of teacher education programs. Educational policy makers can help to create an environment that stimulates the teaching of historical reasoning skills, by organizing specific professional

development initiatives for passing on good practices to teachers, or by creating mentoring programs within schools (e.g. see Achinstein & Fogo, 2015) that can support beginning teachers in carrying out these complex activities.

Finally, future research could help to achieve these aims by further investigating these or other factors that might also influence teachers' beliefs, such as the grade in which teachers work. In particular, more large-scale investigations appear to be well suited for validating and extending the findings of the present study.

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9. APPENDIX A: INTERVIEW PROTOCOL

9.1. Introduction

- Thank the teacher for participating in the study.
- Explain that the goal of the research is to investigate teachers' beliefs about history.
- Emphasize our interest in the teacher's own opinion, and that there are no right or wrong answers.
- Ask permission to tape the interview, and explain that all data will be treated confidentially.

9.2. Background

- What is your age?
- How long have you been teaching history in secondary school?
 - How long have you been teaching the subject in grade 4?
- What higher education courses did you follow prior to teaching?
- Why did you ultimately become a history teacher?

9.3. Beliefs about the nature of history

- How would you describe history as an academic discipline?
- *[Show drawing of a line with 'art' and 'science' opposite to each other]* Where on this line would you place history and why?
- How would you describe a good historian?
 - What is he/she able to do?
 - Does he/she follow a certain procedure? Why (not)?
 - Is he/she allowed to draw on imagination and creativity? Why (not)?
- Is there, according to you, a difference between a historical theory and an opinion? Why (not)?
- Do you think that one historical theory can be superior to another? Why (not)?
 - *[If yes]* Can you explain what criteria can be used to determine which theory is preferable?
- Historians studying the same remains of the past sometimes draw strikingly different conclusions. How would you explain this phenomenon?

9.4. Beliefs about the teaching of history

- According to you, why should pupils be taught history?
 - What are the most important goals of the subject?
- Which competences should students attain during the history course?
 - What kind of knowledge should they acquire?
 - What type of skills should they become proficient in?
- Which pedagogical approach is most fit for teaching history, and why?
 - What is the main strength of this approach?
 - What are weaknesses of this approach?
- Can you describe your own teaching approach during a 50-minute period of history?
 - Which phases can be distinguished in each lesson?
 - What are you doing during each phase?
 - What are the pupils doing during each phase?
- How do your pupils view the subject of history?

9.5. Beliefs about inquiry-based learning

- How does school history differ from historical research?
 - Are there also similarities between school history and historical research? Please explain why you think so.
- Should teachers explain to their students how the information in textbooks and task sheets was created?
 - *[If yes]* How do you try to do this in your own classroom?
- Do you think school history should make students proficient in applying the reasoning skills that historians use to investigating the past? Why (not)?
 - *[If yes]* What should students know and be able to do?
 - *[If yes]* How do you teach these skills in the classroom?
- According to you, is an inquiry (e.g. with multiple information sources) a good approach for teaching knowledge and skills? Why (not)?
 - Do you use this approach during your own lessons?
 - *[If yes]* Please describe how you implement inquiry in the classroom

9.6. Contextual influences

- What factors stimulate the implementation of inquiry-based learning in the classroom? These factors can be both personal or situated at school level.
- What barriers obstruct you from using inquiry in the classroom? Again, these can be both personal or situated at the school level.
 - Which difficulties do students experience during an inquiry?

- Which issues have you encountered when preparing, organizing or facilitating inquiry-based learning activities?

9.7. End

- Say that this concludes the interview, and ask whether the teacher has additional comments related to the topics of the interview, or more general remarks or questions.
- Again, thank the teacher for participating in the study.

10. APPENDIX B: CODING SCHEME

DIS: beliefs about the nature of history

- DIS_GOAL: goals of historical research in general (e.g. explaining the present, finding patterns).
- DIS_CHAR: general nature of history (e.g. science versus art).
- DIS_KNOW: nature of historical knowledge (e.g. absolute or constructed).
- DIS_METH: methods and procedures that historians use.
- DIS_CRIT: criteria that can be used to evaluate historical accounts.

EDU: beliefs about the teaching of history

- EDU_GOAL: general goals of history education.
**Consisted of 6 subcodes, corresponding to the goals mentioned in section 5.1.2.*
- EDU_KNDO: relative importance of knowing versus doing history.
- EDU_INST: ideas about teaching history in general (e.g. teacher- or student-centered).
- EDU_KNOW: focus on constructed nature of knowledge in daily teaching (e.g. explaining how sources are used, how historical theories evolve).
- EDU_STOR: opinion about story-telling in history.
- EDU_INQU: approach to inquiry-based learning activities.

MOT: motives for (not) implementing inquiry-based learning

- MOT_STIM: reasons why teachers integrated inquiry-based learning activities in class (e.g. external pressure, development of critical thinking)
- MOT_BARR: obstacles to preparing/organizing inquiry-based learning activities. **Consisted of 7 subcodes, corresponding to the barriers mentioned in section 5.1.3.*

3

History teachers' knowledge of inquiry methods: An analysis of cognitive processes used during a historical inquiry

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CHAPTER 3

History teachers' knowledge of inquiry methods: An analysis of cognitive processes used during a historical inquiry

ABSTRACT

The present study explores secondary school history teachers' knowledge of inquiry methods. In order to do so, a process model, outlining 5 core cognitive processes of inquiry in the history class room, was developed based on a review of the literature. This process model was then used to analyze think-aloud protocols of 20 teachers' reasoning during an inquiry task. It was found that less than half of the teachers used all cognitive processes during the inquiry. Based on the results, a distinction can be made between an integral, fragmentary and cursory approach to inquiry. Further analysis suggest that there exists no clear pattern in the relation between teachers' beliefs about the subject of history and their approach to inquiry. The implications for teacher training are discussed, and outline how the process model could serve as an instructional tool that can contribute to a comprehensive training program for history teachers.

1. INTRODUCTION

History, the study of the past, derives its name from the ancient Greek 'historia', meaning "inquiry, research, or result thereof" (Joseph & Janda, 2004, p. 163). This etymological base indicates that history is something one does: a reasoning process involving the use of research questions, hypotheses, evidence, and arguments (Monte-Sano, 2011). In keeping with this conception of history, inquiry-based learning has gradually moved center stage in research on school history (e.g. Monte-Sano, 2011; Reisman, 2012), driven by a combination of social, pedagogical, and academic developments (Wilschut, 2010).

Traditionally, school history often served the purpose of nationalistic education. During the past decades, however, rapid technological progress and globalization have caused a shift in its focus toward the preparation of democratic citizens, who are able to critically analyze information and form their own opinion (Laville, 2004). Acting as a catalyst for this change, the cognitive revolution has criticized traditional, textbook-driven history teaching for failing to engage students in higher-order thinking and being unable to foster understanding of the subject's underlying principles (Stearns, 2000). At the same time, emerging postmodernist views on historiography have also pointed out that history is not simply about learning what

happened, as the available evidence can generally be used to construct multiple, sometimes contradictory but equally legitimate, accounts of the past (Wilson & Wineburg, 1993).

In history, inquiry-based learning, also referred to as *historical inquiry*, aims to deepen students' understanding of the subject, by letting them conduct their own investigations into the past. The available evidence suggests that this approach is indeed effective for developing students' historical reasoning skills, but that it may also help to prepare students for solving information problems outside of school (see e.g. Reisman, 2012; Wiley & Voss, 1996). It is important to point out, however, that the overarching goal is not a full attainment of historical research skills, but rather the development of an understanding of how historical knowledge is constructed and evaluated (Lee & Ashby, 2000). As historical reasoning is, in essence, a thought process that hinges on the use and framing of evidence (Monte-Sano, 2010), historical inquiry logically centers on the analysis of information, and its use as evidence to form arguments in support of particular conclusions.

As a result of the move toward historical inquiry, history teachers' practice is becoming increasingly permeated by the standards and debates from the world of historians. Teachers are now expected to introduce students to history's interpretative nature, as well as to transform subject matter into lessons and materials that allow students to engage in the process of knowledge construction in history (Monte-Sano & Budano, 2013). Several studies have consequently looked into how teacher training can prepare teachers for this task (e.g. Bain, 2006; Levy, Thomas, Drago, & Rex, 2013; Martin & Monte-Sano, 2008). An important shortcoming of this work, however, is that it has so far paid relatively little attention to teachers' actual knowledge of how historical inquiries are conducted.

2. HISTORY TEACHERS' KNOWLEDGE OF INQUIRY METHODS

Research has indicated that teachers' beliefs about the subject, together with their subject knowledge, play an important role in their decisions about instruction (Cess-Newsome & Lederman, 1999). This is not different within the context of history education (Barton & Levstik, 2003).

Most of the previous work has focused on teachers' beliefs about history, and in particular on their ideas about the nature of knowledge, and classroom inquiry (e.g. Maggioni, VanSledright, & Reddy, 2009; McDiarmid, 1994; Voet & De Wever, 2016; Yilmaz, 2010). Teachers' beliefs about the nature of knowledge seem to vary between (1) objectivist views emphasizing an objective analysis of evidence, (2) subjectivist views that regard history as merely an opinion, and (3) criterialist views stressing that the result of an inquiry is an interpretation that must nevertheless be grounded in evidence (e.g. Maggioni, VanSledright, & Reddy, 2009). Teachers also appear to hold different conceptions of classroom inquiry, with

some (1) reducing it to processing information and the application of reading comprehension skills, some (2) equating it to a critical evaluation of the reliability of information, and others (3) emphasizing full investigations that center around a problem statement (Voet & De Wever, 2016). According to earlier research, teachers' training can play an important role in the development of these beliefs (Levy et al., 2013; Martin & Monte-Sano, 2008).

Compared to history teachers' beliefs about the subject, their knowledge of inquiry methods is a largely unexplored terrain. This is largely because the power that teachers' beliefs hold over their instructional decisions, appears to outweigh that of their knowledge. It turns out that even teachers with a deep understanding of how historical knowledge is constructed, may choose not share this knowledge with their students, because doing so runs counter to their beliefs about school history (Barton & Levstik, 2003; McDiarmid, 1994). Even so, others have argued that history teachers should have a basic understanding of inquiry methods, if they are to support their students during classroom inquiries (Martin & Monte-Sano, 2008; Yilmaz, 2010). Unfortunately, there is not much information available about the extent to which teachers know how to conduct a historical inquiry. In addition, it is also unclear how this knowledge is related to teachers' beliefs about the subject.

Most of the existing research builds on the work by Wineburg (1991a), who employed think-aloud protocols to compare academic historians' and high school students' reasoning with several information sources on the Battle of Lexington (1775), one of the first military engagements during the American Revolutionary War. The finding that students generally did not know how to handle a historical inquiry, led Wineburg (1991b) to the hypothesis that some of their teachers' may also have limited knowledge of historical inquiry.

Using the same design in a study with 15 secondary school teachers, Yeager and Davis (1996) were able to confirm this supposition, and reported three distinct approaches toward an inquiry: (1) history as a construction of meaning, the most historian-like approach, involved a review of source information, comparison of different accounts, and a search for sub-text and missing information, while (2) history as entertainment reflected a narrow understanding of inquiry as a process of information gathering that was mainly determined by readability and interest. In between lay (3) history as a search for accuracy, representing cases in which an account was solely judged by its preciseness and the extent to which it was corroborated by others, without taking other criteria into account.

A case study by Bohan and Davis (1998), in which three student history teachers examined several explanations for the dropping of the atomic bomb during World War II provided further evidence that not all history teachers are familiar with historical inquiry. Even though each of these students had previously completed coursework that introduced them to history,

it was found that they did not take an analytical approach to sources, nor did they consider evidence contrary to their own opinion.

Unfortunately, these studies only provide a general overview of history teachers' knowledge of inquiry methods. It is not clear exactly which of the cognitive processes involved in an inquiry are the most challenging to teachers, or how teachers' use of these cognitive processes is related to their beliefs about the subject. The present study therefore aims to provide a more comprehensive overview of history teachers' knowledge of inquiry, through an analysis based on a process model for inquiry in the history classroom.

3. A PROCESS MODEL FOR INQUIRY IN THE HISTORY CLASSROOM

Inquiry-based learning consists of a sequence of learning activities through which learners attempt to answer questions by exploring and analyzing data (Levy et al., 2013). Finding that inquiries are often complex undertakings (Hmelo-Silver, Duncan, & Chinn, 2007), research, particularly in the field of science learning, has made considerable efforts to reduce complexity by dividing the inquiry process into smaller and logically connected stages, phases or activities that draw attention to specific aspects of scientific reasoning (see e.g. the reviews of Bell, Urhahne, Schanze, & Ploetzner, 2010; Pedaste et al., 2015).

Previous research has indicated that the main activities of an inquiry are in part dependent on the subject (Bransford, Brown, & Cocking, 2000). Even though there is some common ground between inquiries across subjects, history calls upon a distinct form of classroom inquiry, because, as Levy et al. (2013) explain: "Like the scientist, the historical investigator must consider various approaches to a problem, but unlike the scientist, the historian cannot reenact the topic under investigation" (p. 394). Thus, while inquiries in science learning often revolve around model development, through adjusting variables in experiments or simulations (Bell et al., 2010), historical inquiries are primarily concerned with constructing interpretative accounts from incomplete, partial, or even contradictory information sources (van Drie & van Boxtel, 2008).

A process model for inquiries in the history classroom was developed based on a review of studies on reasoning during a historical inquiry, which were published during the past 25 years. The studies that were selected (1) focused on reasoning specifically in history, and (2) did not use the same framework as research that had preceded it. Even though there exist different approaches to historical research, the available research suggests that it is possible to distinguish a number of key processes. Before moving on to an overview of these processes, it is important to point out that, as the model focusses on cognitive processes, it pays less attention to content-related aspects, such as teachers' use of historical terminology and meta-concepts, like causation, change over time, or empathy (for more information, see van Drie &

van Boxtel, 2008). It should also be noted that the processes outlined in the model are in turn influenced by the resources that are available for an inquiry task. These variables are not considered by the model, but have been documented elsewhere, and mainly include: beliefs about knowledge and knowing in history (Lee & Ashby, 2000), knowledge of the topic under investigation (Wineburg, 1998), experience with methods of historical inquiry (Wineburg, 1998), metacognitive abilities (Poitras & Lajoie, 2013), as well as the available information and nature of the sources (Rouet, Britt, Mason, & Perfetti, 1996).

The process model for historical inquiry integrates the cognitive processes uncovered by previous research into five core cognitive processes. Using the original terminology and descriptions used by these studies, Table 1 shows how the findings of this relatively large body of work fit within the five core processes. Moreover, it indicates that, so far, knowledge of the processes involved has been fragmented across different research reports, with some even using the same terms to describe different activities (e.g. the way contextualization is described across different studies). In line with previous descriptions of historical reasoning as a specific form of reasoning that “requires general reasoning skills, but also contains several characteristics that are more specific to this particular domain (van Drie & van Boxtel, 2008, p. 104)”, some of the core processes can be considered as characteristic of history, while others might appear as more domain-general. Although the model’s presentation may suggest a linear sequence, learners can go through processes in the order that is needed, and return to them at any time.

Sourcing. Depending on the questions that are asked, information sources may be incomplete, partial or even contradictory. A first core process, sourcing, therefore centers on determining the nature of a source, by looking at its appearance and origin, to get a better sense of what might be expected in terms of reliability and content. This results in a set of assumptions about what might reasonably be expected from a source. Wineburg (1991a) originally described this process as finding out more about (1) author characteristics and (2) time and place of creation, and others (e.g. Hicks, Doolittle, & Ewing, 2004) later added (3) the type of source as another aspect to consider.

Appraising. Looking more closely at a source’s content, appraising is a second core process that involves a more thorough assessment of the bias and reliability of a source. Assumptions about a source are thus verified or rejected based on the message it conveys. This requires a critical analysis of (1) point of view and intentions of the author (e.g. Wineburg, 1994), (2) coherence of the message, and possible existence of errors (De La Paz & Felton, 2010), (3) evidence given in support of a claim (De La Paz & Felton, 2010), and (4) similarities and inconsistencies across sources, as well as possible explanations for the latter’s existence (e.g. Wineburg, 1991a).

Specifying. As a third core process that directs the search for information, specifying represents an active, focussed approach to information that strives to optimize understanding. More specifically, this involves (1) question-asking, either as a way to delineate the objective of the search (e.g. van Drie & van Boxtel, 2008) or as a way to handle missing information (e.g. Perfetti, Britt, Rouet, Georgi, & Mason, 1994), and (2) activating prior knowledge, for example by drawing on existing knowledge of the topic or making analogies with other time periods (Wineburg, 1998).

Constructing. A fundamental aspect of inquiries in history, represented by a fourth core process named constructing, consists of going beyond the information provided by sources to build a mental model of the past (Perfetti et al., 1994). This is done by (1) selecting and interpreting information that is relevant to the problem statement (van Drie & van Boxtel, 2008), and (2) contextualizing the information, by building a frame of reference containing the chronological, social, and spatial context of the events (e.g. Wineburg, 1998).

Arguing. A fifth core process, arguing, is concerned with reporting the conclusions of an inquiry. Although there is always some degree of uncertainty surrounding claims about the past, their plausibility is heavily determined by the extent to which they are based on sound arguments. In other words, this requires (1) supporting an explanation by formulating arguments based on quotes, general citations or references (Poitras & Lajoie, 2013), and (2) taking possible counterarguments into account (van Drie & van Boxtel, 2008).

4. AIMS OF THE RESEARCH

So far, studies have only provided a general overview of teachers' knowledge of inquiry methods (e.g. Bohan & Davis, 1998; Yeager & Davis, 1996). Further investigation, based on the process model that is outlined above, could make a significant contribution to the current understanding of history teachers' subject knowledge, but also inform the design of teacher training. In the present study, history teachers' knowledge of inquiry methods is explored through an analysis of their performance during an inquiry task. The main research questions (RQ) are:

- RQ 1: To what extent do teachers engage in the core cognitive processes of historical inquiry?
- RQ 2: Which approaches can be identified based on teachers' performance during the task?
 - RQ 2A: What are the exact differences between these approaches to inquiry?
 - RQ 2B: How are teachers' approaches to inquiry related to their beliefs about the subject?

Table 1

Cognitive processes used during a historical inquiry

	Wineburg (1991a) <i>Heuristics historians use during problem-solving</i>	Perfetti et al. (1994) <i>Interpretative skills involved in reading history</i>	Wineburg (1994) <i>Cognitive representation of historical texts</i>
Sourcing	Sourcing: Looking first at the source or attribution of the source (e.g. Who is the author? What are the place and date of the source’s creation?).		Document as event: Understanding the nature of a source, and particularly the circumstances under which it came into being.
Appraising	Corroboration: Comparing important details across sources before accepting them as plausible or likely.	Detecting author bias: Assessing the author’s point of view, by looking at selectively omitted events, attempts at persuading the reader, or the use of slanted or colorful language. Handling inconsistencies among texts: Recognizing and reconciling details that are reported differently across sources.	Representation of subtext – rhetorical artifact: Reconstructing the purposes and intentions behind the document. Representation of subtext – human artifact: Identifying the author’s biases, convictions, and assumptions about the world.
Specifying		Detecting the incompleteness of texts: Dealing with uncertainty by asking for more information on basic details and facts, historical context, and controversial information.	
Constructing	Contextualization: Placing events in a chronological sequence and concrete spaces, and trying to determine the conditions of their occurrence.		Representation of event - Outside: Considering a source’s description of perceptible aspects of an event (e.g. layout of the land, configuration of buildings). Representation of event - Inside Inferring the ‘invisible’ aspects of events described by a source (e.g. intentions, motives, beliefs). Event model: Combining individual representations of events into a cumulative mental model.
Arguing		Resolving conflicting views: Negotiating contradictory views in order to form a personal opinion.	

Table 1, continued

Cognitive processes used during a historical inquiry

	Wineburg (1998) <i>Historians' problem-solving in face of missing background knowledge</i>	Hicks, Doolittle and Ewing (2004) <i>SCIM-C strategy</i>
Sourcing		<p>Summarizing: Examining the documentary aspects of a source (e.g. Who is the author? What type of source is it?)</p> <p>Contextualizing: Locating the source within time and space (e.g. When was the source produced? Why was the source produced?)</p>
Appraising	<p>Social-rhetorical comments: Fleshing out the author's perspective and purpose.</p> <p>Intertextual linkages: Referring back to documents read previously while processing information.</p>	<p>Corroborating: Comparing information across sources (e.g. What are differences and similarities? How can these be explained?)</p>
Specifying	<p>Specification of ignorance: Addressing partial understanding by expressing puzzlement, asking questions or specifying gaps in knowledge.</p> <p>Analogical comments: Explaining events or behavior by drawing comparisons to other historical periods.</p> <p>Historiographic comments: Making connections to what historical writing has found out about the event.</p>	
Constructing	<p>Linguistic comments: Reflecting on the historical meaning of words, terms and phrases.</p> <p>Biographic comments: Reconstructing individuals' life, personal thinking and behavior.</p> <p>Spatio-temporal comments: Situating events in a physical location, and within a chronological sequence.</p>	<p>Monitoring: Reflecting on understanding and progress (e.g. What additional evidence is needed? Which ideas need further defining?).</p>
Arguing		<p>Inferring: Examining the source in light of the historical question being asked (e.g. What is suggested by the source? What interpretations may be drawn from the source?)</p>

Table 1, continued

Cognitive processes used during a historical inquiry

	van Drie and van Boxtel (2008) <i>Framework of historical reasoning</i>	De La Paz and Felton (2010) <i>Historical reasoning strategy</i>	Poitras and Lajoie (2013) <i>Cognitive and metacognitive activities in historical inquiry</i>
Sourcing	Use of sources – evaluation: Evaluating the source in light of the historical question (e.g. trustworthiness, context, point of view).	Consider the author: Examining the author characteristics and the source’s date of creation.	Evaluating the trustworthiness of sources: Looking at the author or type of document to learn whether it provides a reliable account of the event.
Appraising			Corroborating evidence: Making connections between similar and different information.
Specifying	Asking questions: Asking descriptive, causal, comparative or evaluative questions that guide the construction of a historical narrative.	Understand the sources: Reflecting on the source’s perspective, by looking at the values and assumptions underlying the arguments. Look within each source: Determining the trustworthiness of information, by checking for factual errors or missing information, and considering the available evidence. Look across the sources: Comparing sources to find the main ideas that are repeated, but also major differences in ideas, and possible inconsistencies.	Question-asking: Asking about a singular or composite explanation.
Constructing	Contextualization: Interpreting the phenomenon in accordance with the chronological, spatial and social context. Use of sources - selection: Selecting and interpreting information from sources to answer a historical question.		Formulating an explanation: Providing a provisional account of the events under study. Contextualizing evidence: Elaborating on the details that surround the event
Arguing	Argumentation: Putting forward a claim after weighing different interpretations, supporting it with arguments and evidence, and taking counterarguments into account.	Create a more focused understanding: Using the available evidence to decide what is most plausible and what remains open to interpretation.	Gathering evidence: Formulating an argument for or against an explanation through a direct quote, general citation, or specific reference.

5. DESIGN AND METHOD

This section provides more information about the context of the study, participants' background, and the approach that was used to examine teachers' knowledge of historical inquiry. In addition, it offers an overview of the analyses that were conducted, with specific attention to the issue of reliability.

5.1. Context

The present study was part of a larger research project in Flanders (Belgium) on history teachers' familiarity with disciplinary frameworks, which also explored participating teachers' beliefs about the nature of history and inquiry-based learning (see also, Voet & De Wever, 2016). In Flanders, attainment targets for school history stress the development of a basic understanding of disciplinary methods, and regard classroom inquiries as fundamental to reaching this goal. However, in practice, teachers are mostly able to design their own lessons as they see fit. As there are no central exams, but only a quadrennial evaluation of (parts of) a school's program by government inspectors, there is a lot of freedom with regard to curriculum development (for more information on Flemish history education, also see, De Wever, Vandepitte, & Jadoulle, 2011). It is also important to know that, in Flanders, secondary education is based on educational tracking, which groups students, depending on their ability, into four study tracks that contain different curricula (i.e. general, technical, art or vocational education). This system of educational tracking is, however, heavily debated, as studies have indicated that it is detrimental for equality of opportunity for schooling, and instead promotes social segregation between schools (Hindriks, Verschelde, Rayp, & Schoors, 2010).

5.2. Participants

Invitations to take part in the study were sent out to 127 schools in the region of East-Flanders, and were further distributed across schools in other regions by two pedagogical counselors. Only teachers who had at least three years of experience in teaching history were invited to respond, so that all of the participants had had a number of opportunities to further develop their subject knowledge through their work in the classroom. A second restriction was that only teachers in grade 4 of secondary education (average student age: 15-16 years) could participate. The reason was that inquiry methods tend to become more prominent in the curriculum from the second half of secondary education onward, and that picking a specific grade would allow to select teachers with more similar backgrounds. The call further explained that teachers would be asked to perform a task related to history, but did not contain any details, to avoid dissuading certain teachers from participating. Registration was closed when

more than 20 teachers had replied, after 12 days, and teachers could no longer register for the study from then on.

On average, teachers were 43 years old (SD: 12 years) and had about 15 years of experience (SD: 9 years) in teaching history to secondary school students. Five teachers held a bachelor degree of a three-year teacher training at university college, with a mainly practical focus on learning to teach history and two other subjects in the lower and middle grades of secondary education (grade 1-4). Fourteen teachers had obtained a master degree of a four-year history program at university, which had introduced them to academic history. Finally, one teacher held a master degree of a four-year university program in political sciences, and had thus not received specific training in history. All fifteen university graduates had later followed a one-year teacher training program, which certified them to teach their subject in the middle and higher grades of secondary education (grade 3-6).

Depending on the schools they worked in, these teachers instructed history in different study tracks: 10 worked in general education tracks, mainly consisting of theoretical courses, 6 worked in technical education tracks, offering more technical and practical courses, and 4 worked part-time in both of these study tracks.

5.3. Task

Similar to earlier research (e.g. Wineburg, 1991a; Yeager & Davis, 1996), an inquiry task was designed to elicit and capture teachers' historical reasoning. In keeping with the central role of the use and framing of evidence in historical inquiry, the task required teachers to analyze historical information to evaluate a problem statement about an event in English medieval history: the Peasants' Revolt of 1381. At that time, a combination of restrictive labor laws and oppressive taxes drove a large part of England to rise against central and local authority. The name of the revolt has been much discussed by historians, as some members of urban communities and higher classes also participated in the uprising (e.g. Dobson, 1970; Dyer, 1994). In line with this larger academic debate, the task's instructions presented the following problem statement: 'Do you think the name of Peasants' Revolt is appropriate for the uprisings of 1381?' This problem was first of all selected because solving it required the participants to find and weigh answers to several questions (e.g. What are 'peasants'? Who were the first instigators? How did the revolt spread? What manner of people participated? What was each group's motive for doing so?). A second reason for choosing this specific problem was that it allowed to partly control the cognitive resources that teachers had available for this task. Flemish history textbooks rarely mention the Peasants' Revolt, and even if they do, only mention it very briefly. As such, it was assumed that all teachers would start

the task with little prior knowledge of the events that were under investigation (a hypothesis that was not contradicted by the comments teachers made during the task).

5.4. Materials

Teachers received four documents on the Peasants' Revolt of 1381, and were not allowed to look up additional information. This allowed to further control the resources that teachers had available, but also means that teachers' general information search strategies (e.g. formulating key words, selecting sources) were not investigated by the present study. In order to provide an authentic task, the task materials included a variety of information sources that historians could also encounter while conducting a search on the topic. Furthermore, all of the information sources provided different, and sometimes even opposing, views on the problem statement. The result was a challenging task that required teachers to construct a coherent account from different pieces of information, and thus elicited the use of the core cognitive processes that were outlined by the process model presented above. The final selection included fragments from: the English Wikipedia article on the Peasants' Revolt, a contemporary chronicle by Benedictine monk Thomas Walsingham, and two historical monographs. The first monograph was written by Richard Dobson (1970), an Emeritus professor at Cambridge University, and the second one by Christopher Dyer (1994), an Emeritus Professor at the University of Leicester. All four texts were shortened to fit on one page and translated into Dutch. A header was added to each document, providing more information about the author and date of production. The complete task, including all sources, can be found within appendix 1.

5.5. Data collection

Each teacher worked on the task during an individual session, which had no time limit, but generally lasted up to approximately one hour. At the start of each session, teachers were assured that the data regarding their performance would not be used as part of any professional evaluation, and would be kept confidential. Teachers' reasoning was captured using think-aloud protocols: they were asked to say out loud whatever thought came to their mind during their work on the inquiry task. According to previous work on the study of reasoning, think-aloud protocols outperform retrospective methods by offering more insights in decision-making processes (Kuusela & Paul, 2000) and are preferable over other concurrent methods, as there are no interruptions, questions or suggestive prompts (Van Someren, Barnard, & Sandberg, 1994). Moreover, thinking aloud becomes routine after a few minutes, and is therefore assumed not to interfere with task performance (Ericsson & Simon, 1993). When teachers had been silent for a considerable time, they were generally prompted with:

'What are you thinking?' or 'What are you doing?' During the task, teachers were allowed to mark passages and make notes on the documents. They did not have to write out their conclusions in full, and were invited to present them verbally instead.

5.6. Pilot study

A pilot study was conducted with three other teachers, in order to evaluate the design of the task. The experiences from this pilot study helped to optimize the task and instructions. For instance, it was found that teachers often forgot to articulate their thoughts when they were allowed to read the documents in silence. In contrast, reading out loud appeared to trigger teachers to automatically verbalize their thoughts. The main study therefore required teachers to read all texts out loud.

5.7. Analysis

Teachers' think-aloud protocols were captured using a digital voice recorder, and subsequently transcribed. All transcripts were coded with Nvivo 10, using a content analysis approach (Neuendorf, 2002). The process model for inquiries in the history classroom was adapted into a coding scheme, which is presented in Table 2. Next to the codes, this table presents a short description of each core process and the underlying cognitive activities, as well as examples retrieved from the think-aloud protocol of teacher 4. Using the coding scheme, all transcripts were segmented into thematic units, consisting of phrases, sentences or paragraphs that conveyed one particular thought. An excerpt of a coded think-aloud protocol can be found in appendix 3. After completing the analysis, frequencies of codes were calculated for each individual teacher, but also across all teachers. Teachers' individual results were then transformed into radar charts, as visualizations of qualitative data is often able to facilitate their interpretation (Miles & Huberman, 1994).

5.8. Reliability

The final analysis scheme counted 15 different codes, of which 13 corresponded to the 5 core cognitive processes and 2 were used to map general (meta-)cognitive behavior (e.g. recapitulating the problem statement, checking progress) and off-task behavior (e.g. talking about classroom practices, social comments). The latter two were included in the analysis of inter-coder reliability, but not in the main analyses, which focused on teachers' use of the core cognitive processes. Using the coding scheme, the first author coded all 20 think-aloud protocols. A second coder was then instructed in the use of the coding scheme, and coded 5 think-aloud protocols as part of a training session during which she received feedback on her

Table 2

Overview of the coding scheme

Cognitive processes and corresponding codes		Example
Sourcing - determining the nature of a source		
SO1	Looking at the author's background and credentials.	This one is also a professor, yes.
SO2	Looking at the period of the source's production.	1411. There are 30 years between the events and the author's death.
SO3	Looking at the type of the source.	Why the English version of Wikipedia? Does it present an English perspective?
Appraising - assessing the contents of a source		
AP1	Evaluating the author's perspective	He is obviously biased against the peasants.
AP2	Evaluating the author's reasoning	Laborers asked for freedom... Then those people were really serfs.
AP3	Evaluating the evidence	This is based on law enforcement records, made by the government.
AP4	Corroborating information	The previous text mentioned taxation, and taxes are also present here.
Specifying - actively processing information		
SP1	Asking questions and identifying missing information	What is Wat Tyler [rebel leader]? Is it a name, is it a place.
SP2	Activating prior knowledge	Military operations in France. That's probably the Hundred Years' War.
Constructing - building a mental model of the past		
CO1	Retrieving information about the problem	Most rebels were peasants or craftsmen. So they were affluent peasants.
CO2	Situating events in their context	The revolt had an economical basis, with taxes and labor shortage.
Arguing - using evidence to support a claim		
AR1	Presenting arguments in support	It's not a good name, as only a part of the peasants rose up in revolt.
AR2	Rebutting counterarguments	Although it was a problem of the rural community, it is not a good name, because others joined later on.

Note. Examples were retrieved from the transcript of teacher 4.

coding. Afterwards, the second coder independently coded the remaining 15 think-aloud protocols (i.e. 75% of the data). The two sets of independent coding for these 15 think-aloud protocols were used to calculate segmentation agreement (for more information, see Strijbos & De Laat, 2006) and coding reliability. The 'irr' package in R.3.1. was used to conduct the reliability analysis. The results indicate that proportion agreement for segmentation was 89.1%, which is well above the 80% threshold advocated by Riffe, Lacy and Fico (1998). With regards to coding reliability, a value of .79 for Cohen's Kappa indicated excellent agreement beyond chance (Banerjee, Capozzoli, McSweeney, & Sinha, 1999). Differences in coding were discussed afterwards, with each of the coders explaining his or her interpretation, until final agreement was reached.

5.9. Additional data

After completing the inquiry task, all teachers, save for teacher 19, took part in a semi-structured interview on their beliefs about the subject. This interview study, of which the main findings have been reported elsewhere (see Voet & De Wever, 2016) explored teachers' beliefs about (1) the nature of history, as well as (2) inquiry in the classroom. Beliefs about the nature of history were investigated using questions drawn from academic debate within history, such as: "Is there a difference between a historical theory and an opinion?". On the other hand, beliefs about inquiry in class were examined by probing teachers' ideas about the role of disciplinary thinking in school history, including: "Are there similarities between school history and historical research?" In order to decrease the chance of a social desirability bias occurring, the interviewer explicitly stated that he was interested in teachers' personal opinion, and that, as such, there were no right or wrong answers. The assurance that all data would be kept confidential also helped to reassure teachers that they did not need to be afraid to share their ideas.

After transcription, the interviews were analyzed through a process of open coding, which divided the data into units of meaning, corresponding to a single theme. This analysis resulted in a number of sub-categories for beliefs about the nature of history and inquiry (e.g. beliefs about the nature of history covered sub-categories like: nature of knowledge, research methods and procedures, and criteria for evaluating knowledge). The contents of these sub-codes were then used to create two data matrices (see Miles & Huberman, 1994) that contained a summary of the findings for each participant. Based on the contents of these matrices, each teacher case was assigned a profile that positioned it on two axes, which are described in Table 3: one included three types of epistemological beliefs, whereas the other contained three types of instructional beliefs that surfaced during data analysis.

To check for inter-rater reliability, each of the transcripts was reviewed by a second researcher, who independently attributed a profile to each teacher case. Percent agreement with the original analysis was 81.82% (18 out of 22 cases) for beliefs about the nature of history, and 90.91% (20 out of 22 cases) for beliefs about inquiry. In both cases, the results thus exceed the threshold of 80% that was proposed by Riffe et al. (1998). In cases where the analyses disagreed, both researchers presented their arguments and discussed the case until agreement was reached.

Table 3

History teachers' beliefs about their subject

Beliefs about the nature of history		Beliefs about classroom inquiry	
<i>based on Maggioni, VanSledright and Reddy (2009)</i>			
Type	Description	Type	Description
<i>Criterionalist</i>	Personal choice and judgment play an important role in conducting historical research and forming conclusions, but clear criteria exist to judge the plausibility of accounts.	<i>Investigating</i>	Inquiry is about solving problems, by generating questions, analyzing information and forming arguments.
<i>Objectivist</i>	Interpretation does or should not play a role in history, other than filling up gaps between sources. History is akin to a quest for the truth about the past.	<i>Evaluating</i>	The goal of inquiry is learning how to critically evaluate information, in order to determine which information is correct.
<i>Subjectivist</i>	Historical accounts should be based on evidence, but it is not possible to say which explanation is more plausible, as this is ultimately a matter of opinion.	<i>Understanding</i>	Inquiry activities are reduced to processing and comprehending information that further explains the lesson topic.

Note. This table was adapted from the study by Voet and De Wever (2016)

6. RESULTS

In this section, the results related to the two research questions are discussed separately. The first subsection presents an overview of the cognitive processes that teachers used during the inquiry task, as well as the extent to which individual teachers used them. In the second

subsection, these results are used to construct a typology of teachers' approach to historical inquiry, which is then related to their beliefs about the subject.

6.1. History teachers' use of cognitive processes during an inquiry

After all transcripts had been coded, means were calculated for the number of times each of the codes surfaced in the think-aloud protocols of the complete group of teachers. Table 4 presents the results, and suggests that some cognitive processes took a more prominent place in teachers' thinking compared to others.

Table 4

Means and proportions of codes in teachers' think aloud protocols

Cognitive process	M (SD)	%
Sourcing	7.5 (4.07)	17.81
SO1 Looking at the author's background and credentials.	2.75 (1.86)	6.53
SO2 Looking at the period in which the source was produced.	1.8 (1.4)	4.28
SO3 Looking at the type of the source.	2.95 (2.37)	7.01
Appraising	11.6 (8.04)	27.55
AP1 Evaluating the author's perspective.	2.05 (1.93)	4.87
AP2 Evaluating the author's reasoning.	1.95 (2.06)	4.63
AP3 Evaluating the evidence.	3.8 (3.93)	9.03
AP4 Corroborating information.	3.8 (3.19)	9.03
Specifying	7.6 (8.29)	18.05
SP1 Asking questions and identifying missing information.	4.15 (5.88)	9.86
SP2 Activating prior knowledge.	3.45 (3.24)	8.19
Constructing	11.3 (7.93)	26.84
CO1 Retrieving information about the problem.	8.10 (5.37)	19.24
CO2 Situating events in their context.	3.20 (3.66)	7.6
Arguing	4.1 (3.42)	9.74
AR1 Presenting arguments in support.	2.1 (2.86)	4.99
AR2 Rebutting counterarguments.	2 (1.59)	4.34

In what follows, each of the five cognitive processes is further described within the context of the task, using quotes drawn from the think-aloud protocols.

Sourcing. When teachers tried to get a better sense of a source, the author's characteristics were a first aspect they looked at. For instance, upon reading that a source 4 was written by a professor at the universities of York and Cambridge, teacher 3 noted that:

'This is a work by a leading authority, is what I am thinking now'. A second aspect that teachers paid attention to when sourcing, was the time when a source was produced. Before reading source 3, teacher 9 compared its date to that of source 4 and stated: "This is a work that was written in 1994, so it is more recent. I do not mean to say that historical works from the 1970's are bad, but it is possible that new material has surfaced, which sheds a new light on the past." Finally, teachers also looked at the type of the source. As she started with source 1, teacher 18 said: "I see Wikipedia over there, which makes me a little bit suspicious, and I start thinking I will get a heap of information that does not necessarily have to be correct. But I will read it anyway."

Appraising. When evaluating a source, a first criterion that teachers took into account was the author's point of view, but mainly when this was stated explicitly. For instance, after teacher 16 had read source 2's description of the rebels as "the originators and first causers of these evils", he remarked that: "There is a strong bias in the second source, although it does give a good idea of how the clergy, or at least a part of it, regarded the revolt." Second, teachers evaluated the line of reasoning presented by each account, and either voiced agreement with the author's conclusions, or remarked upon some seemingly faulty line of reasoning. When teacher 7 read source 4's conclusion that most rebels were peasants and craftsmen, when hitherto, the text had only described the rebels' property in terms of its monetary value, he was momentarily confused: "What? How can you... How do you reach this conclusion? This one is hard to follow." Third, teachers investigated the evidence that authors presented, including the references presented by secondary sources. In this way, teacher 10 discovered that: "Richard Dobson [author of source 4], he refers to Walsingham [author of source 2], among others, but probably to provide a description. Let us see where he uses this. [...] Ah yes, he uses Walsingham to write about the important role that poor priests played in spreading discontent." Finally, teachers tried to corroborate information and to explain inconsistencies that they encountered when doing so. For instance, at some point, teacher 2 related that: "I just read something about some [of the peasants] asking for their freedom [in source 1]. [...] But here [source 3], they talk about a large group of peasants, or persons, rebels, who held their own lands. But if they owned their lands, they must have been free, I think. So, this does not really match... But this [source 1] is more general, while this [source 3] is more... A more focused study, I think, yes."

Specifying. To direct their search for information, teachers first of all engaged in question-asking. Some teachers, such as teacher 5, formulated several global research questions: "So, central question. Did the peasants join the revolt and was there concerted action? Possible explanations? Aimed against whom? Course? Results? The classics, really." In addition, teachers kept their eyes out for missing information, which prompted additional question-

asking. For example, when teacher 6 read that the revolt was the best-documented uprising to occur during the middle ages, he made note to: "Investigate why so much information was kept. Who did that?" Second, teachers called upon their prior knowledge to help them with interpreting the sources' content. Among these cases is that of teacher 18, who explained that a number of analogies could be made with other historical events: "It somewhat makes me think of it as a precursor of the French Revolution [in 1789]. You could also link it to what happened here during the Battle of the Golden Spurs [in 1302]. In general, it think it is one of the waves that started near the end of the middle ages, where you see the people becoming more conscious about having an own identity."

Constructing. In their attempt to construct a mental model of events, teachers were particularly observant of information related to the problem statement. More specifically, teachers appeared to build a model of the information that was available in each separate source, and often held out on drawing their own conclusions until they had processed all of the information. For example, after teacher 13 read source 1, she summarized that: "The rebels were a diverse group, consisting of different social classes, with each having their own goal", while after reading source 2, she concluded that: "According to this source, it was actually a revolt of peasants. [...] Yes, because the rebels were mainly peasants and laborers." Although the teacher remarked that these claims were contradictory, she did not consider weighing them against one another until she was in the process of forming her own conclusions. Second, teachers also used the information in sources to situate the events of the revolt within a historical context. In one such example, teacher 20 spent a considerable amount of time reconstructing the start of the revolt, because she could not figure out how labor legislations could possibly have provided an undercurrent for the revolt: "[The labor laws were instated around] the 1350's. But I don't see how that was another reason for the revolt. So that would have lasted until 1381? That seems like, yes... I would not really..."

Arguing. As part of formulating their conclusions, the teachers presented arguments in support, and attempted to rebut counterarguments. Overall, counter-arguments were rebutted in two ways. Teachers sometimes refuted counterarguments by arguing that they were based on faulty reasoning, but the commonly used approach was to reframe these counterarguments, by adding information or adopting a different perspective. Among the examples is that provided by teacher 5, who argued that "It started as a peasants' revolt, but it ultimately became more than just that", and then started to defend his claim by explaining that: "If you look at the ones revolting, then it is logical that peasants are the largest group, because there were a lot of them on the countryside. [But] it then spread from the countryside to the cities. First London, and then to... [...] It escalated, it seems to me, and other groups also joined."

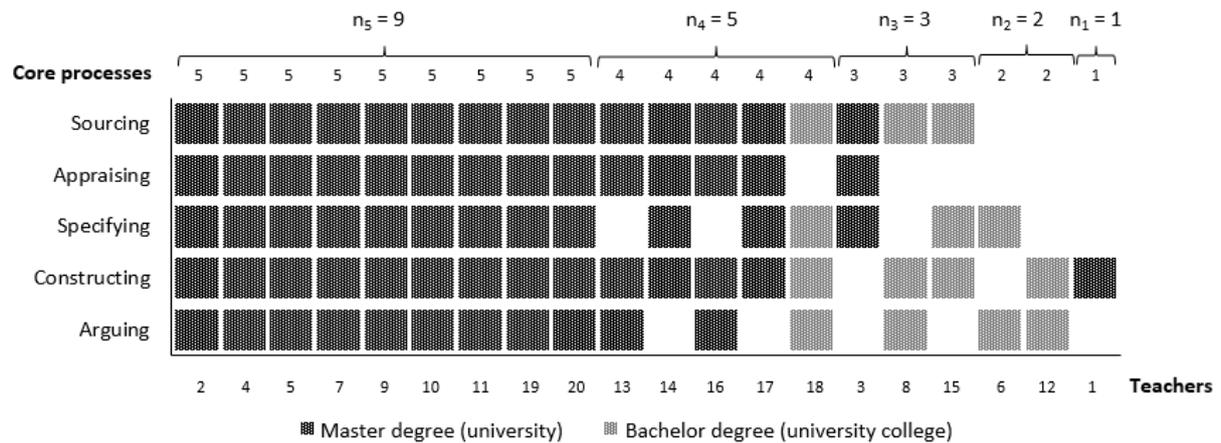


Figure 1. Teachers' use of core cognitive processes.

The analysis also explored the extent to which individual teachers used the five core cognitive processes during the inquiry task. Use of a cognitive process was operationalized as a minimum of activity at the very least. As such, it was decided that teachers had not used a cognitive process if: (1) the count of two or more codes (see table 3) belonging to the same cognitive process was 0 (meaning that two or more of these underlying cognitive activities were absent in the think-aloud protocol), or (2) the count was 0 for one code, and not higher than 2 for the other codes belonging to the same process (meaning that the latter were also scarcely present in the think-aloud protocol). One exception to this rule was the core process of 'arguing', where use of the cognitive process was defined as having considered and rebutted at least one counterargument. Figure 1 presents an overview of the results.

As the figure indicates, 9 teachers (n₅) used all five cognitive processes during the inquiry task. The other 11 teachers (n₄ to n₁) did not use one or more of these cognitive processes. The results indicate that teachers' initial training might be able to explain some of these differences, as each of the 9 teachers who used all cognitive processes had obtained a master degree at university. However, teachers' initial training does not appear to be the sole factor related to teachers' use of the core cognitive processes during the inquiry task, since another 6 teachers with a similar degree did not use all of them. The analysis also considered teachers' age and teaching experience, but these did not appear to be related to their performance.

Looking at the 11 cases of teachers who did not use all cognitive processes, the processes that were most often overlooked by teachers are: specifying (n=5), arguing (n=5), and appraising (n=6). It thus seems that some teachers are less familiar with these cognitive processes than those of constructing (n=2) and sourcing (n=3). The results also suggest a further divide between a first group of 8 teachers (n₄ and n₃) who still tried to assess

sources through either sourcing or appraising, and a second group of 3 teachers (n_2 and n_1), who read through all of the sources without doing so.

6.2. A typology of history teachers' approach to inquiry

Based on the results shown in figure 1, a distinction can be made between three distinct approaches to inquiry: an integral, fragmentary and cursory approach. These approaches indicate that differences between teachers were not simply a matter of more or less historical thinking in general, but rather of which cognitive processes they did or did not use during an inquiry.

Three illustrative teacher cases (teacher 4, 3 and 12) were selected to illustrate how each approach might manifest itself during an inquiry task. The main purpose of these examples is to explain the typifying characteristics of each of the three approaches to inquiry, but there are, of course, differences in the exact ways that teachers within the same category completed the inquiry task (see figure 1). This is especially the case for fragmentary or cursory approaches, where the use of certain cognitive processes differed across teachers.

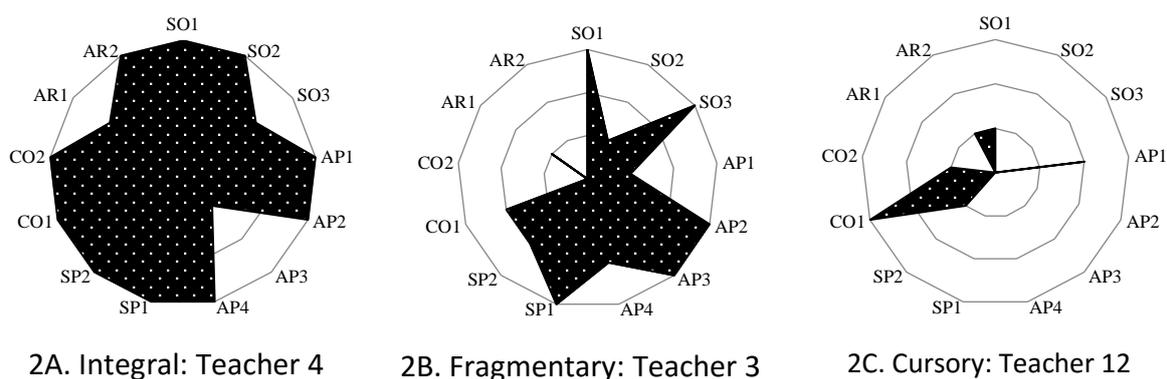


Figure 2. Three distinct approaches to inquiry (see table 3 for the legend of the codes of the cognitive processes depicted in the radar charts).

Figure 2 provides more information on these three teachers' performance, with radar charts illustrating the number of times (i.e. 1, 2 or > 2) each code was counted (for an overview of all teachers' radar charts, see Appendix 2). Most importantly, these cases illustrate that, compared to an integral approach, a fragmentary or cursory approach drew less on a critical analysis of information sources, or did not provide a conclusion that incorporated both arguments and counterarguments.

Integral approach. Teachers with an integral approach used each of the five core cognitive processes. As a consequence, radar charts of these teachers' performance, such as the one presented in Figure 2A, approach the shape of a circle.

The way in which teacher 4 carried out the task implies that he had a good understanding of what a historical inquiry involves. Before he started reading, this teacher took a quick look at each source, and summarized: “[Source 1] Wikipedia. Internet encyclopedia. Yes, we know that. Also anonymous, so with question marks hanging over it. Yes. [Source 2] Chronicler. Ah, this one is a contemporary. [Source 3] University. [Source 4] And this is also a professor, yes.” After getting a sense of each source, teacher 4 began reading source 1, and did so in an analytical manner. First of all, he asked questions and tried to activate his prior knowledge: “What is Wat Tyler [rebel leader] Is it a name, a place? I don’t know yet, but I do want to know.” He also constructed a mental image of the way events were depicted in the source, and (later) critically compared this to other sources: “So here [source 1] they are mainly speaking of laborers. [...] And those are probably farmers and serfs. Maybe that part is not correctly translated, but I don’t know that. Because I don’t know their social status. But laborers can refer to all kinds of people. Source 3 suggests, based on judicial records, that they are mainly tenants. But mainly the middle... [class]”. Teacher 4 kept using this analytical approach as he read through the other sources, and ultimately gave an elaborate conclusion, which counted a number of arguments and counterarguments, and integrated information from different sources: The main idea of his conclusion was that: “The main problem... The core of the problem is the shortage of laborers and the friction between the nobility, manorial lords, and their serfs and free peasants. But I also think that there is a general malaise in society, which makes them revolt. I draw this conclusion mainly from what the people from London do. That is to say, they support the revolt.”

To conclude, the case of teacher 4 shows how an integral approach manifests itself as an analytical approach to information, which takes different perspectives into account. However, even when using all cognitive processes, it was still possible for teachers to make factual errors. For example, teacher 19 confused King Richard II with Richard I, and then surmised that the taxes preceding the revolt had been used to finance the third crusade, which thus made him situate the events in a historical context that had actually preceded them by 200 years.

Fragmentary approach. Teachers with a fragmentary approach to inquiry did not use all cognitive processes, but nevertheless tried to determine the value of each source through sourcing, appraising, or both. As Figure 2B demonstrates, radar charts corresponding with this teacher type generally show a leaf-shaped form.

As teacher 3 was reading through the sources, it became clear that he was very focused on evaluating each source. In particular, he was very critical of the reasoning and evidence presented in a text, regardless of its author’s status. For example, as teacher 3 read the conclusion of source 1, he disagreed and noted that: “the fact that support is given by a

number of people that are not peasants does not mean that it cannot be called a Peasants' Revolt." Similarly, he later criticized the reasoning in source 3: "[upon reading that the gentry scarcely took part in the revolt] I am thinking about this claim, because that... They seem to assume, or know this. That is what I am asking myself right now. [...] They are saying that rebels from the group of country squires were scarce, but where, where is the evidence?" On the other hand, however, this teacher seldom summarized information from the documents, and did not make comments indicating that he was trying to situate the events in a historical context. In the end, teacher 3 reviewed his evaluation of each source, and concluded that: "I am inclined to agree with source 4, and therefore to say that 'Peasants' Revolt' is an incorrect name for the English revolt of 1381, because the study of professor Dobson indicates that, apart from peasants, craftsmen, priests and the gentry were also involved in the revolt." He did not take information from other sources into account, nor did he consider possible counterarguments.

Although he did not use a number of the core cognitive processes, the case of teacher 3 indicates that teachers with a fragmentary understanding nevertheless understand that a critical evaluation of source information makes up an important part of a historical inquiry. However, the fact that they overlooked a number of cognitive processes generally resulted in a less complete analysis of information or an account that lacked further substantiation

Cursory approach. Teachers showing a cursory approach appeared to have little familiarity with historical inquiry, and did not use most of the core processes, including sourcing and appraising. Therefore, these teachers' radar charts, of which Figure 2C is an example, are mostly blank.

As teacher 12 started reading the sources, it quickly became evident that she read through all of the information without critically analyzing it. Most of her thinking seemed to focus on the retrieval of information for solving the problem. This resulted in comments like: "This has little to do with peasants, although, maybe it does." or "Wait, I forgot something. The laborers asked for higher wages and less work. That may yet be useful." When teacher 12 presented her conclusion, she did not refer to information within the sources, but instead stated that: "The peasants took the lead in the revolt, or others got them as far as to start a revolt, if I may say it that way. They were manipulated. They were, without actually realizing it, doing the dirty work for others." This conclusion was remarkable, as none of the information sources suggested that as much had happened. Unfortunately, teacher 12 did not further substantiate her claim, so it was unclear how she had actually reached this conclusion.

In short, the case of teacher 12 illustrates how teachers with a cursory approach appear to have little familiarity with a historical inquiry. These teachers did not engage in an analytical

inquiry methods. On the other hand, the graph also suggests that some of the teachers with a fragmentary approach actually did consider elaborate inquiries, focused on 'investigating' information sources to answer a problem statement about the past. It is furthermore interesting that teachers with a cursory approach did not turn up in the latter category of beliefs about classroom inquiry.

7. DISCUSSION

In order to investigate history teachers' knowledge of inquiry, a process model was developed for inquiry in the history classroom. Although earlier research had already described these processes, knowledge of them was found to be fragmented across different research reports (see the overview in table 1). The present study contributes to the theory on inquiry in the history classroom by constructing a frame that integrates the findings from previous work. This work revealed five *core cognitive processes*: sourcing, appraising, specifying, constructing, and arguing.

The finding that less than half of the teachers within the sample used each of these cognitive processes during an inquiry task provides additional evidence for the claim that not all history teachers may be competent in historical inquiry (Bohan & Davis, 1998; Yeager & Davis, 1996). Three distinct approaches were identified, which indicate that differences in teachers' performance during an inquiry are not simply a matter of more or less historical thinking in general, but rather of the cognitive processes that they do or do not use. An *integral approach* corresponds to use of all five core processes, suggesting a strong knowledge of historical inquiry. A *fragmentary approach* indicates that, although teachers did not use all cognitive processes, they still paid specific attention to assessing the content or value of sources through sourcing or appraising. Finally, a *cursory approach* refers to cases where most cognitive processes, including sourcing and appraising, were not used, and teachers read through the documents without adopting an analytical stance. This typology resembles that of Yeager and Davis (1996), although the more detailed analysis of the present study now offers a number of clear criteria for making a distinction between teachers. Furthermore, the results also show that a fragmentary approach to inquiry can take different forms, depending on the cognitive processes that are overlooked. This finding therefore nuances the previous study's description of such an approach as a preoccupation with sources' accuracy.

Next to this, the results suggest that part of the differences in teachers' performance might be related to their training prior to the start of their career (McDiarmid, 1994; Yilmaz, 2010). More specifically, it was found that all 9 teachers with an integral approach held a master degree of a training program that had introduced them to academic history (with the exception of teacher 19, who had followed a political sciences program). However, next to 5

teachers holding a bachelor degree of a more practically oriented teacher training, 6 other teachers with a master degree did not use all cognitive processes during the task. This finding suggests that other factors are also at play here. Assuming that teachers holding the same degree started their career with a similar knowledge base, it would be interesting to know why some teachers' knowledge of inquiry seemingly faded as they started teaching history.

Furthermore, the finding that there was no clear pattern in the relation between teachers' beliefs about the subject and their approach to inquiry, seems to suggest that beliefs about history exist relatively separate from one's knowledge of inquiry methods. Although the lack of such a pattern should be interpreted with caution because of the small sample size, it does echo earlier findings that even teachers with an elaborate knowledge of inquiry methods sometimes choose not to teach their students about those methods (Barton & Levstik, 2003)

Finally, there remain a number of limitations to the present study. First of all, the present study mainly investigated counts to determine whether teachers had or had not used a cognitive process. Although the criteria for this decision were not arbitrary, they are not absolute either, as there is some room for discussion as to what actually constitutes 'use' of one of the core cognitive processes. Future research could further investigate this issue, by for example looking into other measures of engagement in the core cognitive processes of historical inquiry.

Second, the use of the process model for historical inquiry resulted in a focus on the extent to which a number of core cognitive processes were used during the inquiry, rather than content-related aspects, such as factual accuracy, or the use of certain terminology or meta-concepts. The finding that teachers who used all cognitive processes could still make factual errors is not necessarily a cause for concern, however, as earlier research (e.g. Wineburg, 1998) already indicated that it is not abnormal for confusion or errors to occur during an inquiry, nor are these automatically disastrous to its outcomes. On the other hand, future research investigating the use of historical terms and meta-concepts during an inquiry could provide a valuable addition to the process model, as previous work suggests that teachers' understanding of this domain-specific vocabulary in part determines whether and exactly how they engage in each of the core cognitive processes (van Drie & van Boxtel, 2008).

Related to this, a third limitation is that the present study mainly focusses on teachers' use and framing of evidence, given its central role in history and historical inquiry (Monte-Sano, 2010). Processes that precede this task, such as the formulation of a problem statement, or the search for information, were not investigated. Future research that looks further into this matter could therefore complement the process model outlined by the present study.

A fourth limitation is that the present study used a single task to measure teachers' knowledge of historical inquiry. Although the emergence of the core cognitive processes

across findings from different studies makes it seem likely that teachers would use the same approach throughout different inquiry tasks, the question still remains whether different task sets might elicit different reasoning patterns in the same participant, or yield consistent results.

A fifth limitation, which is characteristic to think-aloud protocols, is that teachers who did not use certain cognitive processes, may still have known about them. Research has shown that the same abstract knowledge can have both declarative and procedural embodiments (Anderson, 1993). In other words, some teachers may be able to give a factual description of inquiry methods, while they are unable to execute these in practice. Future research could investigate whether this is indeed the case by comparing think-aloud protocols to other measures, such as knowledge tests or classroom observations.

Finally, it may also be possible that closing the study's registrations after the required number of teachers had responded introduced a sampling bias. It is not unthinkable that the first replies came from highly motivated teachers, who might have been more familiar with inquiry methods, even though the results do not indicate this was the case.

Despite these limitations, the present study contributes to the literature a process model of inquiry for the history classroom and typology of teachers' approach to inquiry, which can provide a starting point for future research.

8. IMPLICATIONS AND FUTURE RESEARCH

Finding that knowledge about historical inquiry has been fragmented across different research reports, the present study offers a process model of historical inquiry that integrates the findings of previous work into five core cognitive processes. This model may help to overcome the confusion caused by the existence of multiple frameworks emphasizing different aspects of historical reasoning, and gives both educators and researchers a clear overview of cognitive processes that are fundamental to historical inquiry. An important limitation of the model, however, is that, given its focus on cognitive processes, it pays less attention to content-related aspects. Further investigations of teachers' use of historical terms and meta-concepts could therefore offer a valuable addition to the model, as this may reveal further differences in teachers' reasoning, or help to explain why some do not engage in certain core cognitive processes.

Equally important, however, are the implications that the findings hold for research on the training of history teachers. The finding that more than half of the teachers did not use all five core cognitive processes during an inquiry, indicates that a significant number of teachers may not have strong knowledge of historical inquiry. This gives rise to some concern, as researchers have made the case that understanding historical inquiry is fundamental for

being able to teach it to students (Martin & Monte-Sano, 2008). Even though curriculum materials may go a long way in supporting teachers to organize inquiries (Davis & Krajcik, 2005), it can be argued that teachers still need sufficient knowledge of inquiry to be able to adopt a reflective approach toward the use of these materials. The main question thus appears to be how teacher training can further develop teacher candidates' knowledge of inquiry in the history classroom.

The finding that all teachers demonstrating an integral approach to the historical inquiry had followed a four-year program on academic history, is in line with earlier research suggesting that courses introducing teachers to history's disciplinary frameworks may contribute toward the development of their knowledge on inquiry in the classroom (Bain & Mirel, 2006; Martin & Monte-Sano, 2008). In this light, the process model presented in this study offers an instructional tool that can contribute to a comprehensive training program. An approach that has student teachers use the process model to investigate think-aloud protocols of student work during inquiries, or their own observations during inquiries in the classroom, could significantly increase their understanding of classroom inquiries. More specifically, this could help student teachers to (1) become more familiar with the core cognitive processes involved in a historical inquiry, (2) make a more systematic assessment of thinking during inquiries, and (3) get a better sense of students' thinking during inquiry, as well as the errors common to their work.

Finally, the finding that teachers' beliefs about the subject seem to exist relatively separate from their knowledge of inquiry, suggests that teacher training programs should aim to cover both of these topics, as growth in one area does not necessarily seem to run parallel with that in the other.

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10. APPENDIX 1: INQUIRY TASK

10.1. Task description

Is the 'Peasants' Revolt' an appropriate name for the English uprisings of 1381?

In 1381, England was witness to a great and violent revolt, which has traditionally been described as the 'Peasants' Revolt'. There is, however, a lot of discussion about this name for the revolt. You have access to four (fragments) of information sources that provide more information on the revolt. Use these sources to form your own conclusion: Do you think the name of 'Peasants' Revolt' is appropriate for the uprisings of 1381? It is important that you also explain on what basis you draw this conclusion. You can use the space below to make notes.

10.2. Source 1. Wikipedia (English version), *The Peasants' Revolt*

About the source: Wikipedia is an online encyclopedia, which is maintained by people all over the world. Everyone can contribute to Wikipedia, even anonymously.

The Peasants' Revolt, Tyler's Rebellion, or the Great Rising of [1381](#) was one of a number of [popular revolts in late medieval Europe](#). Tyler's Rebellion was not only the most extreme and widespread insurrection in English history but also the best-documented popular rebellion ever to have occurred during medieval times.

The Poll Tax. The revolt was precipitated by heavy-handed attempts to enforce the third [poll tax](#), first levied in 1377 supposedly to finance military campaigns overseas [1]. The third [poll tax](#) was not levied at a flat rate (as in 1377) nor according to schedule (as in 1379); instead it allowed some of the poor to pay a reduced rate, while others who were equally poor had to pay the full tax, prompting calls of injustice. The tax was to be paid by every man and woman older than 15 years [2].

Labour shortage. The [Black Death](#) that ravaged England in 1348 to 1350 had greatly reduced the labour force, as a large part of the population had died [3]. As a consequence, the surviving labourers could demand higher wages and fewer hours of work, and some even asked for their freedom. They often got what they asked for: the lords of the manors were desperate for people to farm their land and tend their animals. Then, in 1351, King Edward III summoned parliament to pass the [Statute of Labourers](#). The statute attempted to curb the demands for better terms of employment by pegging wages to pre-plague levels and restricting the mobility of labour. Compliance with the new law was strictly observed; labourers or lords who failed to observe it were punished [4]. The enforcement of the new law angered the peasants greatly and formed another reason for the revolt.

Rebels. Despite its name, participation in the Peasants' Revolt was not confined to serfs or even to the lower classes. The most well-known leader, Wat Tyler, was, in fact, not a peasant. Other leaders include Jack Straw, John Wrawe, and John Ball. John Wrawe "led the peasants of Essex," and John Ball was a priest who had been imprisoned for a few years before the revolt. The peasants also received help from members of the noble classes - one example being William Tonge, a substantial alderman [clarification is needed], who opened the London city gate through which the masses streamed on the night of June 12 [5]. However, this is debatable; the actions of individuals like Tonge could be ascribed to fear and panic rather than rational persuasion by the rebels. It is possible that people, like Tyler, had other complaints and issues with the government or "local officials," so they took this opportunity to rebel and make their demands known [6].

[1] A continuation of the [Hundred Years' War](#) initiated by King [Edward III of England](#).

[2] J. Dean (1996). Literature of Richard II's Reign and the Peasants' Revolt.

[3] J. Dean (1996). Literature of Richard II's Reign and the Peasants' Revolt.

[4] D. Jones (2009). "The Peasants' Revolt." *History Today* 59.6, 33-39.

[5] Dobson 220

[6] J. Dean (1996). Literature of Richard II's Reign and the Peasants' Revolt.

10.3. Source 2. Thomas Walsingham, *Historia Anglicana I*

About the source: Thomas Walsingham was a monk who died around 1422. Like all chroniclers, Walsingham was mainly a collector of stories, and not a historian as we now know them.

For the rustics, whom we call 'nativi' or 'bondsmen', together with other country-dwellers living in Essex sought to better themselves by force and hoped to subject all things to their own stupidity. Crowds of them assembled and began to clamor for liberty, planning to become the equals of their lords and no longer to be bound by servitude to any master. In order to put their desires into effect, men from those two villages which were the originators and first causers of these evils sent messages to every village however small. No man was excused and all, both old and vigorous, were to assemble with weapons as they could; all men who failed, neglected or scorned to come knew that their goods would be scattered, their homes burnt or destroyed and their heads cut from their necks. In a short time so large a body was forced to assemble that it could be reckoned at five thousand of the most mean and common rustics. Among a thousand of these men, it was difficult to find one who was properly armed; but, because they formed so large a number, they believed the whole kingdom would be unable to resist them.

To gain greater support, they sent messengers to Kent to inform the people there of their plans, inviting them to meet them in order to acquire their liberty, concert further action and

change the evil customs for and of the kingdom. Therefore the Kentishmen, hearing of things most of them already desired, without delay assembled a large band of commons and rustics in the same manner as the men of Essex. Soon they blocked all the pilgrimage routes to Canterbury, stopped all pilgrims of whatever condition and forced them to swear that they would come and join the rebels whenever they were sent for, and that they would induce their fellow citizens or villagers to join them; and that they would neither acquiesce nor consent to any tax levied in the kingdom henceforth except only for the fifteenths which their fathers and ancestors had known and accepted. Soon afterwards the news of these deeds passed rapidly through the counties of Sussex, Hertford, Cambridge, Suffolk and Norfolk; and all the people expected great happenings.

And so the mob came to the place called 'le Blakhet', and after the king had declined to meet with them, the common people were furious and immediately took the road to London. The mayor and aldermen of London, fearing for the city, ordered the gates to be closed immediately; but the common people of the city and especially the poor favoured the rustics and stopped the mayor from closing the gates by using force and threatening to kill him if he tried to do so. And so the rascals enjoyed free access to and exit from the city. On the next day the rebels went in and out of London and talked with the simple commons of the city about the acquiring of liberty; and in a short time easily persuaded all the poorer citizens to support them in their conspiracy.

10.4. Source 3. Christopher Dyer (1994), *Everyday life in medieval England*

About the source: Christopher Dyer is Emeritus Professor of Regional and Local History, and director of the Centre for English Local History at the University of Leicester.

This study is based on the mass of manorial records, which are now more readily available. Such is their bulk that it has been necessary to concentrate on the four countries of Essex, Hertfordshire, Kent and Suffolk. The method of research has been to compile an index of non-urban places affected by the revolt, and then to look for manorial records of those places or at least for manors in their vicinity. By combing manorial and government records for the names of known rebels, it is possible to find out more about their background. This has been done for eighty-nine rebels, forty-eight from Essex, eighteen from Hertfordshire, thirteen from Suffolk and ten from Kent.

We know something about their material possessions from the escheators' valuations of the goods and lands of indicted individuals, and the records of the royal courts sometimes give the rebels' occupations. This evidence shows that about half of the rebels from the whole area of rebellion owned goods valued at £1 to £5, and 15 of them were worth more than £5, including the very affluent Thomas Sampson of Suffolk and John Coveshurste from Kent. This

is sufficient to show that we are dealing primarily with people well below the rank of the gentry, but who mainly held some land and goods, and not the poorest.

The economic standing of our rebels is best indicated by the size of their holdings, of which we are given some indication in thirty-six cases. Of these, fifteen had holdings of 14 acres or more, of whom only two held more than 32 acres; nine held between 7 and 12 acres; and 12 were smallholders with 5 acres or less. In some cases the information is incomplete, so the figures represent minimum landholdings. Nor should the other rebels be assumed to have been landless – the great majority can be shown from references to rent payment or their attendance at manorial courts to have been tenants.

In general, the sample seems to represent a wide spectrum of rural society, with a slight bias towards the better off. This could reflect the nature of the government sources, which tend to give the names of leaders rather than the rank and file, and the manorial records, which tell us more about tenants than servants. The gentry will not appear in the sample because manorial documents will refer to them rarely, but rebels from this group were few in any case. There is nothing here to contradict the traditional identification of the rising as the 'Peasants' Revolt'. Most of the rebels were peasants and craftsmen. Even when we talk about the presence of craftsmen from villages and small towns among the rebels and their leaders, we are in fact talking about a part of rural society. These people were not allies to the peasants, but rather a part of them.

[1] The large manor of the abbey at St Albans in Hertford was not included in this study, because the large amount of documents within this collection requires a separate study.

[2] Hilton, *Bond men made free*, p. 180-4.

10.5. Source 4. Richard Dobson (1970), *The Peasants' Revolt of 1381*

About the source: Richard Dobson was Emeritus Professor of history at the universities of York and Cambridge.

In the first place the traditional description of the 1381 rising as a 'Peasants' Revolt is itself deceptive. In no part of England for which documentary evidence survives in quantity do peasants appear to have risen in complete isolation from members of other social classes. At Canterbury, Norwich, Yarmouth, Bury St Edmunds, Ipswich, St Albans, Winchester and Bridgwater as well as London the riots of the year were the product of an alliance, at times uneasy, between the townsmen and villagers from the surrounding regions. Although disorder in York, Beverly and Scarborough was precipitated by news of events in London, the issues at stake in these three towns were essentially self-generated and not all conditional on the intervention of the local peasantry.

The same general conclusion emerges from a study of the otherwise very different and much more explosive situation within London itself. The exact role played by the Londoners during 1381 remains as controversial an issue now as it was at the time; but their intervention was certainly important, and probably decisive. Without some London support, the peasants from Kent and Essex could never have enjoyed their brief moment of exhilarating and exhausting power. Nearly all the chroniclers agree that there was a good deal of sympathy for the peasants' cause among the lower classes within the city. Even the official city account of the revolt admits that the insurgents were assisted by London's 'perfidious commoners of their own condition'. Surviving but incomplete lists of the names of Londoners involved in acts of rebellion (154 in the Rolls of Parliament and 238 in the London Plea and Memoranda Rolls) point to a massive participation of Londoners in the revolt.

And even if we confine our attention to the rural elements within the rebellion it proves impossible to analyse the movement as one of exclusively peasant grievances. The prominent role played by 'poor priests' as sowers of discord and as rebel leaders is one of the best-known features of the revolt. John Wrawe and John Ball, to take the two most famous examples, were members of the large ecclesiastical proletariat of late medieval England, a class whose clerical status was too rarely rewarded by a sufficiently responsible religious function.

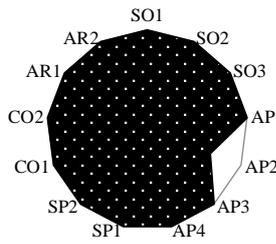
Even more remarkable are those instances in which members of the county gentry actively contributed towards the disorders of the year. It is just possible that the participation of knights like Sir Roger Bacon and Sir Thomas Cornuere in the East Anglian risings testifies to the economic difficulties of the smaller English landlords at a time of acute labour shortage. According to this interpretation, the crisis of 1381 may have promoted (if only temporarily and in restricted areas of eastern England) a political alliance between the richer peasantry and lesser squirarchy. However, the great majority of English gentleman who took part in the rebellion did so for personal and usually discreditable reasons. The collapse of order in the summer of 1381 encouraged existing 'gentry gangs' to extend the range of their blackmailing and 'protection racket' activities.

[1] Rot. Parl., III, 96-7; York Memorandum Book, ed. M. Sellers (Surtees Society, 1912-15), II 69-70; Coram Rege Roll, Easter 9 Richard II [KB. 27/500], Rex, membs. 12, 12v; partly printed in Réville, pp. 253-6; Ancient Petitions [SC.8], no. 11205; printed by C. T. Flower, 'The Beverly Town Riots', Trans. Royal Hist. Soc., new series, XIX (1905) 94-5.

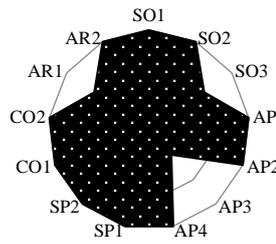
[2] London Letter Book H, fo. CXXXIII, by H. T. Riley, Memorials of London, pp. 449-51; cf. Calendar of London Letter BOOK H, p. 166.

[3] Walsingham, *Historia Anglicana*, II 1-4; cf. *Chronicon Angliae*, pp. 301-4; Coram Rege Roll, Easter 5 Richard II [KB. 27/484], Rexn memb. 26; partly printed in Réville, pp. 175-82; *Chronicon Henrici Knighton*, II 151, 170; *Fasciculi Zizaniorum*, Rolls Series, 1858, pp. 272-4.

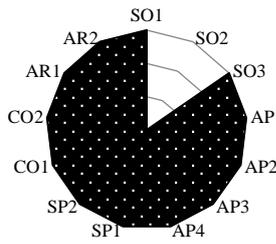
11. APPENDIX 2: OVERVIEW OF TEACHER CASES



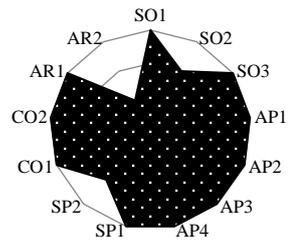
Teacher 2



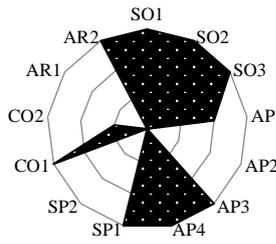
Teacher 4



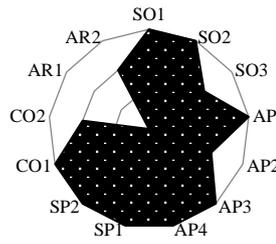
Teacher 5



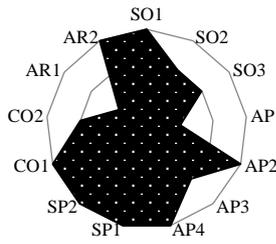
Teacher 7



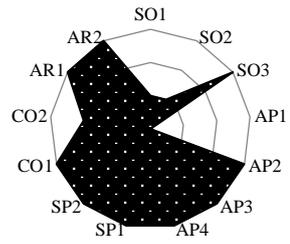
Teacher 9



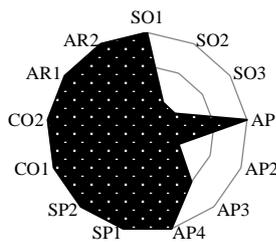
Teacher 10



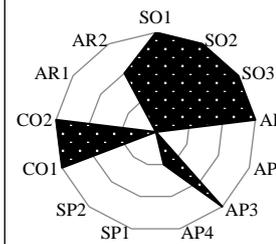
Teacher 11



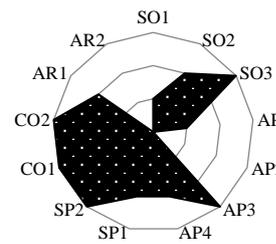
Teacher 19



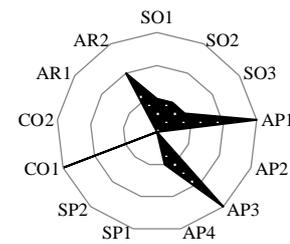
Teacher 20



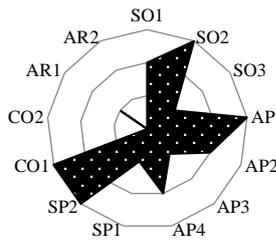
Teacher 13



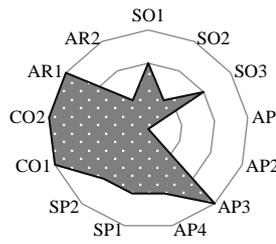
Teacher 14



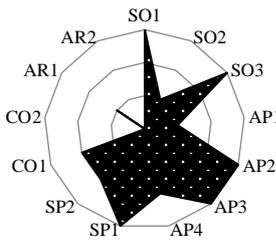
Teacher 16



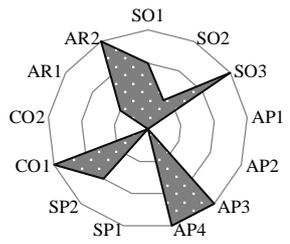
Teacher 17



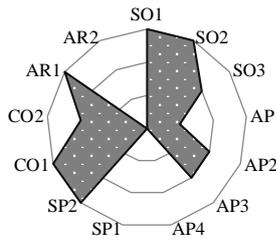
Teacher 18



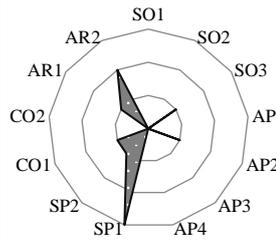
Teacher 3



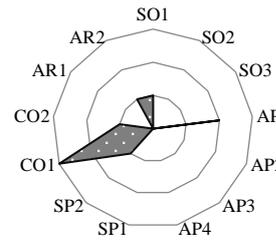
Teacher 8



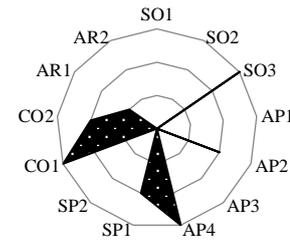
Teacher 15



Teacher 6



Teacher 12



Teacher 1

12. APPENDIX 3: CODED EXCERPT FROM THE THINK ALOUD PROTOCOLS

The following excerpt was randomly selected from the think aloud protocol of teacher 10, and details how he analyzed source 4 in the inquiry task (for more information on the codes, see table 3).

GC1	Reporting general activity	Okay, I am moving on to the fourth source.
AP3	Evaluating the evidence	Richard Dobson. And that is the source that was also used, or maybe not... By Wikipedia, ah yes. There is a reference to 5, Dobson, but not to his surname, or the year of... Dobson 220. So maybe that's the same Dobson as the one I am about to read.
GC3	Reading the source	Richard Dobson was Emeritus Professor of History at the universities of York and Cambridge. In the first place, the traditional description of the 1381 rising as a 'Peasants' Revolt' is itself deceptive. In no part of England for which documentary evidence survives in quantity do peasants appear to have risen in complete isolation from members of other social classes.
CO1	Retrieving information about the problem	I am underling peasants not rising in isolation from other social classes. Dobson also says that not all rebels were peasants.
GC3	Reading the source	At Canterbury, Norwich, and so on, the riots of the year were the product of an alliance, at times uneasy, between townsmen and villagers from the surrounding regions. Although disorder in York, Beverly,... was precipitated by news of the events in London, the problems there already existed and not at all conditional on the intervention of the local peasantry.
CO1	Retrieving information about the problem	I am underling that those unrests were not caused by the local peasant population.

GC3	Reading the source	The same conclusion emerges from a study of the situation within London itself. The exact role played by the Londoners remains as unclear now as it was at the time; but their intervention was certainly important and probably decisive. Without some London support the peasants from Kent and Essex could never have gained control. Nearly all the chroniclers agree that there was a good deal of sympathy for the peasants' cause among the lower classes within the city.
AP4	Corroborating information	I am now thinking that I have already read that information in the account by Walsingham.
GC3	Reading the source	Even the official city account of the revolt admits that the insurgents were assisted by London's 'perfidious commoners of their own condition'.
AP3	Evaluating the evidence	The footnote refers to a letter book, and it appears that he also uses the source by Walsingham, which I just read.
GC3	Reading the source	Surviving but incomplete lists of the names of Londoners involved in acts of rebellion, 154 in the rolls of Parliament and 238 in the London Plea and Memoranda scrolls, point to a massive participation by Londoners in the revolt.
AP3	Evaluating the evidence	Okay, so there are comprehensive lists available of the Londoners who were involved in the revolt.
GC3	Reading the source	And even if we confine our attention to the rural elements within the rebellion, it proves impossible to analyze the movement as one of exclusively peasant grievances. The prominent role played by poor priests is one of the best-known features of the revolt. John Wrawe and John Ball, to take the two most famous examples...

- AP4 Corroborating information** That is what I just read in Wikipedia. So that will indeed be the part that... I am now looking in the text from Wikipedia to see where I encountered those names.
- AP4 Evaluating the evidence** Five, which is indeed the footnote referring to Dobson. So that part of Wikipedia is probably based on the book of Dobson.
- GC3 Reading the source** To take the two most famous examples, where members of the large ecclesiastical proletariat of the late medieval England, a class whose clerical status was too rarely rewarded by a sufficiently responsible religious function. More remarkable are those instances in which the lower nobility actively contributed towards the disorders of the year. It is just possible that the participation of knights like sir Roger Bacon and Sir Thomas Cornuerd in the East Anglian risings testifies to the economic difficulties of the smaller English landlords at a time of accurate labor shortage.
- AP4 Corroborating information** That labor shortage is also mentioned in Wikipedia.
- GC3 Reading the source** According to this interpretation, the crisis of 1381 may have promoted an alliance between the richer peasantry and the lower nobility, if only temporarily and only in restricted areas of eastern England. However, the great majority of English gentleman who took part in the revolt did so for personal and usually discreditable reasons.
- SP1 Asking questions and identifying missing information** But what kind of discreditable reasons? The text does not mention this.
- GC3 Reading the source** The collapse of order in the summer of 1381 encouraged existing gangs of the lower nobility to blackmail other people.
- GC1 Reporting general activity** Okay, I have read all four sources.

4

Teachers' adoption of inquiry-based learning activities: The importance of beliefs about the subject, self and social context

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CHAPTER 4

Teachers' adoption of inquiry-based learning activities: The importance of beliefs about the subject, self and social context

ABSTRACT

Concerned by findings that professional development initiatives on inquiry-based learning (IBL) have generally neglected to systematically assess teachers' beliefs, the present study further investigates the relevance of these beliefs to teachers' adoption of IBL. A theoretical model was constructed that identifies three constitutive dimensions of teachers' beliefs related to IBL: beliefs about the subject, self, and context. This model was examined using data from a survey completed by 536 secondary school history teachers. The results indicate that a large part of teachers' decision to implement IBL is determined by beliefs about: the value of procedural knowledge, self-efficacy, and contextual hindrances. Furthermore, it appears that teachers with an academically oriented training hold beliefs that are more favorable to IBL. Based on the findings, a number of suggestions are offered to professional development aiming to stimulate the implementation of IBL across classrooms.

1. INTRODUCTION

Research across different subject domains, such as mathematics, science, and history, suggests that strong factual knowledge, as well as insight into disciplinary methods and reasoning processes are both crucial to develop a meaningful understanding of the subject matter and the ability to solve problems (Donovan & Bransford, 2005). As a consequence, educational standards have increasingly emphasized the importance of inquiry-based learning (IBL), which situates the learning of theories and concepts in authentic learning activities that engage students in disciplinary thinking (Levy, Thomas, Drago, & Rex, 2013). This approach is based on current learning theories' assumption that knowledge is more interconnected and meaningful when acquired in its likely contexts of use, and, according to the evidence, leads to deeper learning and significant gains in student achievement (Hmelo-Silver, Duncan, & Chinn, 2007).

Even so, previous research indicates that IBL is not yet common practice in many classrooms (e.g. Capps, Crawford, & Conostas, 2012; Lotter, Yow, & Peters, 2014; Voet & De Wever, 2016). As a result, a significant body of work has focused on the design of professional development initiatives to support pre- or in-service teachers' implementation of IBL. Most of

these studies are situated in the fields of science, technology, engineering, and mathematics (STEM) learning (see e.g. Brand & Moore, 2011; Lotter, Rushton, & Singer, 2013; Morrison, 2014; Nadelson et al., 2013), although there has also been some work in other domains, such as history education (e.g. Levy et al., 2013; McDiarmid, 1994).

A review of the literature indicates that, in the design of these professional development initiatives, the focus generally lies on expanding teachers' knowledge of IBL (also see the review of Capps et al., 2012). In particular, five types of activities emerge that, taken together, demonstrate how teachers can gradually be familiarized with IBL: (1) *immersion*, providing opportunities to participate in or observe authentic inquiries (e.g. Brand & Moore, 2011; Lotter et al., 2014; Luft, 2001); (2) *explicit-reflective instruction*, aimed at deepening understanding of complex subject matter, disciplinary standards, and pedagogical approaches (e.g. Cheng & So, 2012; Morrison, 2014; Nadelson et al., 2013); (3) *developing lesson plans*, through a transfer of newly acquired information into the adaptation of curriculum units (e.g. Akerson & Hanuscin, 2007; Lotter et al., 2014; Seraphin, Philippoff, Parisky, Degnan, & Warren, 2013); (4) *reflection*, allowing to discuss questions, concerns, experiences, or feedback (Brand & Moore, 2011; Lotter et al., 2014); and (5) *extended support*, to further share ideas, lesson plans, or other professional development opportunities (e.g. Nadelson et al., 2013).

However, teachers' implementation of IBL does not appear to be solely determined by the knowledge they hold. In fact, research has demonstrated that teachers' actions in classroom are largely in line with their beliefs, or tacit assumptions about learning and teaching (see the review by Kagan, 1992). In essence, beliefs are personal judgements, which makes them more affective, evaluative and episodic in nature compared to knowledge (Nespor, 1987). These beliefs act as filters that ultimately screen, define, distort, or reshape teachers' decision making (Pajares, 1992). Although there exists a substantial body of research on teacher beliefs, their structure, and relation with knowledge and practice, all of which underlines the importance of these beliefs (see e.g. the reviews by Kagan, 1992; Pajares, 1992; Woolfolk Hoy, Davis, & Pape, 2006), a review of professional development initiatives on IBL shows that only 'very few studies systematically assessed teacher beliefs' (Capps et al., 2012, p. 304). The present study looks further into teachers' beliefs about IBL, and suggests that the lack of consideration for these beliefs is an important shortcoming of current professional development initiatives.

2. THE CASE OF HISTORY EDUCATION

Previous work shows that there exist substantial differences in inquiry practices across domains (Donovan & Bransford, 2005; Levy et al., 2013). In addition, teachers beliefs about IBL may also vary depending on the domain in which it is situated (Pajares, 1992). It can therefore be argued that it is imperative to take the domain-specificity of IBL into account

when investigating teachers' beliefs. The present study specifically focusses on the school subject of history, and is part of a larger research project on history teachers' implementation of IBL (also see Voet & De Wever, 2016).

In line with research in other fields, studies have shown that inquiries into the past present an effective approach for developing students' understanding of the subject matter of history, as well as both disciplinary and domain-general thinking skills (Reisman, 2012; Wiley & Voss, 1996). Historical inquiry has been described as a distinct form of academic inquiry, even though it bears some similarities to inquiry in other domains (Levy et al., 2013). This is due to the unique nature of the past, which cannot be observed directly, but can still be studied through remaining artifacts. As the available information does not explain the past as a whole, but can offer evidence for a number of interpretations, historical inquiry is generally characterized by uncertainty (Rouet, Marron, Perfetti, & Favart, 1998). Accounts of the past are formed through theory-evidence coordination, in which individuals apply their own theories to determine the meaning and value of evidence (Kuhn, Weinstock, & Flaton, 1994). These personal theories can then be evaluated based on the plausibility of the arguments they provide in support of their claims (Voss, Perkins, & Segal, 1991).

Over the past two decades, there has been considerable interest in the ways history teachers bring these ideas into their classroom, together with the factors that influence their instructional decisions. Studies investigating this topic have typically adopted a small-scale and qualitative design, providing an in-depth look at one or more teacher cases (McCrum, 2013; Van Hover & Yeager, 2003; Voet & De Wever, 2016). So far, however, there has been little to no large-scale research on the topic. Building on the concept of teachers' beliefs, the present study presents a model for analyzing history teachers' adoption of IBL.

3. TOWARD A MODEL OF BELIEFS ABOUT IBL

According to Schoenfeld (1983) cognitive actions are generally the result of beliefs about (1) the task at hand, (2) oneself, and (3) the social environment where the task takes place. Similarly, a review on the nature and structure of beliefs systems by Op 't Eynde, De Corte, and Verschaffel (2002) identified the (1) subject of study, (2) self, and (3) social context as the constitutive dimensions of these systems. Each of these three types of beliefs is formed in the larger context of a society with certain educational policies, cultural values and norms (see the review by Woofolk Hoy, Davis, & Pape, 2006)

In the present study, the three types of beliefs are further operationalized using five constructs. First of all, research on teachers' beliefs about specific academic content often makes a distinction between (1a) *conceptions of the field's nature*, or domain-specific epistemological conceptions, and (1b) *orientations towards teaching*, which are formed through a judgment of appropriate goals, instructional activities, and forms of evaluation

(Kagan, 1992). Second, keeping in mind the specific topic of IBL in history, teachers' beliefs about the self are defined here as (2) *self-efficacy*. Contrary to other conceptions of the self, which represent general affective evaluations of oneself, self-efficacy offers a more accurate judgment of one's capabilities in light of a specific task (Tschannen-Moran, Woolfolk Hoy, & Hoy, 1998). Furthermore, among teachers' beliefs about the immediate context, their ideas about (3a) *students' ability* to engage in disciplinary reasoning, as well as their perception of (3b) *contextual hindrances* spawned by the complexities of classroom life, seem to take a central place (Van Hover & Yeager, 2003).

Finally, the present study also considers (4) teacher characteristics that appear to influence these three types of beliefs: (4a) *teaching degree* (Yilmaz, 2010) and the (4b) *study track* in which teachers work (Voet & De Wever, 2016). An overview of this theoretical framework is presented in figure 1. In what follows, each of these variables will be further discussed.

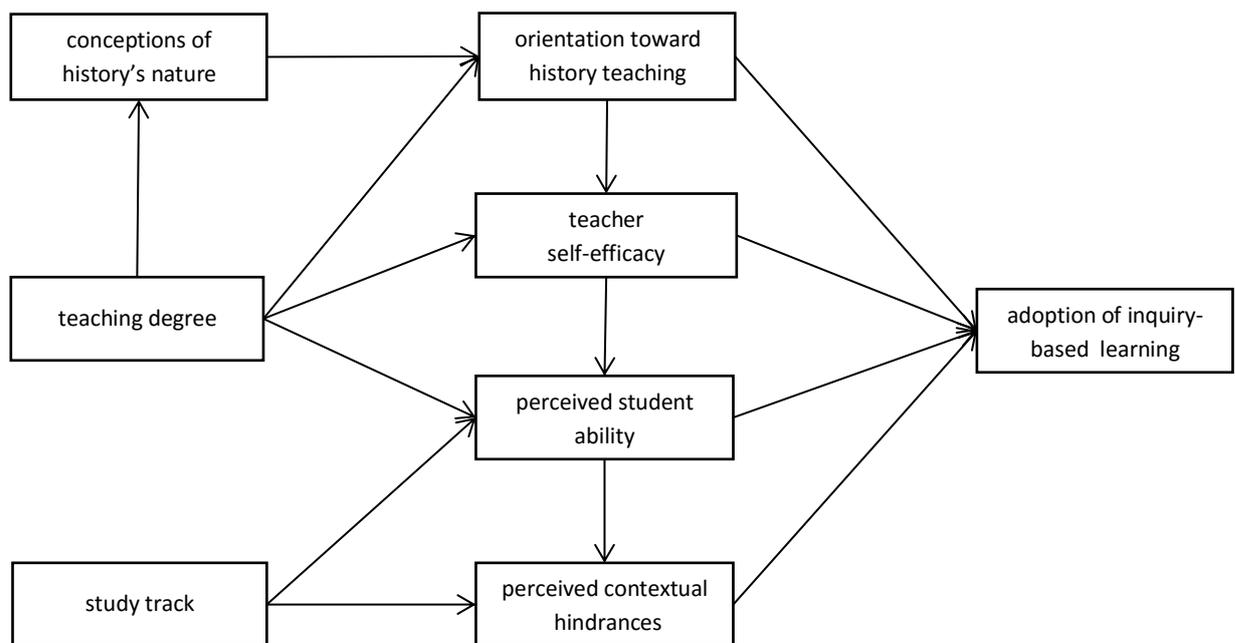


Figure 1. Theoretical model.

3.1. Beliefs about the subject

3.1.1. Conceptions of history's nature

Beliefs about the nature of a discipline, also referred to as domain-specific epistemological beliefs, are a set of conceptions about how knowledge is constructed and evaluated within a

specific field, including ideas about standards for inquiry, and the criteria to judge answers (Hofer, 2001). One of the most widely used frameworks for history was proposed by Maggioni, VanSledright and Alexander (2009), and identifies three distinct stances: (1) objectivism, which views historians as mere conduits of information, who strive for objectivity and carefully avoid interpretation; (2) subjectivism, which regards historical accounts as puzzled together by instinctive preference or casual selection, and reduces all of history to a matter of opinion; and (3) criterialism, which acknowledges that although historical research is guided by personal theories of historians, claims must be grounded in arguments and evidence, and can thus be evaluated. Several studies in history have found evidence for these stances, although they sometimes use different terminology (Bouhon, 2009; McCrum, 2013; Voet & De Wever, 2016). Furthermore, other work has suggested that teachers' beliefs about the nature of the discipline are linked to their *orientation toward history teaching*. Overall, previous findings indicate that teachers with objectivist views tend to put more emphasis on students' mastery of facts and grand narratives, and seem to prefer teacher-centered instruction. Teachers with subjectivist and criterialist views, on the other hand, appear to be more concerned with critical thinking or inquiry skills, and lean toward student-centered modes of instruction (Bouhon, 2009; McCrum, 2013; Wilson & Wineburg, 1993).

3.1.2. *Orientation toward history teaching*

Content-specific orientations toward teaching refer to the goals and purposes for teaching a particular subject (Grossman, 1990), which are, in part, connected to more general beliefs that teachers hold about students, school and education (Van Driel, Bulte, & Verloop, 2007). With regard to history education, researchers commonly distinguish between two overarching knowledge goals: (1) substantive knowledge encompasses the framework of the past, or the "who, what, where, when and why" (Lee & Ashby, 2000), while (2) procedural knowledge is necessary to understand how history works. The latter requires insight into second-order or meta-concepts describing the study of the past (e.g. reliability, causation, and change), but also into the procedures to apply these ideas to authentic practices of inquiry (VanSledright & Limón, 2006). Teachers generally attribute a different value to each of these two goals (Bouhon, 2009). This specific orientation toward teaching functions as a conceptual map that guides their instructional decisions (Magnusson, Krajcik, & Borko, 2001), including the *adoption of inquiry-based learning*. In particular, the study by Husbands (2011) suggests that teachers who attach more value to procedural knowledge goals are more inclined to engage their students in reasoning with and about historical information and concepts. Furthermore, as a specific orientation toward teaching drives instructors to invest more time and effort in certain pedagogical practices, and perceive others as less interesting (Gess-Newsome &

Lederman, 1999), it can be assumed that this would positively affect *teacher self-efficacy* with regard to their preferred instructional approach (Grossman, 1990).

3.2. Beliefs about the self

3.2.1. Teacher self-efficacy

Teachers' self-efficacy beliefs can be described as a judgment of their capabilities to reach desired goals (Tschannen-Moran, Woofolk Hoy, 2001). As these beliefs are essentially a self-assessment based on a task analysis, Pajares (1996) argued that they should be investigated within the context of specific tasks, rather than being operationalized as a general personality trait. In the present study, teachers' self-efficacy beliefs are therefore operationalized against the backdrop of learning activities that center around working with historical evidence. So far, little research has been conducted on history teachers' self-efficacy beliefs with regard to such activities. However, domain-general research has found a consistent relation between self-efficacy beliefs and teachers' behavior in the classroom. In particular, these beliefs appear to influence teachers' persistence and resilience when things do not work out as planned (Tschannen-Moran & Woofolk Hoy, 2001). As such, teacher self-efficacy can be assumed to positively influence their *adoption of inquiry-based learning*. Furthermore, teachers' self-efficacy beliefs also seem to be positively related to *perceived student ability*, as teachers with stronger self-efficacy beliefs are more likely to expect that all students can learn, and are less critical of students' errors (Ashton & Webb, 1986).

3.3. Beliefs about the social context

3.3.1. Perceived student ability

With regard to students' ability to engage in historical reasoning, Booth (1994) concluded that limits "seem to be not set so much by cognitive factors, but by a wide range of issues such as the teaching context, the use of accessible and problematic historical materials, or the teaching styles and subject knowledge of the teacher" (p. 65). Unfortunately, it appears that history teachers often hold different beliefs. Studies have often described secondary school teachers' perceptions of students' ability as a major barrier to inquiry-based learning activities, finding that they generally had doubts about students' psychological and intellectual development, frustrations about their unwillingness to think critically, and reservations about low achieving students' ability to engage in higher-order thinking (Moisan, 2010; Van Hover & Yeager, 2003). In conclusion, it appears likely that more optimistic beliefs about students' ability will be positively related to the *adoption of inquiry-based learning*, and negatively to *perceived contextual hindrances*.

3.3.2. *Perceived contextual hindrances*

The complexities of classroom life can have a powerful influence on teachers' classroom practice, and have often been found to constrain their options for providing instruction in line with their ideas about teaching and learning the subject (Fang, 1996). With regard to history teachers' organization of inquiry-based learning activities, the most important obstacle appears to be the history curriculum itself. The need to cover the (national) curriculum generally makes it difficult for teachers to free up time for conducting inquiries (Haydn, 2011). In addition, it appears that students often have problems to successfully engage in inquiry tasks, which can turn these activities into "time-eaters", requiring a significant amount of extra time and effort on behalf of the teacher (Van Hover & Yeager, 2003). As such, a number of studies have documented how these contextual hindrances appeared to obstruct the *adoption of inquiry-based learning* (Fehn & Koeppen, 1998; Van Hover & Yeager, 2003).

3.4. Teacher characteristics

3.4.1. *Teaching degree*

Teachers' beliefs about the subject appear to be, in part, influenced by the extent to which their training has exposed them to courses about the discipline's assumptions, values, and methods (e.g. McDiarmid, 1994). In this light, Yilmaz (2010) noted that teachers with an advanced degree in history generally had more sophisticated *beliefs about the nature of history* compared to those who had not taken courses on the subject. Similarly, it can be assumed that teachers who have more knowledge about history and its methods will also have more confidence for organizing inquiry activities, resulting in a higher *teacher self-efficacy*. In addition, Levy, Thomas, Drago, and Rex (2013) noted that an engagement in historical inquiries made student teachers more interested in teaching such activities themselves, thus affecting their *orientation toward history teaching*. Finally, earlier studies suggests that teachers whose training stimulated them to investigate students' thinking, or provided them with an overview of students capabilities might have a better understanding of students' abilities (Monte-Sano, 2011), thus influencing their reports of *perceived student ability*.

3.4.2. *Study track*

In a previous study, Voet and De Wever (2016) suggested that the study tracks in which history teachers worked could be linked to differences in how they organized inquiry-based learning activities. In several educational systems, students can choose between a number study tracks, which offer different curricula with either a more academic or vocational orientation. Depending on the study track in which they work, teachers are generally confronted with student groups with different interests and abilities, but often also have a different amount of

time available for teaching history each week. As such, it is possible that study tracks influence both *perceived student ability*, as well as *perceived contextual hindrances*.

4. AIMS

To summarize, the main aim of the present study is to empirically investigate the theoretical model presented above, which uses three constitutive dimensions of beliefs systems to explain history teachers' adoption of inquiry-based learning (IBL). More specifically, the research questions are:

- How do history teachers' *beliefs* about the subject, self, and social context influence their *adoption* of IBL?
- How are history teachers' *beliefs* about the subject, self, and social context related to one another?
- How do teacher *characteristics*, such as teaching degree and study track, influence history teachers' *beliefs* about the subject, self, and social context?

5. DESIGN AND METHOD

A pen-and-paper questionnaire was designed to further investigate the theoretical model. This section provides more information on the development of the instrument, data collection, participants, validation of the measures, and data analysis.

5.1. Instrument development

A review of the literature made it clear that there exist only a small number of instruments for capturing history teachers' beliefs about their subject, self, and context, in light of inquiry-based learning (IBL). Furthermore, a closer inspection gave rise to questions about the validity of these instruments, as some included little information on the validation process (von Borries, 2000), whereas the methods reported by others (e.g. the use of principal components instead of factor analysis, also see the section on instrument validation for more information on recommended procedures) were not able to completely confirm validity (Maggioni et al., 2009). Therefore, several new Likert scales were constructed for the purpose of the present study. Some items were adapted from the instruments mentioned above, and new items were developed based on literature regarding history teachers' beliefs. This work resulted in six 6-point scales:

(1) *Beliefs about the nature of history*: Based on the framework by Maggioni et al. (2009), three subscales were constructed that correspond to: objectivism (NHO), subjectivism (NHS), and criterialism (NHC); (2) *Orientation toward history teaching*: In line with the goals outlined by earlier work, two subscales were constructed to capture teachers' orientation toward teaching substantive knowledge (OTS) and orientation toward teaching procedural knowledge

(OTP); (3) *Teacher self-efficacy* (TSE): Keeping in mind the context-specificity of teachers self-efficacy beliefs, this scale was constructed to measure feelings of competence for organizing learning activities that focus on reasoning with evidence; (4) *Perceived contextual hindrances* (PCH): For this scale, a number of items were developed to capture the extent to which contextual factors called for additional efforts or caused problems when organizing inquiry-based learning activities; (5) *Perceived student ability* (PSA): Based on earlier findings regarding history teachers' perceived barriers for organizing inquiry-based learning activities (Voet & De Wever, 2016), this scale was constructed to map perceptions of students' capability to carry out such activities; (6) *Adoption of inquiry-based learning* (AIL): This scale asked teachers about the extent to which they integrated different kinds of inquiry-based learning activities into their lessons.

The questionnaire also contained a number of categorical items developed by Bouhon (2009), which gauged history teachers' general ideas about teaching and learning the subject. Each of these items required teachers to review three statements, and select the one that was closest to their own ideas. Finally, there were several items on teacher characteristics, such as sex, age, teaching degree, and the study tracks in which teachers worked.

5.2. Data collection

Data were collected within secondary education in Flanders (Belgium), which consists of six grades, starting at age 12 and ending at age 18. Throughout these grades, the attainment goals that the government sets out for secondary education put an increasing emphasis on students' capability to reason with historical information, in order to arrive at grounded conclusions in relation to a key problem (for more information on secondary school history in Flanders, see De Wever, Vandepitte, & Jadoulle, 2011). The pen-and-paper survey was distributed across three study tracks, with different amounts of time available for teaching history each week. For teachers in general education and some art education tracks, the curriculum holds two 50-minute periods of history each week, whereas technical education and certain other art education tracks only receive one period of history each week. In order to reduce social desirability (see also Krumpal, 2013; Nederhof, 2006), the survey was designed to be filled in anonymously, through self-administration, and to be returned within a sealed envelope. Participants were asked to also fill in and sign an informed consent, which was returned within a separate sealed envelope, so as to ensure complete confidentiality.

5.3. Participants

In total, 550 history teachers from 219 secondary schools participated in the study. After examination of the data, 24 cases with a large number of missing values were removed from the sample. A model-based imputation method (EM-algorithm) was used in 13 cases with only

one or two missing values (see also Kline, 2005). On average, the participating teachers had 13 years of experience in teaching history (SD=10 years). Looking at their certification, 258 held a degree of a three-year bachelor program at university college, which takes a mainly practical approach to learning to teach history, in addition to one or two other subjects, and prepares teachers to work in grades 1 to 4 of secondary education. Another 223 had obtained a master degree of a four-year history course at university, centered around academic history and historical research, together with a one-year teacher training, which prepared them to teach in grade 3 to 6. The remaining 45 teachers held a degree that provided no specific preparation for teaching history (e.g. other subjects teacher, orthophonist,...). With regard to the time that teachers had available for teaching, 119 teachers instructed history in one-period classrooms, 205 in two-period classrooms, and 202 in both 1- and 2-period classrooms.

5.4. Instrument validation

The psychometric quality of the questionnaire was examined through an investigation of factorial validity and internal consistency. First, the dataset was split in two random subsets (N=268), which were used to respectively conduct an exploratory (EFA) and confirmatory (CFA) factor analysis. Next, the whole dataset was used to calculate Cronbach's α for each scale. A first review of the results showed that not all subscales related to beliefs about the nature of history could be replicated through the factor analysis (i.e. items from the criterialist and subjectivist subscale failed to load on the same factor). Therefore, only the objectivist subscale is included in the analyses reported here.

The EFA was carried out using SPSS 18. In accordance with methodological recommendations provided by earlier work (Costello & Osborne, 2005), extraction was done through Maximum Likelihood estimation, and rotation through the oblique Promax method (as factors were expected to be correlated). The results of the Kaiser-Meyer-Olkin test indicate that the sample was adequate for conducting an EFA (KMO=.82), while Bartlett's Test confirms that the items under investigation are related ($\chi^2=2245.79$, $df=300$, $p<.001$).

Following the advice by Courtney (2013), the number of factors to retain was determined by comparing the number of eigenvalues greater than 1 with the output from Cattell's scree test, and Horn's parallel analysis (the latter was carried out using the 'Paramap' package in R 3.1). The eigenvalues and Horn's Parallel Analysis pointed to respectively a 7- and 8-factor structure, while the scree plot showed no clear point of inflection. As such, both a 7- and 8-factor solution were further explored. In the 7-factor structure, which is in line with the theoretical model, all items loaded moderately high to high on one factor, and cross-loadings stayed low. The results of the goodness-of-fit test further indicate that the 7-factor structure is a good fit for the data ($\chi^2=159.95$, $df=146$, $p=.203$). In contrast, estimating the 8-factor

structure turned out to be problematic. The occurrence of an ultra-Heywood case (i.e. a communality estimate exceeding 1, implying that a unique factor has negative variance) during the estimation process indicated that an 8-factor solution was not appropriate for the data. An overview of the EFA's results is presented in appendix A.

The CFA was conducted using the 'Lavaan' Package in R 3.1. One within-scale correlation was allowed (BNU3 and BNU4). The results indicate a good fit (CFI=.96; TLI=.95; RMSEA=.03, 90% confidence interval= [.03, .04], SRMR=.04), when compared to the criteria proposed by Hu and Bentler (1999): CFI and TLI \geq .95, RMSEA \leq .06, SRMR \leq .08.

Finally, the internal consistency of each scale is presented in table 1. The results indicate that all scales reported here have an acceptable to good internal consistency. An overview of the scales is presented in appendix B.

Table 1

Internal consistency of the scales

Scale	Items	Cronbach's α
Conceptions of history's nature: Objectivism (HNO)	4	.71
Orientation toward history teaching: Substantive (OTS)	3	.73
Orientation toward history teaching: Procedural (OTP)	3	.8
Teacher self-efficacy (TSE)	4	.78
Perceived student ability (PSA)	3	.72
Perceived contextual hindrances (PCH)	4	.83
Adoption of inquiry-based learning (AIL)	4	.69

5.5. Analysis

As a first step, teachers' general beliefs about teaching and learning history were examined by calculating the distribution of teachers' responses to each of the categorical items developed by Bouhon (2009). Teachers who had not completed all of these items were excluded from this part of the analysis, which slightly reduced the sample size ($n = 513$). In addition, the complete sample ($n = 536$) was used to calculate means for each of the validated Likert scales.

The Likert scales were then used to test the model of teachers' adoption of inquiry-based learning. Based on the complete sample ($n = 536$), a structural equation model (SEM) was estimated in R 3.1. The nested structure of the data (i.e. a number of teachers worked in the same schools) was taken into account by using the 'lavaan.survey' package. Similar to the confirmatory analysis, one within-scale correlation was allowed (BNU3 and BNU4). Again, the

results of the analysis indicate a good fit: CFI=.96, TLI=.95, RMSEA=.03, 90% confidence interval=[.03, .04], SRMR=.05.

6. RESULTS

The first part of the results section presents several descriptive findings on history teachers' beliefs about their subject, while the second section focusses on the structural equation model of teachers' adoption of inquiry-based learning activities.

6.1. Descriptive findings

Table 2 presents the findings with regard to teachers' goals and approach to history teaching. For most teachers, the main goal is to develop students' knowledge of the past, together with a basic ability to critically analyze information. A smaller group of about one out of five teachers seems to hold higher expectations, and indicates that students should be able to conduct their own inquiries, based on a problem statement presented by the teacher. Finally, roughly one out of three teachers holds a narrow view of the primary goal of history as learning about what happened in the past.

Table 2

Goals and approaches for history teaching.

Item	N teachers	Relative %
<i>In my classroom, a student who excels in history is one who...</i>		
a. knows the chronology, facts and central concepts of history, and is able to relate different chapters of the textbook to one another.	187	36.45
b. demonstrates a balanced development of knowledge and skills, and is able to identify, analyze and criticize an information source.	212	41.33
c. is able to tackle new contents, which means: answering a research question based on an analysis of information sources, drawing on theory and facts from the history lessons.	114	22.22
<i>To teach effectively, taking the available time and student level into account...</i>		
a. the most logical and effective approach is to explain the most important facts and concepts in a clear and structured way, and to ensure that underlying relations, mainly on a chronological level, are clear.	102	19.88
b. it is important to provide sufficient support for the learning of facts and concepts, by effectively alternating between an analysis of information sources and plenary sessions, reciprocal teaching and feedback.	322	62.77
c. it is necessary to give students time and opportunities to observe, discover and ask questions about important facts and concepts. Students have to apply, experiment with, and compare them, to achieve understanding.	89	17.35

Note. N= 513. Teachers could select only one of the options for each question.

Moving on to teachers' beliefs about instruction, the majority appears to favor an approach that combines student activity with teacher explanation and guidance. Approximately one out of five teachers stresses a more teacher-centered approach that is dominated by lectures, while a similar number prefers largely student-centered activities that provide a significant amount of time for exploration and experimentation.

Table 3

History teachers' ideas about stories and information sources

Item	N teachers	Relative %
<i>The position of stories in the history lesson</i>		
a. a captivating and well-structured story helps students to understand complex situations, get more insight into contexts and evolutions, and recognize causes and consequences.	399	77.78
b. stories do not contribute to the development of skills and do not put students to work. Students have to analyze information sources in order to gain knowledge. Stories can then be used to organize this knowledge.	33	6.43
c. studying stories, whether they are told by the teacher, the textbook or historians, allows students to form their own stories, and discover that all stories are constructed and contain a certain interpretation of the past.	81	15.79
<i>Information sources in the classroom...</i>		
a. are an extra to the lesson, to help students imagine a situation, or to make an idea more clear. Students regularly need illustrations and examples to understand everything.	135	26.32
b. help to work on skills and present important knowledge. Their use by students requires a structured approach: teachers have to ask questions, provide guidance, and guard progress, so that no lesson time is lost.	263	51.27
c. have to be extensively and critically analyzed, by letting students search, discuss, ask questions and take different points of view. It is self-evident that this takes up a lot of time.	115	22.41

Table 3 further explores teachers' beliefs about the narratives that are presented during the history lesson, and students' use of information sources. As is apparent from the results, the large majority of teachers regard narratives primarily as a way to present, break down and structure complex content into something that students can understand. About one out of six teachers sees these narratives as part of an approach that also aims to develop students'

understanding of history itself, next to enabling them to actively constructing their own knowledge. In contrast, only a few teachers believe that students cannot learn from narratives, and that these can only be used to organize knowledge that was first acquired through other means. Looking at teachers' ideas about working with information sources in the classroom, the results suggest that the majority prefers teacher-driven inquiries, during which students are carefully guided through each step, and teachers structure their work by asking critical questions and providing feedback on their progress. Similar to the findings presented in Table 1, one out five teachers reports that information sources should be used to let students conduct their own inquiries, through an approach that provides them with room for exploring and discussing different points of view. On the other hand, a relatively large group of about one out of four teachers primarily considers information sources as illustrations of the past, rather than a starting point for developing students' ability to engage in historical reasoning.

Table 4

Means and standard deviations of the scales

Scale	Mean	Standard Deviation
Conceptions of history's nature: Objectivism (HNO)	3.5	.87
Orientation toward history teaching: Substantive (OTS)	5.07	.6
Orientation toward history teaching: Procedural (OTP)	4.32	.83
Teacher self-efficacy (TSE)	4.17	.77
Perceived student ability (PSA)	3.6	.91
Perceived contextual hindrances (PCH)	4.08	.98
Adoption of inquiry-based learning (AIL)	4.01	.8

Note. All scales are six-point scales

Finally, Table 4 presents the findings for the scales that are used in the SEM model. The mean for objectivist beliefs hovers near the middle of the scale, indicating neither strong agreement, nor strong disagreement with conceptions of history as an objective approach to information, without any room for interpretation. Looking at the means for the subscales of orientation toward history teaching, these results indicate that teachers commonly value both substantive and procedural knowledge, although substantive knowledge is rated markedly higher. Furthermore, the average teacher appears to be moderately confident in his or her own ability to organize inquiry-based learning activities, but seems to have neither high, nor low expectations when it comes to students' ability. Finally, the moderately high means for perceived contextual hindrances and adoption of inquiry-based learning imply that, overall,

teachers occasionally organize inquiry-based learning activities, but feel rather hindered by the teaching context when doing so.

6.2. The SEM model

The structural equation model (SEM) is presented in Figure 2. In total, 38% of the variance of teachers' adoption of inquiry-based learning is explained by the model. More information on the output of the analysis (e.g. standard errors, z-values, other R-squares) can be found in appendix C.

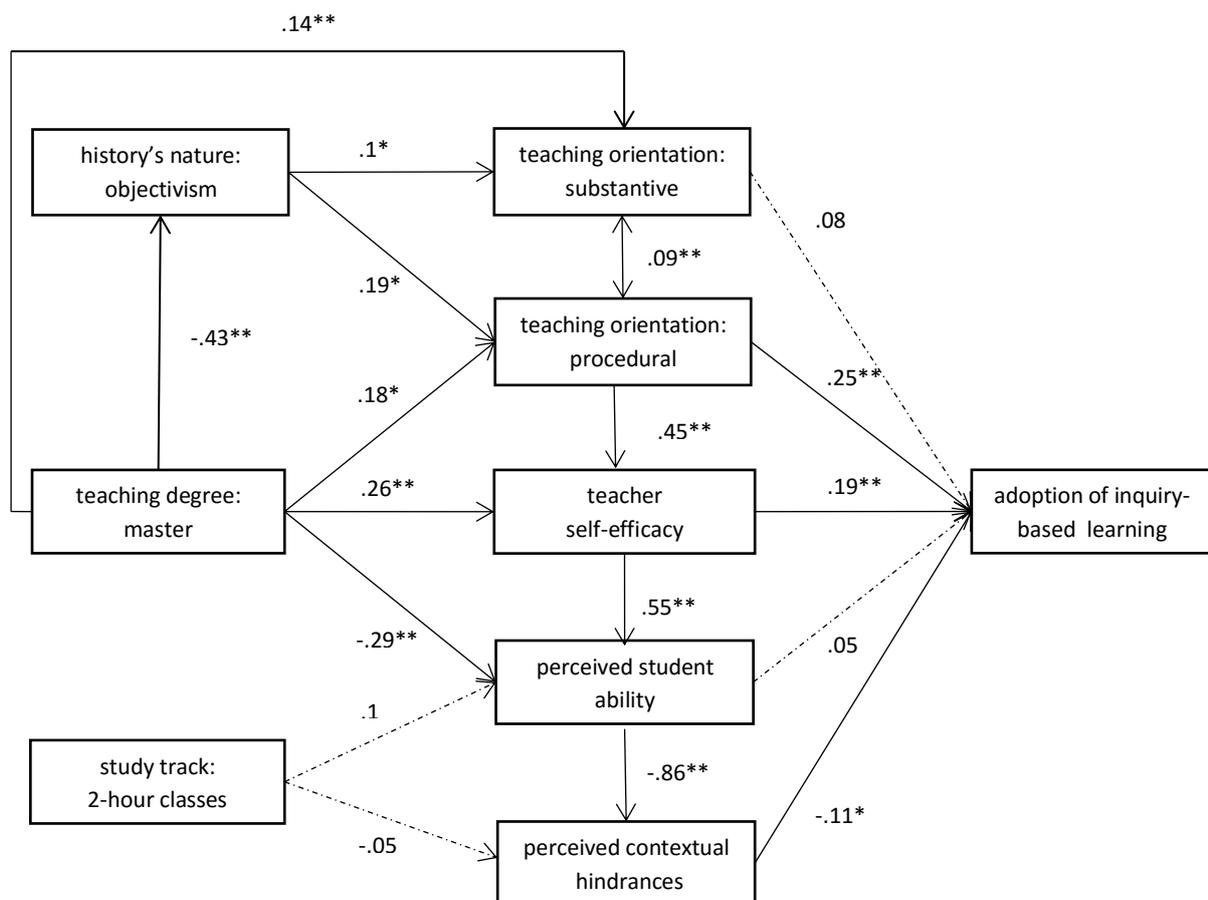


Figure 2. Structural equation model (* $p < .05$, ** $p < .01$).
Dashed lines indicate non-significant effects.

Three out of five variables have a significant impact on teachers' adoption of inquiry-based learning activities. The weight that history teachers place on procedural knowledge goals (i.e. learning about the foundations and practices of historical reasoning) appears to be most influential, and is positively related to their adoption of inquiry-based learning activities ($\beta = .25, p < .001$). Teachers' feelings of self-efficacy with regard to organizing such activities also

exert a positive effect ($\beta=.19$, $p=.004$). In contrast, perceived contextual hindrances have an expected negative effect on teachers' adoption of inquiry-based learning activities ($\beta=-.11$, $p=.04$). Teachers' beliefs about the relative importance of substantive knowledge (i.e. building a framework of the past) appear to have no significant effect ($\beta=.08$, $p=.31$), similar to their perceptions of students' ability to conduct inquiries ($\beta=.05$, $p=.52$).

Furthermore, the SEM confirms that these five variables are connected to one another. First of all, there is a small, but significant, positive correlation between history teachers' orientation toward teaching substantive and procedural knowledge ($\rho=.09$, $p<.001$). In addition, teachers' commitment to procedural knowledge goals appears to positively influence their self-efficacy for organizing inquiry-based learning activities ($\beta=.45$, $p<.001$), which in turn has a positive effect on perceptions of students' ability to engage in such activities ($\beta=.55$, $p<.001$). Finally, beliefs about students' ability appear to have a large negative effect on teachers' report of contextual hindrances, which obstruct them from organizing inquiry activities ($\beta=-.86$, $p<.001$).

History teachers' beliefs also appear to be influenced by other variables. The study tracks in which teachers work does not appear to have a significant influence, neither on their perceptions of students' ability related to conducting inquiries ($\beta=.1$, $p=.18$), nor on perceived contextual hindrances ($\beta=-.05$, $p=.52$). There is, however, a significant influence of teachers' objectivist ideas about history, which positively effects teachers' ideas about the value of both substantive and procedural knowledge goals (respectively $\beta=.1$, $p=.03$ and $\beta=.19$, $p=.02$). Teachers' training appears to be the most powerful indirect influence on their adoption of inquiry-based learning activities. At first sight, the results suggest that there are considerable differences between teachers with a master degree in history (i.e. obtained upon completion of a four-year program on academic history) and teachers holding other degrees. Having a master degree in history seems to have a positive effect on the perceived importance of both substantive and procedural knowledge (respectively $\beta=.14$, $p=.002$ and $\beta=.18$, $p=.03$), as well as teachers' self-efficacy for organizing inquiry-based learning activities ($\beta=.26$, $p<.001$). Furthermore, holding a master degree is negatively related to maintaining objectivist beliefs about history ($\beta=-.43$, $p<.001$). It also negatively impacts teachers' expectations regarding students' ability to conduct historical inquiries ($\beta=-.29$, $p=.03$).

Table 5 further explores the effect of different teaching degrees. Dummy coding, with master degree as the reference level, was used to add the different categories into the SEM. All differences between teachers with a master and bachelor degree (i.e. obtained after a three-year course with a practical focus on teaching history and one or two other subjects) appear to be significant. Although there are similar differences between teachers with a

master degree and those without any formal training in history, most of these are not significant (partly due to the small size of this group, which increases the standard error).

Table 5

Effect of teaching degrees, in relation to that of a master degree

Dependent Variable	β (SE)	
	<u>no formal training</u> (n=46)	<u>bachelor degree</u> (n=261)
Orientation toward history teaching: substantive (OTS)	-.12 (.06)*	-.14 (.05)**
Orientation toward history teaching: procedural (OTP)	-.2 (.15)	-.18 (.09)*
Teacher self-efficacy (TSE)	-.07 (.1)	-.3 (.07)**
Perceived student ability (PSA)	.13 (.14)	.32 (.07)**
Beliefs about the nature of history: objectivism (NHO)	.18 (.11)	.49 (.09)**

Note. Dummy coding, with master degree (n=229) as the reference level, was used to add the different categories related to teachers' degree into the SEM.

7. DISCUSSION AND CONCLUSION

Up until now, most professional development initiatives on inquiry-based learning (IBL) have been characterized by a strong focus on developing teachers' knowledge of inquiry practices, while generally neglecting to follow up on their beliefs (Capps et al., 2012). This is unfortunate, as previous work has warned that professional development does not automatically lead to permanent change in teachers' beliefs (e.g. Voet and De Wever, 2017; McDiarmid, 1994). The present study further underlines the importance for professional development initiatives on IBL to systematically assess and take into account teachers' beliefs, by showing that a large portion (38%) of the variance in history teachers' adoption of IBL can be explained by these beliefs. The findings support the theoretical model presented above, and confirm that teachers' work in practice is influenced by a mixture of beliefs about the subject, self, and social context (Op 't Eynde et al., 2002; Schoenfeld, 1983). In particular, three factors appear to play a key role in their decision-making process: (1) the value attributed to the teaching and learning of procedural knowledge, (2) feelings of competence related to organizing IBL-activities, and (3) the extent to which teachers feel hindered by the classroom environment from carrying out such activities. These three factors are also connected to one another. A plausible explanation is that teachers who place more importance on the development of procedural knowledge goals, will also put more effort into mastering instructional activities

that allow them to teach this kind of knowledge. In turn, their increased confidence for teaching such activities likely results in a more positive view of the working context.

Furthermore, it also seems that part of the differences in beliefs held by teachers can be explained by the extent to which their training has confronted them with academic thinking within their discipline. In line with what previous work has often assumed (e.g. McDiarmid, 1994), history teachers with an academic degree possess beliefs that are more favorable to the adoption of IBL. They appear to attach more weight to knowledge goals in general, including the teaching of procedural knowledge, and also feel more capable of organizing inquiry activities. Similar to what Yilmaz (2010) found, they are also less likely to agree with views that run counter to current academic assumptions about the nature of the field. However, one drawback of the academic training program appears to be that its graduates generally have lower expectations of their students' ability to conduct inquiries. A possible explanation is that, due to their academic focus, such programs might pay less attention to secondary school students' thinking, compared to non-academically oriented training programs.

In contrast to teachers' former training, the study track in which they teach has no significant effect on their beliefs. This finding is not in line with an earlier study suggesting that study tracks might influence history teachers' approach to IBL (Voet and De Wever, 2016). The present study thus seem to provide a new perspective on these previous findings, because, while there is indeed a small effect of study tracks, the analysis indicates that it is in fact not significant.

With regard to IBL's current integration into classrooms, the descriptive findings show that, on average, most of history teachers' beliefs related to IBL are situated around the 'moderate' or middle levels of the corresponding scales. They regard procedural knowledge as 'rather important', feel 'rather able' to organize IBL, and 'rather agree' that the classroom presents a number of obstacles to IBL. As a consequence, their implementation of IBL also remains confined to 'every now and then'. The only exception to this trend is teachers' beliefs about the value of substantive knowledge, where the average approaches the higher end of the scale. As such, it is not surprising that, given the choice, most teachers indicate that they mainly want to develop a basic analytical skillset, through teacher-driven inquiries. Only one out five teachers seems inclined to organize more extensive, student-centered inquiry activities. Similarly, a relatively large group of one out of three teachers reports a focus that lies primarily on learning substantive knowledge. These results resemble the findings of recent research, which concluded that history teachers' attention to historical reasoning remains relatively narrow (Van Nieuwenhuysse, Wils, Clarebout, Draye, & Verschaffel, 2015). Yet, compared to reports from a decade ago, indicating that inquiry was seldom practiced in history education (e.g. Bain, 2006; Hartzler-Miller, 2001), they also point toward a positive

evolution. As a result of the increasing emphasis on disciplinary reasoning skills across curricula, IBL appears to be gradually finding its way into the history classroom.

Finally, there remains one finding that is rather peculiar. History teachers' agreement with objectivist beliefs about history is positively associated with a focus on procedural knowledge goals, whereas researchers have traditionally assumed that teachers who view history as a picture of the past are more inclined to tell its story, rather than to teach students about disciplinary reasoning processes (e.g. McCrum, 2013; Wilson & Wineburg, 1993). In other words, there is no clear-cut explanation as to why teachers who equal history to an objective study of facts would attach more value to the teaching of inquiry competences. Looking further into this matter, a plausible explanation may be found in the instrument used. Even though Likert scales have been commonly used to measure epistemological beliefs about history (e.g. Maggioni, VanSledright, & Alexander, 2009), some have criticized the use of such scales, arguing that the limited number of options offered by such recognition measures do not allow individuals to make their own meaning (see e.g. Wood et al., 2002).

While this may to some extent be true, a review of other literature on epistemological understanding indicates that the actual problem may lie elsewhere. To be more specific, studies have demonstrated that epistemological understanding develops over different stages (King & Kitchener, 1994; Kuhn, Cheney, & Weinstock, 2000), and beliefs about history do not appear to be an exception to this rule (Lee & Ashby, 2000; Lee & Shemilt, 2003). This means that, depending on the particular stage of individuals' epistemological development, they will either agree with or reject particular statements about knowledge. As such, it could be argued that Likert scales asking individuals to indicate the extent to which they agree with certain statements might not be the best approach to measuring epistemological understanding. A more appropriate approach to pinpointing individual' current stage of epistemological understanding, seems to lie in asking individuals to choose between contrasting statements. For example, in the work of Kuhn et al. (2000), participants are presented with two different judgements and then asked to select either: 'only one can be right' or 'both can have some rightness'. Future research could look further examine this issue by comparing Likert scales to other instruments based on contrasting items, and possibly also other measures, such as interview items, in order to find out whether these measures do indeed lead to different results.

A second important limitation of the present study lies in its specific focus on the domain of history education. Even though inquiry practices may differ across domain, previous work describing beliefs about the subject, self, and social context, as a key determinant as cognitive action (Op 't Eynde et al., 2002; Schoenfeld, 1983), suggest that it can be reasonably assumed that these beliefs exert a similar influence in domains other than history. Future research could further investigate this by applying the present study's framework to the study of IBL to

these domains. This would also help to construct a more comprehensive image of the current state of teachers' beliefs related to IBL, which may very well differ across domains.

Another and more general limitation, which is inherent to the survey method, is that the results are derived from self-reports by teachers, and might thus be subject to a social desirability bias. In order to reduce the risk that such a bias might occur, the design of the data collection specifically took into account the recommendations provided by methodological reports (Krumpal, 2013; Nederhof, 2006), such as the self-administration procedure, and the assurance of anonymity. Even so, the available data do not allow to check the extent to which a social desirability bias might have actually influenced the findings.

Despite these limitations, the present study clearly points out the importance of teachers' beliefs in the context of professional development on IBL. Furthermore, it indicates that there is still room for improvement when it comes to history teachers' current implementation of IBL. These findings hold a number of implications for the organization of teacher training and professional development initiatives, and also provide a starting point for future research on teachers' beliefs about IBL.

8. IMPLICATIONS AND FUTURE RESEARCH

So far, professional development on inquiry-based learning has mainly focused on developing teachers' knowledge of disciplinary inquiry and subject matter, while often neglecting to assess their beliefs at regular intervals during training (Capps et al., 2012). The findings of the present study suggests that this is an important shortcoming, as a large part of teachers' decision-making concerning the implementation of inquiry-based learning (IBL) is determined by a combination of beliefs about the subject, self, and social context. More specifically, teachers' implementation of IBL appears to be influenced by their beliefs about (1) the value of procedural knowledge, (2) self-efficacy for organizing IBL, and (3) hindrances associated with working in a specific classroom context. Taken together with previous studies pointing out that professional development does not automatically lead to change in teachers' beliefs (McDiarmid, 1994, Voet & De Wever, 2017), this underlines the importance of systematically following up on teachers' beliefs during professional development on IBL (e.g. by using the instruments introduced by the present study).

A review of the literature identified five types of activities that form the building blocks of most professional development initiatives on IBL: immersion, explicit-reflective instruction, developing lesson plans, reflection, and extended support (also see section '1. Introduction'). It appears that, when used in the right way, some of these building blocks can also be used to (re-)address teachers' beliefs. According to earlier work (Richardson, 2003), teachers' beliefs can be affected through activities that (1) situate the learning of propositional knowledge in authentic situations (e.g. 'explicit-reflective instruction' employing cases or practicums) or (2)

stimulate student teachers' inquiry into their own beliefs (e.g. through alternating 'developing lesson plans' with 'reflection' that focusses on particular subsets of beliefs).

In addition, the results of the present study provide a number of suggestions for determining the focus of such activities. First of all, teachers with an academic training appear to hold beliefs that are more favorable to IBL, as they attach more value to both substantive and procedural knowledge goals and feel more capable to organize IBL. As such, a confrontation with academic practice, thinking and debate within a discipline may provide a good foundation for attending to teachers' beliefs about IBL. Second, however, the results indicate that academically trained teachers also had significantly lower expectations of students' ability to engage in IBL. This suggests that, even though a focus on academic thinking seems to have its benefits, it is important for professional development on IBL not to lose sight of what happens in the actual classroom, for example by concentrating on the ways students may think about the field, or what their capabilities are.

Looking at the current state of IBL within the specific context of history education, the results indicate that, despite a positive evolution over the past decade, there still appears to be room for improvement, as teachers' belief related to IBL remain relatively moderate. This finding thus reveals a promising starting point for professional development initiatives that aim to further promote IBL in history education. The suggestions outlined above can help to inform the design of such activities.

Finally, the present study can serve as a stepping stone for future quantitative research on teachers' implementation of IBL. First of all, the present study casts some doubt on the use of Likert Scales for measuring epistemological beliefs about history. As noted above, instruments based on contrasting items appear to be more fitting for capturing this kind of beliefs. Future research could look further into this matter by comparing results of both instruments against one another, and possibly against a third measure, such as interviews. Furthermore, the scales that were designed and validated within the context of Flemish secondary education can assist other scholarly work that aims to investigate teachers' beliefs related to IBL in other educational contexts. More specifically, future research could investigate teachers' beliefs in domains other than history, or test for other variables that might have an impact on teachers' adoption of IBL.

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10. APPENDIX A: RESULTS OF THE EXPLORATORY FACTOR ANALYSIS (EFA)

Table 6

Eigenvalues of factors 1-8

Factors	Eigenvalues	Variance explained (%)	Cumulative variance explained (%)
1	5.5	21.99	21.99
2	2.89	11.54	33.53
3	2.67	9.07	42.06
4	1.74	6.98	49.58
5	1.38	5.53	55.11
6	1.16	4.64	59.75
7	1.04	4.15	63.9
8	.94	3.77	67.67

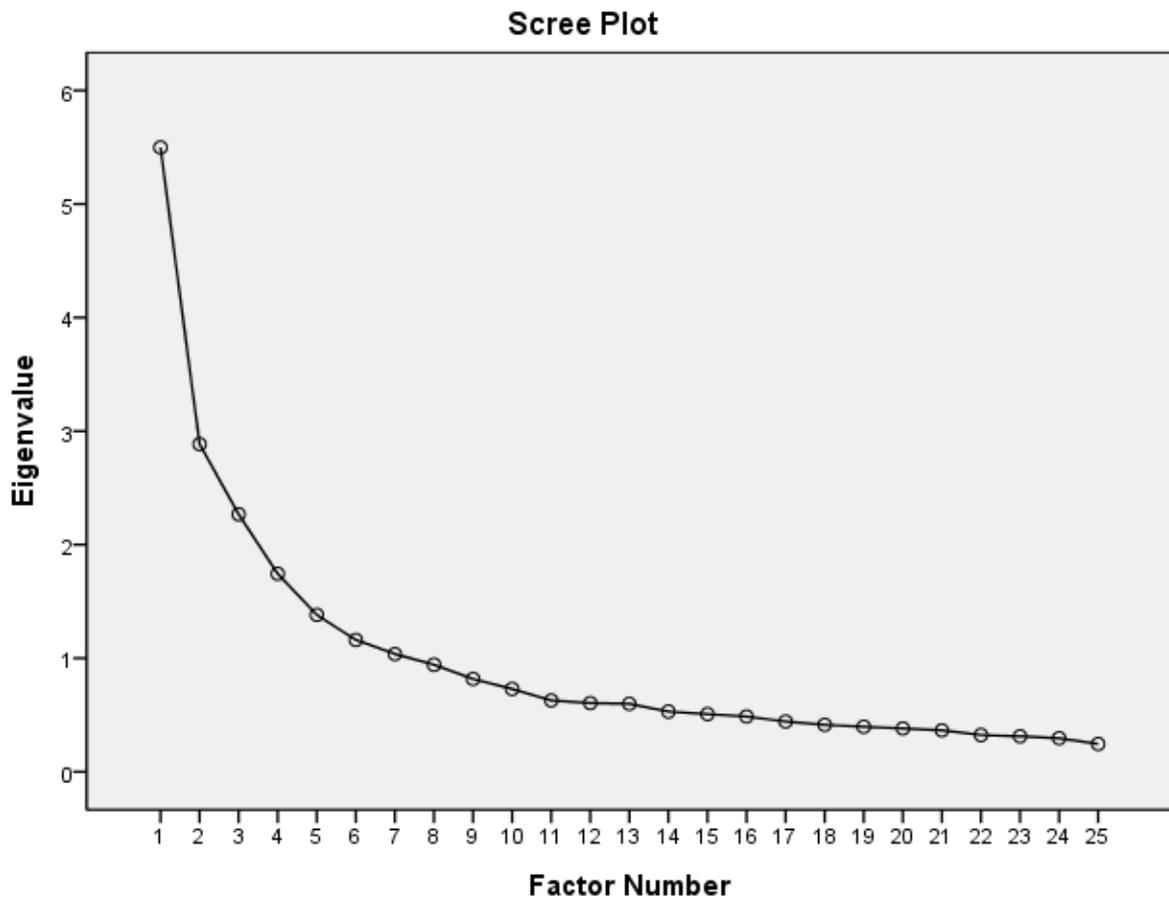


Figure 3. Cattell's scree test

Table 7

Results of the parallel analysis

Factors	Real data eigenvalues	Random data mean
1	4.89	.46
2	2.1	.4
3	1.53	.35
4	1.06	.31
5	.78	.27
6	.67	.23
7	.42	.2
8	.2	.17
9	.1	.14

Table 8

Factor correlations of the 7-factor solution

Scale	HNO	OTS	OTP	TSE	PSA	PCH	AIL
HNO	1						
OTS	-.01	1					
OTP	-.01	.31	1				
TSE	-.18	.05	.37	1			
PSA	-.04	-.05	.21	.26	1		
PCH	-.08	.06	-.19	-.22	-.58	1	
AIL	.03	.09	.43	.36	.30	-.3	1

Table 9

Factor loadings of the 7-factor solution

Items	1	2	3	4	5	6	7
HNO1	0	-.01	-.03	.42	-.16	.09	-.02
HNO2	.06	-.04	.08	.58	-.001	-.08	.06
HNO3	.04	.01	.02	.8	.1	-.06	-.07
HNO4	-.04	.01	-.06	.58	.04	.04	.02
OTS1	.1	.02	.58	-.06	-.12	-.01	.02
OTS2	.03	-.11	.83	.06	.04	.04	-.1
OTS3	-.07	.08	.71	.02	.07	.01	.04
OTP1	.83	.02	-.01	.07	-.06	.04	.04
OTP2	.78	.06	.02	-.02	.12	-.04	.04
OTP3	.59	-.05	-.07	-.05	.07	.14	-.08
TSE1	.07	-.01	-.03	-.002	.76	.03	-.07
TSE2	.07	.04	-.03	.05	.62	.06	.21
TSE3	.05	-.07	.11	-.03	.65	.05	.05
TSE4	-.03	-.01	-.02	-.02	.7	.02	-.04
PSA1	.02	.01	.01	.05	-.03	.04	.85
PSA2	.13	-.16	-.04	-.1	.08	-.08	.53
PSA3	-.06	-.07	-.01	.01	.02	.08	.52
PCH1	-.04	.84	-.01	-.06	.02	.08	.06
PCH2	.03	.79	.01	-.03	-.001	-.02	-.1
PCH3	.04	.68	.01	-.02	-.03	-.1	-.01
PCH4	.03	.59	-.06	.05	-.03	-.01	-.15
AIL1	.2	-.13	.02	-.02	.06	.33	.02
AIL2	-.01	.002	.1	-.002	.001	.69	.02
AIL3	.1	-.06	-.02	-.01	.001	.37	.04
AIL4	-.02	.05	-.04	.01	.09	.75	.01

11. APPENDIX B: SCALES AND ITEMS

All scales were translated from Dutch. Two translators carried out the work independently. Afterwards, both versions were compared and discussed, resulting in the translation presented here.

11.1. History's nature : Objectivism (HNO)

To what extent do you agree with the following statements about historical research (so not about school history)? For each statement, check the answer that is closest to your opinion.

1	2	3	4	5	6
Completely Disagree	Disagree	Rather disagree than agree	Rather agree than disagree	Agree	Completely agree

HNO1. Our image of the past changes almost exclusively through the discovery of new information sources.

HNO2. Historical research comes down to reporting objective data.

HNO3. The result of good historical research is an incontestable report about the facts.

HNO4. History is simply the truth about the past.

11.2. Orientation toward history teaching: Substantive (OTS) and Procedural (OTP)

How important do you think the following goals of school history are, for the grade and study track in which you teach history most frequently? For each goal, check the answer that is closest to your opinion.

1	2	3	4	5	6
Very unimportant	Unimportant	Rather unimportant than important	Rather important than unimportant	Important	Very important

OTS1. Building a historical framework for situating events and phenomena.

OTS2. Gaining insight into the most important characteristics of different time periods.

OTS3. Developing a basic knowledge of turning points in the distant and more recent past.

OTP1. Experiencing how knowledge is generated in history through inquiry.

OTP2. Learning to solve a problem statement through a careful investigation of a series of information sources.

OTP3. Learning about the criteria for good historical research.

11.3. Teacher self-efficacy (TSE)

At this moment, to what extent do you feel able to organize and support the following learning activities during the history lesson? For each statement, check the answer that is closest to your opinion.

1	2	3	4	5	6
Completely unable	Unable	Rather unable than able	Rather able than unable	Able	Completely able

- TSE1. Discussing cases that clarify the role of evidence and interpretation in historical research.
- TSE2. Making students use information sources to form their own, well-grounded interpretations about an event.
- TSE3. Having students make a report of an inquiry with sources, based on sound arguments.
- TSE4. Making students formulate a critical conclusion based on contradictory information.

11.4. Perceived student ability (PSC)*

Too what extent do you feel hindered by the following barriers to teaching competences related to historical inquiry? For each statement, check the answer that is closest to your opinion.

*Note: items are reverse coded.

1	2	3	4	5	6
Completely Disagree	Disagree	Rather disagree than agree	Rather agree than disagree	Agree	Completely agree

- PSA1. Students are not able to apply the basic methods of historical inquiry correctly.
- PSA2. Students have too little prior knowledge of history to conduct their own investigations.
- PSA3. Students lack the motivation to scrutinize information sources on their own.

11.5. Perceived contextual hindrances (PCH)

To what extent do you agree with the following statement about the context of the grade and study track in which you teach history most frequently? For each statement, check the answer that is closest to your opinion.

1	2	3	4	5	6
Completely Disagree	Disagree	Rather disagree than agree	Rather agree than disagree	Agree	Completely agree

- PCH1. You have to overcome a great deal obstacles before you can have students conduct their own investigation of a problem about the past.
- PCH2. Whenever you ask students to scrutinize information sources and report their findings, it does not take long for problems to occur.
- PCH3. It takes a lot of extra effort to make students experience how knowledge about the past is generated.
- PCH4. When I plan to have students conduct a structured investigation, the reality of the classroom often prevents this from happening.

11.6. Adoption of inquiry-based learning (AIL)

How often do you organize the following learning activities during the history lesson, in the grade and study track in which you teach history most frequently?

1	2	3	4	5	6
Never	Seldom	Sporadic	Now and then	Regularly	Very often

- AIL1. Making students carefully scrutinize information sources in order to solve a problem statement.
- AIL2. Demonstrating and having students practice the basic methods of a historical inquiry.
- AIL3. Making students conduct a stepwise investigation of a certain historical fact or phenomenon.
- AIL4. Showing how you can analyze information based on specific research questions.

12. APPENDIX C: RESULTS OF THE STRUCTURAL EQUATION MODEL (SEM)

Table 10

Regressions and covariances of the SEM

Variables		β	SE	Z-value	p
<i>Regressions</i>					
<u>Dependent</u>	<u>Independent</u>				
AIL	OTS	.08	.08	1.02	.31
	OTP	.25	.06	4.53	<.001
	TSE	.19	.07	2.89	.004
	PSA	.05	.08	.65	.52
	PCH	-.11	.06	-2.05	.04
OTS	HNO	.1	.05	2.15	.03
	TDM	.14	.04	3.11	.002
OTP	HNO	.19	.08	2.28	.02
	TDM	.18	.09	2.16	.03
TSE	OTP	.45	.06	7.87	<.001
	TDM	.26	.06	4.32	<.001
PSA	TSE	.55	.07	7.69	<.001
	TDM	-.29	.07	-4.07	<.001
	STC	.1	.07	1.36	.18
PCH	PSA	-.86	.07	-12.1	<.001
	STC	-.05	.08	-0.65	.52
HNO	TDM	-.43	.08	-5.33	<.001
<i>Covariances</i>					
OTS	OTP	.09	.02	4.48	<.001
HNO3	HNO4	.2	.07	2.83	.01

Note. See table 2 for abbreviations of the scales. TDM and STC refer to respectively 'teacher degree: master' and 'study track: 2-hour classes'

Table 11

R-square of the latent variables

Variable	R ²
HNO	.12
OTS	.04
OTP	.02
TSE	.27
PSA	.27
PCH	.5
AIL	.38

5

Towards a differentiated and domain-specific view of educational technology: An exploratory study of history teachers' technology use

This chapter is based on:

Voet, M., & De Wever, B. (in press). Towards a differentiated and domain-specific view of educational technology: An exploratory study of history teachers' technology use. *British Journal of Educational Technology*.

CHAPTER 5

Towards a differentiated and domain-specific view of educational technology: An exploratory study of history teachers' technology use

ABSTRACT

Adopting a differentiated and domain-specific view of educational technology, the present study focusses on the case of school history. It argues that, in this particular context, one of technology's main assets is its ability to support inquiry-based learning activities, during which students interpret the past through historical reasoning. As little is known about how history teachers use technology in the classroom, an exploratory study was carried out with 22 teachers in fourth grade of secondary education in Flanders (Belgium). Semi-structured interviews were used to investigate beliefs about technology, ways in which technology was implemented, and factors influencing the adoption process. The results suggest that most teachers held positive beliefs about technology, and that use of technology was driven by several rationales. Although a significant group of teachers was thoughtful of how their own use of technology could support students' learning, student use remained limited to instances where technology served as a resource for the task, rather than a tool for supporting cognitive or social activity. It appears that teachers were not yet aware of technology's ability to scaffold inquiry activities. Furthermore, limitations in school infrastructure often prevented them from experimenting with more pervasive student uses of technology.

1. INTRODUCTION

Since the 1980s, the use of technology to support learning and teaching has been highly valued in educational research, as it has often been assumed that technology can turn learning activities into more active and engaging processes, and make schools more effective than they currently are (Cuban, 2001). In the decades that followed, however, reports revealed that implementation of technology was often obstructed by factors internal to the teacher, as well as external barriers situated across different levels of educational practice. In a review of these studies, Hew and Brush (2007) outlined six types of barriers that interacted in influencing teachers' decision to adopt technology: (1) lack of time and resources, (2) limited knowledge and skills, (3) unsupportive leadership and school time-tabling, (4) negative attitudes and beliefs, (5) pressures of high-stakes testing, and (6) incompatibility with subject culture norms. As a consequence, a large part of the research conducted during the past decade focused on

overcoming these barriers (Ertmer, 2005; Haydn & Barton, 2007). The result was a number of design principles for technology courses in teacher training, with recommendations such as: providing role models, offering opportunities to learn by design, and learning with and from peers (see also the review of Tondeur et al., 2012).

Recent large-scale surveys on technology in education suggest that the increased attention to this issue is now starting to bear fruit. The ICT in Education Survey of schools, carried out on behalf of the European Commission (2013), gives an overview of the situation in Europe (i.e. the 28 member states of the EU, but also Iceland, Turkey, and Norway). The results indicate that teachers are now confident in their ability to use technology, hold positive beliefs about technology's potential for improving students' learning process, and organise more technology-based learning activities compared to several years ago. A more global perspective is provided by the Teaching and Learning International Survey (TALIS), conducted by the OECD (2014) in 35 nations across several continents (i.e. Australia, Asia, Europe, North and South America). Similar to the European context, the data suggest that more than 80% of the teachers provide students with projects or class work involving the use of technology, although some teachers do so more frequently than others.

At the same time, it has been argued that, instead of examining teachers' implementation of technology in general, there is a need for a *differentiated view* that distinguishes high- from low-level use of technology (e.g. Ertmer, 2005). Whereas low-level use serves to optimise traditional teaching practices, high-level use is aimed at fostering the development of higher-order thinking skills through more student-centred learning (Ertmer, 2005; Smeets & Mooij, 2001). Similarly, others have criticized most of the literature for not taking a *domain-specific perspective* towards teaching with technology, claiming that the subject matter is decisive for determining the ways in which technology can be of assistance (Haydn & Barton, 2007). A significant body of research has therefore called for an approach that does not merely focus on whether technology is used, but rather on *how* it is used *within* specific subject domains (e.g. Mishra & Koehler, 2006).

In short, there is a need for more domain-specific studies, focussing on how teachers use technology to instruct a particular subject. The present study is part of a research project on school history (see also Voet & De Wever, 2016) and sets out to provide a more clear picture of high-level use within this specific context, in order to examine teachers' practice.

2. DEFINING HIGH-LEVEL USE OF TECHNOLOGY IN HISTORY EDUCATION

In history, higher-order, disciplinary thinking markedly differs from that in other domains. This is mainly because knowledge of the past is neither fixed nor given (Lee, 2005). Instead,

the past is constructed by historians, through study of human-constructed artefacts that generally represent a particular world view, and offer only a piece of the historical puzzle. Information must therefore be meticulously interrogated and corroborated, but may still give rise to more than one plausible interpretation of the same event (Reisman, 2012). Becoming adept at historical reasoning therefore means that students must learn to: (1) ask relevant historical questions, (2) assess the value and reliability of sources in light of the questions asked, (3) interpret and situate information within its historical context, (4) form a conclusion by weighing arguments based on the available evidence, and (5) draw on domain-specific terms and concepts as 'tools' for thinking (for more information, see the review by van Drie & van Boxtel, 2008).

Involving students in authentic *inquiry-based learning* activities that draw on one or more of these aspects of historical reasoning has been put forward as a logical, but also effective, approach to realizing this goal (Reisman, 2012). As such, inquiry-based learning activities have consistently moved toward the center of scholarly work and history curricula across the world (van Drie & van Boxtel, 2008). In practice, however, the ill-structured nature of inquiry-based learning makes it difficult for novices to successfully complete such activities without assistance (Hmelo-Silver, Duncan, & Chinn, 2007). For instance, it has been found that students do not spontaneously adopt an analytical approach to information, and often find it difficult to balance multiple arguments (van Drie & van Boxtel, 2008). Fortunately, other studies also indicate that technology can help teachers to offer the support required for facilitating reasoning during inquiries. Bearing in mind the prior characterization of high-level use of technology as a means to stimulate both student-centred learning and higher-order thinking, this, then, is how high-level use of technology in history can be understood.

Looking further into this matter, research shows that high-level use of technology can facilitate historical inquiries in several ways, by providing either cognitive or social support, or both (Weinberger, Ertl, Fischer, & Mandl, 2005). When used as a cognitive tool, technology stimulates or supports students to engage in the domain-specific reasoning processes outlined above. For example, Saye and Brush (2002) described how a combination of storyboard templates and hyperlinks connecting different information sources assisted students in resolving conflicting accounts, and encouraged the creation of a personal narrative. Alternatively, when used as a social tool, technology can help to facilitate students' collaborative reasoning. An illustration can be found in the work by Higgins, Mercier, Burd, and Joyce-Gibbons (2012), who conclude that certain features of multi-touch tables, such as a shared display and a zoom function, increased students' joint attention to clues in a historical inquiry task, and hence stimulated a constructive approach to the task.

In short, this overview makes the case that, in the context of school history, one of the main assets of technology is its ability to support inquiry-based learning activities, during which students engage in historical reasoning. As of yet, little is known about the ways in which history teachers actually use technology in their daily classroom practice. The question thus arises whether teachers have in fact embraced the examples of high-level use of technology that have been put forward by scholarly work, in addition to any low-level use that may also be present in their teaching. Therefore, the present study aims to investigate the ways in which history teachers use technology to support learning within their classrooms.

3. DESIGN AND METHOD

The study is part of a research project on history teachers' conceptions of the nature of their subject, and the way it should be taught. The main goal of this project was to explore how teachers integrated inquiry-based learning activities into their lessons, as well as to examine the beliefs that underlie their approach (for more information, see Voet & De Wever, 2016). Interviews were selected as the method of data collection, in order to provide teachers with the opportunity to describe and explain their use of technology in their own words.

3.1. Participants' selection and background

In total, 22 teachers from various secondary schools in Flanders (Belgium) were interviewed about their use of technology. In Flanders, secondary education spans six grades, with students generally starting at age 12 and graduating at age 18. Depending on the grade and study track that they have chosen, the majority of Flemish students receives either one or two 50-minute history lessons during each week of the school year. From the third grade on, the broad attainment targets set out by the government start to put a strong focus on inquiry skills, such as finding, selecting and analysing information (Flemish Government, 2014). In the present study, only teachers working in fourth grade (average student age: 15-16 years old) were allowed to participate. In addition, only teachers with at least three years of experience in teaching history could take part, to ensure that all participants had had sufficient time to experiment with the use of technology in the classroom. Finally, potential participants were only told that the study would explore their classroom practice (i.e. technology was not mentioned), in order to avoid a selection bias. Participants' mean age was 43 years (SD: 11 years) and their mean experience in teaching history was 15 years (SD: 8 years). Exactly half of the group was male, the other half was female. A first group of 5 teachers held a Bachelor degree (three-year university college program). The other 17 teachers had received an advanced degree, with 16 having obtained a Master degree (four-year university program, followed by a one-year teacher training), and 1 also a PhD (in history).

3.2. Data collection and analysis

Each teacher took part in a semi-structured interview, focussing on (1) beliefs about technology in education, (2) ways in which technology was used during the history lesson, and (3) factors that influenced the implementation of technology (see appendix 1 for the complete interview protocol). All interviews were recorded, transcribed and then coded using NVivo 10. Using the overview of high-level technology use in history as the guiding framework, a preliminary reading of the transcripts allowed to construct a coding scheme for analysing history teachers' technology use more closely. This coding scheme was applied to the interviews in order to identify and label units of meaning, expressing a single idea. In line with the central themes during the interview, the main codes included: beliefs, types of use, and barriers. Each of these main codes was then further split into a number of sub-codes (e.g. 'types of use' was split up into 'teacher use' and 'student use', which in turn covered several codes corresponding to specific applications). Following the recommendations of Miles and Huberman (1994), a matrix holding a summary of each teacher's individual case was compiled after the coding was completed, as a visual aid to the interpretation of the data.

4. RESULTS

When teachers talked about their school and the history classroom, it became clear that each of them worked in an environment that offered several possibilities for teaching and learning with technology. All teachers gave their lessons in classrooms equipped with a computer connected to a beamer, or an interactive whiteboard. An Internet connection was often available, either through cable or wireless access. Although most classrooms did not hold computers for students, teachers could generally request to have their lessons scheduled in the school's computer lab or, in some cases, make a reservation for a mobile tray with student laptops. Partly because of these conditions, all participating teachers reported that they frequently used technology in their class. This also became clear from their accounts of technology use, which drew on a number of classroom experiences.

4.1. Rationales for technology in instruction

As teachers related their beliefs about technology and its role in history education, there emerged four clearly distinct rationales for adopting technological tools for instruction. In general, teachers used technology to (1) increase the effectiveness of instruction, (2) connect to students' daily life, (3) increase work efficiency, or (4) comply with a subjective norm. Table 1 provides an outline of these findings.

Table 1

Rationales for technology use

Category	Description	Frequency
<i>Increasing effectiveness</i>	Technology offers new possibilities to meet the needs and interest of all students in class.	17
<i>Connecting to everyday life</i>	Seeing that technology is ubiquitous in everyday life, it should not be kept out of schools.	12
<i>Increasing efficiency</i>	The use of technology reduces teachers' workload and allows to focus more on teaching.	11
<i>Complying with subjective norm</i>	Technology is used because influential others (e.g. colleagues, inspection) think it is important.	4

Most important, 17 teachers firmly believed that technology is able to make teaching more effective, by enabling teachers to quickly switch between teaching methods, providing aids to improve students' understanding, or drawing their attention. As teacher 11 said: "There are some students that learn more... Some students have an auditory disposition, while others have a visual one. Some have both of them. Technological support helps you to cater to all of them, to reach as much students in the group as possible."

A second rationale for using technology, mentioned by 12 teachers, was a belief that education should reflect students' daily life. As teacher 16 stated: "I think it is important for education, because they are using it every day. It is, after all, the world they live in. And it is increasingly becoming our world, so I cannot see why it should be kept out of schools." Teacher 6 held the same beliefs, but added that schools also have a role in building students' proficiency with these tools: "I think it is important that they learn how to use the tools of the current age. They have to be able to keep up with the changes of our time."

Third, 11 teachers also mentioned that technology assisted them in working more efficiently. For teacher 8, one of the most important changes was that: "You no longer need to spend all your time writing on a blackboard with your back to the students. It allows me to keep my connection with the class, and makes teaching so much easier for me." Similarly, teacher 4 noted that: "It has made teaching more agreeable to me. For instance, if you have to give the same lesson 10 times, and you use PowerPoint, you have to prepare it only once. Without technology, you would still need to use the blackboard during each of these lessons."

A last rationale, which surfaced during the interviews with a minority of 4 teachers, involved a need to comply with a subjective norm. These teachers reported how others, such as their colleagues, or school inspectors checking up on the realisation of the governments' attainment goals, expected them to use technology in their teaching. Whereas most only

regarded this as a minor influence, teacher 2 admitted that she would not use technology if the decision would be left entirely up to her: "In fact, I could do without... The main reason I use technology is to keep others satisfied. I do believe it has potential, but there are a lot of things that prevent me from going any further" (see also part 3 of the results section on factors inhibiting technology use).

4.2. Types of technology use

Looking at teachers' adoption of technology to support learning, a general distinction can be made between teacher use and student use of technology. The former refers to instances where technology is used exclusively by the teacher, whereas the latter involves cases where students actively work with technology.

Table 2

Types of technology use

Category	Description	Frequency
Teacher use		
<i>Bringing the past into class</i>	Employing multimedia to let students experience certain aspects of the past.	17
<i>Structuring the learning content</i>	Using presentation and diagramming tools to point out the core insights of the lesson.	5
<i>Looking up information</i>	Searching the web for information to answer unexpected student questions.	6
Student use		
<i>Looking up information</i>	Searching the web for information to construct a report about a topic in history.	15
<i>Presenting findings</i>	Using various software to report findings within the context of an assignment.	9

As teachers talked about their classroom practice, 18 provided illustrations of both teacher use and student use of technology, while 4 solely mentioned examples of teacher use. The analysis revealed three types of teacher use of technology, next to two types of student use. Teacher use was mainly aimed at (1) bringing the past into the classroom, (2) structuring the learning content and (3) looking up information to answer student questions. On the other hand, student use generally involved (1) looking up information to report on a historical topic, or (2) creating multimedia to present the findings of such activities. An overview of these findings is presented in table 2.

Looking at *teacher use of technology*, a large majority of 21 teachers argued that the largest potential of technology lay in its power to store impressions of the past, and present those to students in the classroom. As teacher 3 said: “For instance, you are able to bring the medieval ages to life. Some time ago, we were covering roman and gothic architecture, which is hard to explain without pictures to illustrate the differences. [...] Otherwise, most students would not understand what I am talking about. I think it is very important, and students themselves often say that they are better able to remember something if they have seen it.” Next to this, 5 teachers noted that technology offers a number of possibilities for structuring the learning content. For example, teacher 11 remarked that: “There is PowerPoint, but that is already somewhat outdated. There are other ways now. I have a tool installed on my computer that allows me to make mind maps, which I sometimes use when I am trying to point out the main ideas near the end of a lesson.” Finally, 6 teachers also expressed themselves positively about how technology allows teachers to look up additional information during lessons, in order to answer student questions. Teacher 12 said that: “When students want to know or have trouble understanding something, you can look it up on the Internet and find the answers to their questions. Being a teacher does not make me all-knowing.”

With regard to *student use of technology*, a large group of 15 teachers reported giving students assignments that required them to use the Internet for looking up and comparing information sources, with the goal of drafting a report about a historical topic. As teacher 5 indicated, the Internet gave her students access to sources that she otherwise would not be able to bring into the classroom: “If the information is on the Internet, they can access it, through online archives, and such. There was an assignment that I gave for two years, for which they always had to use the Internet. I asked them to visit the archives of the Public Welfare Centre, in order to look at the records of foundlings and other sources stored there.” Next to this, 9 teachers regarded technology as a medium that students could use to present their findings within the context of an assignment. Illustrating this, teacher 19 recounted: “I made a task on the origins of the EU, which provides students with an introductory text and some questions. I expect them to use these to create a short lecture, using a PowerPoint, to convince me that they have learned something. They should learn how to present the results of their work in a structured way.”

4.3. Factors inhibiting technology use

Overall, teachers’ adoption of technology seemed to be inhibited by three factors, of which the first one was situated at the school level, and the other two were internal to the teachers. These inhibiting factors were related to (1) school infrastructure, (2) perceived added value of technological tools, and (3) proficiency with technology. An overview of these findings is presented in table 3.

Table 3

Factors inhibiting technology use

Category	Description	Frequency
<i>School infrastructure</i>	Malfunctioning equipment and limited access to computer labs can make it hard to use technology.	12
<i>Perceived added value</i>	The value of technology decreases when it does not improve traditional approaches.	9
<i>Technology proficiency</i>	Some teachers feel unfamiliar with technology, making them slower in unlocking its potential.	4

School infrastructure turned out to be a major inhibitor. It was brought up by 12 teachers, and typically in a negative way. Teachers either complained about limited possibilities for having students use technology, due to busy schedules for computer labs, or technological difficulties, such as regular malfunctions of the school's Internet or incorrect equipment settings. This first factor appeared to be particularly present in cases where teachers had referred to a subjective norm as one of the rationales for technology use. For instance, teacher 2, who had admitted earlier that she primarily used technology to keep others satisfied, complained that: "It bothers me to no end that there are always surprises. Sometimes, I open the closet and all of the cables are gone. In some classes, it is really hard to look for a solution and keep control at the same time. At other times, I cannot find the remote, or the Internet is down. Those are tough problems, which make me want to teach without..."

Second, teachers' remarks about the different applications that they used in the classroom indicated that a large part of them were critical about their usefulness. Out of all teachers, 9 explicitly mentioned that technology should only be used in class if it offers a certain added value. Teacher 8, who recently participated in an in-service training, related that: "It was about interactive whiteboards. I attended the session, and other teachers explained how you could use it. I want to use it, but it seems that it cannot really do much more than PowerPoint. Whether you write on the board with an electric pen or chalk, it really does not make a difference. It has to offer something that you cannot do without it. And when you find what it is, you can use it in class". Adding to this, teacher 7 was convinced that: "A good teacher is not simply one who uses technology, but one who uses technology to help him achieve the learning goals that he has set".

The third factor revolved around teachers' proficiency with technology. A small group of 4 female teachers between 35 and 65 years reported a rather limited capability. Each of these teachers explained how they were largely unfamiliar with most of the technological equipment in the classroom, because they had grown up without them. Still, however, this did

not appear to stop them from implementing technology, but mainly seemed to slow down their adoption process. As teacher 20 said: “One time, I was teaching with tablet computers. I was writing something on the blackboard and told a student to grab a piece of paper. But this student told me that we could also use the tablet. The fact that I am not from the digital age, is the largest obstacle for me. I still have to acquire all this knowledge, because I just do not have it.”

5. DISCUSSION AND CONCLUSION

Advocating a differentiated and domain-specific view of educational technology, the present study focuses on history teachers’ use of technology. It argues that, in school history, high-level use of technology can be defined as instances where technology is used to facilitate student-centred inquiries into the past. When used as a cognitive or social tool, technology can respectively stimulate students to engage in domain-specific reasoning processes, such as assessing the value of information or using evidence to construct arguments (e.g. Saye & Brush, 2002), or promote a constructive approach to the task (e.g.g Higgins et al., 2012).

In line with recent large-scale research (European Commission, 2013), the results suggest that today’s history teachers hold mainly positive beliefs about educational technology. Most teachers personally valued technology and, sometimes citing up to three different rationales, believed that it could make their teaching more effective, mend the gap between school and students’ daily life, or simply allow them do their work more efficiently. However, in a few cases, teachers also indicated that they had adopted technology because they felt compelled by social (e.g. colleagues) or institutional (e.g. an inspector verifying the attainment of the national curriculum) pressures. This finding is in line with earlier studies reporting how teachers’ technology use is not only determined by personal values, but also by external influences situated at different levels of the educational system (e.g. Hew & Brush, 2007).

Furthermore, the present study confirms that, next to using technology themselves, the majority of teachers also organise activities during which students actively use technology (OECD, 2014). The results show that that teachers carefully considered how their own use of technology could improve students’ understanding. From this angle, technology’s main potential was often described in terms of using multimedia to bring the past into the classroom, in order to illustrate and clarify the learning content. Yet, when teachers talked about student use of technology, they generally reported instances where technology served as a resource for student work (e.g. using the Internet to gain access to information sources, making a PowerPoint to present an overview of findings), rather than a tool for scaffolding inquiry-based learning activities. None of the teachers appeared to use technology as a cognitive or social tool for supporting students’ reasoning with historical information, after the manner of the examples presented by earlier work (Higgins et al., 2012; Saye & Brush,

2002). The results thus indicate that, although teachers frequently used technology, their approach did not correspond to high-level use of technology in history.

However, it turned out that a significant number of teachers were nevertheless critical users of technology, who argued that its use must be warranted by a certain added value. Even though they were not using technology to the best advantage, they thus appeared to be in the process of adopting a differentiated view, similar to what the present study advocates (see also Ertmer, 2005). One of the reasons that these teachers then did not report high-level uses of technology, may be that they are simply unaware of its potential as a tool for facilitating student inquiries. Next to this, the results also indicate that limited access and insufficient technological support continue to form a major barrier to organizing more pervasive, student-centred activities with technology (Cuban, 2001). This is in part surprising, as earlier work has made a number of suggestions to resolve these issues, such as the use of trained student helpers, or rotation systems enabling each student to use technology during a certain amount of the lesson time (Hew & Brush, 2007).

Finally, the finding that a limited proficiency with technology was mainly reported by female middle-aged to older teachers could be coincidental due to the small sample, but is nevertheless in line with earlier work (Ilomäki, 2011). However, as current teacher training programs are increasingly paying attention to learning to teach with technology (e.g. Tondeur et al., 2012), it seems likely that this last barrier will gradually cease to exist in the near future.

6. FUTURE WORK

The finding that history teachers' adoption of technology does not correspond with what the present study has described as high-level use in history, holds a number of implications for future research. This finding first of all calls for further investigation, as an important limitation of the present study is that the available data are limited to what teachers reported during interviews. In addition to more large-scale research, other qualitative methods, such as observations, would therefore be important to increase knowledge of history teachers' technology use. Furthermore, future research could also examine how teachers might be supported in learning exactly how high-level use of technology can be realized within the context of history education.

With regard to educational practice, the results indicate that teacher training programs should carefully reflect on whether their current technology courses endorse a differentiated and domain-specific view. Related to this, one of the main questions is whether these programs give sufficient preparation on how technology can be used as a cognitive or social tool for supporting students' historical reasoning. The frequently cited barrier of limited access and insufficient technological support also suggests that more efforts should be made to disseminate recommendations found within the literature across

the educational sector, so that schools can make the most of their often limited infrastructure.

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8. APPENDIX A: INTERVIEW PROTOCOL

8.1. Introduction

- Thank the teacher for participating in the study.
- Explain that the goal of the research is to investigate teachers' approach to history teaching, in order to explore and get an overview of current practices in history education.
- Emphasize our interest in the teacher's own opinion, and that there are no right or wrong answers.
- Ask permission to tape the interview, and explain that all data will be treated confidentially.

8.2. Background

- What is your age?
- How long have you been teaching history in secondary school?
 - How long have you been teaching the subject in grade 4?
- What higher education courses did you follow prior to teaching?
- Why did you ultimately become a history teacher?

8.3. Teaching approach

- Which pedagogical approach is most fit for teaching history, and why?
 - What is the main strength of this approach?
 - What are weaknesses of this approach?
- Can you describe your own teaching approach during a 50-minute period of history?
 - Which phases can be distinguished in each lesson?
 - What are you doing during each phase?
 - What are the pupils doing during each phase?
- According to you, is an inquiry (e.g. with multiple information sources) a good approach for teaching knowledge and skills? Why (not)?
 - Do you use this approach during your own lessons?
 - *[If yes] Please describe how you implement inquiry in the classroom*

8.4. Beliefs about and use of technology

- Do you think it is important that history teachers use technology, such as computers, iPads?
 - How do you feel about technology?
 - Does technology offer added value?
- Do you use technology to prepare your instruction?
 - *[If yes]* Can you explain how and for what purposes you use technology?
 - *[If no]* Can you explain why not?
- Do you use technology in your classroom?
 - *[If yes]* Can you clarify how and for what purposes technology is commonly used?
 - *[If no]* Can you explain why not?
- Do your students sometimes use technology in class?
 - *[If yes]* Can you describe how students use technology and for what purposes?
 - *[If yes]* Does students' use of technology differ from your own use as a teacher, or do they overlap?
 - *[If no]* Can you explain why not?
- Does students' homework sometimes involve use of technology?
 - *[If yes]* Can you explain in what ways technology is involved in students' homework, and why?
 - *[If yes]* Does students' use of technology at home differ from that in the classroom?
 - *[If no]* Can you explain why not?
- Do you think technology may be able to help you with organizing or supporting student inquiry activities?
 - *[If yes]* Please explain why you think so.

- *[If no]* Can you explain why not?

8.5. Contextual influences

- What stimulates, or could stimulate you, to use technology during your work as a teacher? These factors can be both personal or situated at school level.
- Which barriers obstruct you from using technology for the history lesson? Again, these can be both personal or situated at the school level.

8.6. End

- Say that this concludes the interview, and ask whether the teacher has additional comments related to the topics of the interview, or more general remarks or questions.
- Again, thank the teacher for participating in the study.

6

How does immersion in inquiry-based learning affect student teachers' beliefs? The effects of a technology-enhanced inquiry environment in history teacher training

This chapter is based on:

Voet, M., & De Wever, B. (submitted). How does immersion in inquiry-based learning affect student teachers' beliefs? The effects of a technology-enhanced inquiry environment in history teacher training. *Instructional Science*.

CHAPTER 6

How does immersion in inquiry-based learning affect student teachers' beliefs? The effects of a technology-enhanced inquiry environment in history teacher training

ABSTRACT

Professional development on inquiry-based learning (IBL) generally draws heavily on the principle of providing instruction in line with what teachers are expected to do in their classroom. So far, however, relatively little is known about how this impacts teachers' beliefs, even though these beliefs ultimately determine their classroom behavior. The present study therefore investigates how a technology-enhanced learning environment, used for facilitating IBL in history teacher education, affects student teachers' beliefs about teaching and learning history, in addition to their self-efficacy for inquiry. In total, 302 history teachers participated in a four-hour long inquiry activity designed within the WISE learning environment, and completed a pre and posttest right before and after the intervention. Multilevel analyses suggest that the intervention had a significant positive effect on the value that student teachers attributed to procedural knowledge goals, or learning how historical knowledge is constructed, and on student teachers' self-efficacy for conducting inquiries. Despite these general positive results, however, the results also show that the impact of the intervention differed significantly across students. In particular, it appears that immersion in IBL had little effect on a subgroup of 25 student-teachers, who held largely content-oriented beliefs. Based on these findings, the present study discusses a number of implications for professional development on IBL.

1. INTRODUCTION

Arguing that one of the main goals of education is the development of students' capability to manage information in order to solve problems or make everyday decisions, many recent educational reform initiatives, especially within science learning, have advocated the adoption of *inquiry-based learning* (IBL) in schools (Brand & Moore, 2011). IBL is a pedagogical approach that provides students with authentic problems, and the materials that allow them to construct their own conclusions (Hmelo-Silver, Duncan, & Chinn, 2007). As such, IBL leaves more room for student initiative and creativity compared to traditional textbook exercises (Yerushalmy, Chazan, & Gordon, 1990). Previous research indicates that IBL is more effective in developing scientific thinking skills than traditional, expository teaching approaches (e.g.

Kuhn, 2010). Furthermore, recent meta-analyses show that IBL can even lead to higher student achievement, provided that students are given sufficient support (Alfieri, Brooks, Aldrich, & Tenenbaum, 2011; Furtak, Seidel, Iverson, & Briggs, 2012; Lazonder & Harmsen, 2016).

Given the increasing interest in IBL, there has emerged a body of research on professional development initiatives supporting teachers' adoption of this pedagogical approach (e.g. Brand & Moore, 2011; Crawford, 2007; Levy, Thomas, Drago, & Rex, 2013; Lotter, Yow, & Peters, 2014; Morrison, 2014; Nadelson et al., 2013; Voet & De Wever, 2017a). Most of these initiatives start from the 'teach as you preach' principle, which is about putting into practice what teachers are expected to do in their own classrooms (see e.g. the review by Capps, Crawford, & Conostas, 2012). This principle has its roots in social learning theory, which states that "most of the behaviors that people exhibit are learned, either deliberately or inadvertently, through the influence of example" (Bandura, 1971, p. 5). Building on this, Lortie (1975) found that teachers' long 'apprenticeship of observation' during their own time as students caused them to teach very similar to how they themselves were taught. Professional development initiatives therefore generally assume that, in order to get teachers to organize IBL in their classrooms, they first of all need to work through a substantive amount of content in a way that mirrors this pedagogical approach (McDermott, 1990). Instead of merely delivering information about IBL, immersion in IBL thus aims to provide teachers with 'good practices', in the hope that teachers will subsequently adjust their teaching based on their observations (Struyven, Dochy, & Janssens, 2010).

An overview of good practices is, by itself, not enough to reach sustainable change, however. In fact, research has shown that teachers' behavior in class is strongly connected to the *beliefs* they hold about teaching and learning (see e.g. the reviews by Kagan, 1992; Pajares, 1996). In short, a belief is 'a proposition which may be consciously or unconsciously held, is evaluative in that it is accepted as true by the individual, and is therefore imbued with emotive commitment' (Borg, 2001, p. 186). The main question is, therefore, whether immersion in IBL during professional development initiatives is able to alter beliefs that teachers have formed during their long careers as students. In relation to this, some have also argued that, even though immersion in IBL is very important, without a meta-commentary that makes the underlying ideas explicit, the desired improvements may fail to occur (Swennen, Lunenberg, & Korthagen, 2008).

Unfortunately, there is not much information available on the impact of immersion in IBL on teacher beliefs with regard to IBL, as very few professional development initiatives have systematically assessed teacher beliefs (Capps et al., 2012). Apart from the question as to how immersion in IBL affects teachers' beliefs, it is also not clear whether its specific effects are similar for each individual. The present study therefore sets out to provide more clarity with

regard to this issue, by examining how pre-service history teachers' beliefs are affected through engagement in IBL within a technology-enhanced learning environment. In what follows, the concepts of teacher beliefs and technology-enhanced inquiry are further discussed.

2. A DOMAIN-SPECIFIC APPROACH TO IBL AND TEACHER BELIEFS

Research has demonstrated that, although the core attributes of IBL remain unchanged across domains, its actual form varies depending on a domain's specific nature (Donovan & Bransford, 2005; Levy et al., 2013). For instance, Levy et al. (2013) showed that, whereas inquiries in science center around posing claims backed with data collected from investigations of the natural world, inquiry in English language arts teacher education is largely driven by the questioning of discourses and metanarratives. In relation to this, Pajares (1992) argued that teacher beliefs may also differ depending on the domain under investigation. Subjects' impact on teachers' thinking appears to be even stronger in reality, as research reveals that schools are generally home to a number of subject subcultures, each with their own values and beliefs (Grossman & Stodolsky, 1995). As such, it is clear that an investigation of teacher beliefs with regard to IBL must be situated within a domain-specific framework.

The present study is situated within the context of history education, a field in which inquiry is based on the central assumption that knowledge is constructed, rather than extracted, from evidence (Wilson & Wineburg, 1993). This is because historical sources are human crafts, which were made from a particular point of view, and thus inevitably represent a partial account of the past (Rouet, Marron, Perfetti, & Favart, 1998). Historical explanation therefore requires the mediation of a historian, who has to sift through, interpret, evaluate, and integrate the available evidence (Kuhn, Weinstock, & Flaton, 1994). This does, however, not imply that historical explanations are merely opinions, but rather that their value depends on the arguments and evidence used to support them (van Drie & van Boxtel, 2008). As a result, IBL in history is both interpretative and argumentative in nature.

When it comes to translating these principles of historical inquiry into IBL activities, research suggests that, next to conceptions of their work environment, teachers' decision to organize IBL in class is largely driven by their beliefs about teaching the subject, and perceived competence for organizing IBL (Voet & De Wever, 2017b). The focus of the present study lies on the latter two types of beliefs, as these can act as a drive that stimulate teachers to work around constraints presented by their working context. First, teacher *beliefs about teaching the subject* can be divided into substantive and procedural knowledge goals, to which teachers may attribute different values (Lee & Ashby, 2000; VanSledright & Limón, 2006). In short, substantive knowledge goals are concerned with acquiring a framework of the past (e.g. knowledge of historical periods, evolutions, and patterns), whereas procedural knowledge

goals mainly focus on learning to investigate the past (e.g. knowledge of heuristics, inquiry standards, meta-concepts). Second, teachers' *perceived competence for organizing IBL* strongly depends on their self-efficacy to conduct their own inquiries. Or in other words, in order to get teachers to implement IBL in class, they must first feel competent to conduct their own inquiries (Martin & Monte-Sano, 2008).

3. IMPROVING THE INQUIRY EXPERIENCE THROUGH TECHNOLOGY

As noted before, the effectiveness of IBL largely depends on the support that is provided (Alfieri et al., 2011; Furtak et al., 2012; Lazonder & Harmsen, 2016). In the context of professional development initiatives, where teachers may not have yet mastered inquiry (Capps et al., 2012), it is therefore important to provide sufficient guidance during immersion in IBL, in order to ensure a positive inquiry experience on behalf of the participants. In light of this, Lazonder and Harmsen (2016) point out that support can vary from less specific forms of guidance, such as simple process constraints that are used to structure the inquiry, to more specific guidance, such as scaffolding that takes over more demanding parts of the inquiry. In practice, however, it is often challenging to implement these forms of guidance into IBL activities (Kim, Hannafin, & Bryan, 2007).

A possible solution to this practical conundrum may lie in the use of educational technology, all the more so because several researchers have argued that one of technology's main assets within the context of history education is its ability to support IBL activities (e.g. Copeland, 1985; Voet & De Wever, in press). More specifically, technology offers the possibility to create multimedia that can take the form of investigation tools, record-keeping tools, or knowledge sources (Edelson, Gordin, & Pea, 1999). As a result, there has been considerable interest in the use of technology for supporting IBL (see e.g. Linn, Davis, & Bell, 2013; van Joolingen & Zacharia, 2009), with some arguing that technology may also enhance interest and motivation for IBL (Blumenfeld et al., 1991), or in other words, positively influence teachers' beliefs with regard to IBL.

Furthermore, an added benefit of technology-enhanced learning environments in history, is that they may include sources other than the documentary evidence common to pen-and-paper inquiries (De La Paz & Felton, 2010; Reisman, 2012). Technology-enhanced learning environments may present students with sources that contain more varied information about the past, such as sound recordings and film fragments (van Drie & van Boxtel, 2008), or may even make use of digital source archives created by libraries, universities, or government agencies (Swan & Hicks, 2007). In short, this makes it clear that the use of a technology-enhanced learning environment offers several benefits for professional development initiatives that aim to immerse participants in IBL.

4. RESEARCH QUESTIONS

Building on the theoretical framework outlined above, the present study investigates how immersion in IBL through a technology-enhanced learning environment may impact student teacher beliefs. In particular, the focus lies on beliefs that are relevant to IBL's implementation in classroom. As such, the research questions are:

- How does immersion in IBL through a technology-enhanced inquiry environment impact student teacher beliefs about teaching the subject, and self-efficacy for inquiry?
- Does the impact of immersion in IBL vary across student teachers?

5. DESIGN AND METHODS

This section provides more information about the context of the study and its participants, as well as the technology-enhanced learning environment used to model IBL. With regard to the latter, the focus particularly lies on clarifying the design principles that formed the basis for the learning environment, as well as the ways in which technology was used to support and enrich the inquiry experience. Afterwards, this section also gives an overview of the instruments and methods of analysis that were used to gather and interpret the data.

5.1. Context and participants

The present study took place in the context of teacher education in Flanders (Belgium), within the integrated teacher training program, which prepares students to teach in the first four grades of secondary education (average student age: 12-16 years old). This teacher training program can be followed at university college, with the sole entry-level requirement being that students have finished secondary education. At the start of this program, students select two school subjects in which they will be trained. The program lasts three years, during which students are taught the content as it is instructed in secondary education, but also follow courses on teaching methodology. After successful completion of the program, students are awarded a degree of bachelor in education (De Wever, Vandepitte, & Jadoulle, 2011).

In total, 302 student teachers from 12 university colleges participated in the present study. All students had selected history as one of their subjects, and were in the first year of their training program. Student teachers' mean age was 20 years ($SD= 2$ years). Of all students, 185 were male and 117 female. Although little is known about the knowledge that students have about IBL in history when they enter the teacher training program, previous research has shown that IBL does not appear to be common practice in Flemish history classrooms (e.g. Van Nieuwenhuysse, Wils, Clarebout, Draye, & Verschaffel, 2015; Voet & De Wever, 2017b). It can therefore be reasonably be assumed that most students have relatively limited knowledge of IBL in history when they enter the training program.

5.2. Core principles of the IBL-activity

The design of the activity used for immersing student teachers in IBL was based on three core principles. The first principle centered around *authenticity*, or creating a learning activity that resembles the work that historians do. This implies a discovery-oriented approach to IBL, which calls for personal questioning, exploration, and discovery, rather than an information-oriented approach, which is limited to seeking already-existing answers (Spronken-Smith et al., 2011). Within the present study, this discovery-oriented approach resulted in an emphasis on (1) an ill-structured problem leaving room for different conclusions, and (2) knowledge transformation, requiring students to form their own interpretations of the evidence (see also Voet & De Wever, 2017a). This was achieved through the use of an evaluative problem statement, which required students to use the available evidence to form and support their own conclusions about the past (see section 5.3. Designing the IBL-activity). In comparison with other question types, an evaluative question is therefore more likely to stimulate historical reasoning (van Drie, van Boxtel, & van der Linden, 2006). The second principle emphasizes *collaboration* during inquiry, as it has been argued that historical reasoning is primarily a social activity, in which agents shape each other's thoughts through spoken or written communication (van Drie et al., 2006). The social interaction involved in collaboration also stimulates students to elaborate their knowledge, by explaining their understanding to one another, which in turn results in more coherent arguments (Teasley, 1995). Finally, a third and last important principle consists of *scaffolding* the inquiry. As the combination of ill-structured problems and knowledge transformation generally results in challenging tasks, students should be given sufficient support in order to ensure a positive experience with IBL (Lazonder & Harmsen, 2016). In line with research that has attempted to reduce the complexity of inquiry by breaking it down into several stages or phases (e.g. Bell, Urhahne, Schanze, & Ploetzner, 2010; Pedaste et al., 2015), the present study used a macro-script that sequenced key activities (e.g. formulating historical questions, evaluating sources, forming arguments) within a workflow (for more information about scripts, see Dillenbourg & Hong, 2008)

5.3. Designing the IBL-activity

Based on the three core principles, an IBL activity was designed based on the topic of the English Peasants' revolt in 1381 (for more information, see Dobson, 1970; Dyer, 1994). This topic was selected because it is not part of the curriculum within Flemish history textbooks, and therefore student teachers had no prior knowledge regarding this topic. Furthermore, the name of the revolt has been heavily debated within academic history, as the lower classes were not the only ones to rise during the revolt. As such, student teachers were asked to form their own conclusion about the problem statement: "Do you think that 'Peasants' Revolt' is a

fitting name for the uprisings that took place in England in 1381?" In line with the authenticity design principle, a variety of information sources, which historians could also encounter in their search for information, were selected as evidence for the IBL activity. This selection included fragments from: the Wikipedia article on the Peasants' Revolt, a TV documentary titled "The great Rising of 1381", a medieval chronicle by Benedictine monk Thomas Walsingham, and two historical monographs by Dobson (1970) and Dyer (1994). These sources were furthermore selected because they offered different, and sometimes even contradictory, points of view about the name of the revolt. Because these five sources contained sufficient information to solve the inquiry, student teachers were not allowed to consult additional sources. This also allowed to control the information that student teachers used to solve the inquiry.

The macro-script for the IBL activity (see section 5.2. Core principles of the IBL-activity) was created using the Web-based Inquiry Science Environment (WISE). WISE is an online platform for designing, developing, and implementing IBL into the classroom, and has been well received by both research and practitioner communities (for more information on WISE, see Slotta & Linn, 2009). A screenshot of this learning environment is presented in Figure 1. On the left-side of the computer screen, there is a navigation panel that guides students through key inquiry activities, but also allows them to revisit these activities. There are some constraints, however, as student teachers cannot visit an activity before completing the previous ones (i.e. constraints are indicated by a grayed out button in the navigation panel). On the right-hand side of the screen, students can go through the content that corresponds to each key activity, and, if required, enter and store their notes. In total, the IBL activity consisted of nine key activities: (1) studying information on the historical context (e.g. including concepts like class system, feudality), (2) studying an explanation of how historians conduct an inquiry (i.e. centering around the interpretation of information and use of arguments), (3) translating the problem statement into historical questions, (4 – 8) analyzing and evaluating a particular source, and (9) writing down a conclusion.

5.3. Running the intervention

A pilot study showed that four hours were more than sufficient for carrying out the IBL activity. Each university college that participated in the present study was therefore asked to allocate four consecutive hours for its implementation. During this time, student teachers worked in randomly selected dyads on the IBL activity. The IBL activity's effects on student teacher beliefs were captured using an individual pre- and posttest, which took place right before and after student teachers' work in the learning environment. Finally, it is also important to note that the present study was part of a larger research project on the use of a

The screenshot shows the WISE v4 interface. At the top, there is a header with the logo 'WISE v4' and navigation links for 'Full Screen', 'My Work', 'Flagged', and 'Home / Sign Out'. On the left is a navigation panel titled 'Onderzoek naar het verleden: De Engelse boerenopstand'. It includes a welcome message 'Welcome Test User!' and a list of steps: '1: Inleiding' (with sub-steps 1.1 to 1.4), '2: Informatiebron 1', '3: Informatiebron 2', '4: Informatiebron 3', '5: Informatiebron 4', '6: Informatiebron 5', and '7: Conclusie'. The main content area is titled 'De Engelse boerenopstand' and features a large historical photograph of a battle scene. Below the photo is a caption: 'De opstandelingen, door hedendaagse fotograaf Red Saunders (Bron: tentoonstelling 'Hidden')'. The text below the photo is titled 'Opstand in het middeleeuwse Engeland' and describes the events of the Peasants' Revolt on May 30, 1381, mentioning King Richard II and Wat Tyler. A small map is visible at the bottom of the content area.

Navigation panel

Key activities of the inquiry

Activities not yet available

Content of the current step

Figure 1. Overview of the WISE learning environment.

technology-enhanced inquiry environment in history teacher education. One of the goals of this research project was to examine how different forms of support might influence student teachers' reasoning during the assignment. In the present study, students were randomly divided over four conditions. Depending on these condition, some student teachers received additional support for using sources, forming arguments, or both, whereas others did not. However, as analyses indicate that this extra layer of support that was added to the macro-script had no significant impact on the evolution of student teachers' beliefs (see Appendix A), these conditions will not be further discussed, and a parsimonious model without conditions will be used for the analyses.

5.3. Instruments

Three scales were used to capture teacher beliefs at pre- and posttest. Seeing that there do not yet exist scales on teacher beliefs about history education, two 5-item scales were constructed for respectively substantive and procedural knowledge goals. Items for these scales were constructed based on the review study by VanSledright and Limón (2006). To measure teacher self-efficacy for inquiry, the Perceived Competence Scale (PCS) was adapted to the topic of IBL in history. Previous uses of this 4-item scale have generally yielded a good Cronbach's Alpha measure, with values higher than .80 (e.g. Williams & Deci, 1996; Williams, Freedman, & Deci, 1998). An overview of the scales and their items can be found in Appendix B. To further explore possible changes in student teacher beliefs, the posttest also asked student teachers to react to the following two open questions: "Did the task change your view of historical research?" and "Did the task change your view of history education?"

5.4. Analyses

A first part of the analysis focused on an inspection of the scales' factorial validity and internal consistency. In order to determine factorial validity of the data, the dataset (N=302) was randomly split in two subsets (N=151), of which the first was used to conduct an exploratory factor analysis (EFA), and the second to conduct a confirmatory factor analysis. The EFA was carried out with SPSS 24, after the number of factors to retain had been determined through a scree plot and Horn's parallel analysis, of which the latter is one of the most strongly recommended techniques in this regard (Courtney, 2013). Horn's parallel analysis was conducted using the 'Paramap' package in R3.3.2, while the scree plot was retrieved from the SPSS output. Afterwards, the 'Lavaan' package in R3.3.2 was used to conduct a confirmatory factor analysis, of which the fit indices were evaluated using the commonly used cutoff scores proposed by Hu and Bentler (1999). After factorial validity had proven to be satisfactory, the complete dataset (N=302) was used to check internal consistency of the scales. Separate Cronbach's Alpha's were calculated for each scale at the pretest, and at the posttest.

The scales were then used in the second part of the analysis to determine the impact of immersion in IBL through a technology-enhanced inquiry environment on student teacher beliefs. The hierarchic nature of the data, with students being nested in different dyads and then within different university colleges, was taken into account through the use of multilevel modeling. MLwiN 2.32 was used to estimate a model of the difference score for each scale, and to calculate estimates for student teachers' scores at pre-and posttest.

In a third and final part of the analysis, the first author went through student teachers' written comments and identified comments that (1) explicitly mentioned an increased understanding of history's nature, or (2) described changes in beliefs with regard to IBL or contained negative reactions to IBL in history. A second researcher then independently coded the data, in order to calculate inter-rater reliability. Cohen's Kappa was calculated using the 'irr' package in R3.3.2, and indicates good interrater reliability for coding of comments concerning student teachers' understanding of history's nature ($K=.81$), as well as those about beliefs with regard to IBL in school history ($K=.83$).

6. RESULTS

In this section, the results concerning the factorial validity and internal consistency of the scales used to measure student teacher beliefs are first of all examined. Afterwards, the scales are used to conduct quantitative analyses that allow to determine the impact of the technology-enhanced inquiry of IBL on student teacher beliefs. The results are then further investigated through analyses of student teachers' written comments about their experience with the inquiry learning environment.

6.1. Examining the scales

The exploratory factor analysis (EFA) of the scales started with determining the number of factors to retain (for more information on the selection of statistical techniques, see section 5.4. Analyses). A scree-plot (see Figure 2) of the data points toward a 3-factor solution, as there is a clear inflection in the plot right after the third factor.

A parallel analysis was then run to compare the data's real eigenvalues to a set of randomly generated correlation matrices ($N=100$, percentile of eigenvalues=95). Table 1 presents an overview of the results, and shows that only the first three factors' eigenvalues are larger than the corresponding random eigenvalues, thus confirming that a three-factor solution is the best fit for the data.

As such, a three-factor solution was extracted during the EFA. Table 2 presents an overview of the factor loadings. A quick overview of this table shows that all items loaded as intended, with low cross-loadings on other factors. Thus, factorial validity appears to be good

for all three scales, which were constructed to respectively measure procedural knowledge goals (PKG), substantive knowledge goals (SKG), and self-efficacy for inquiry (SEI).

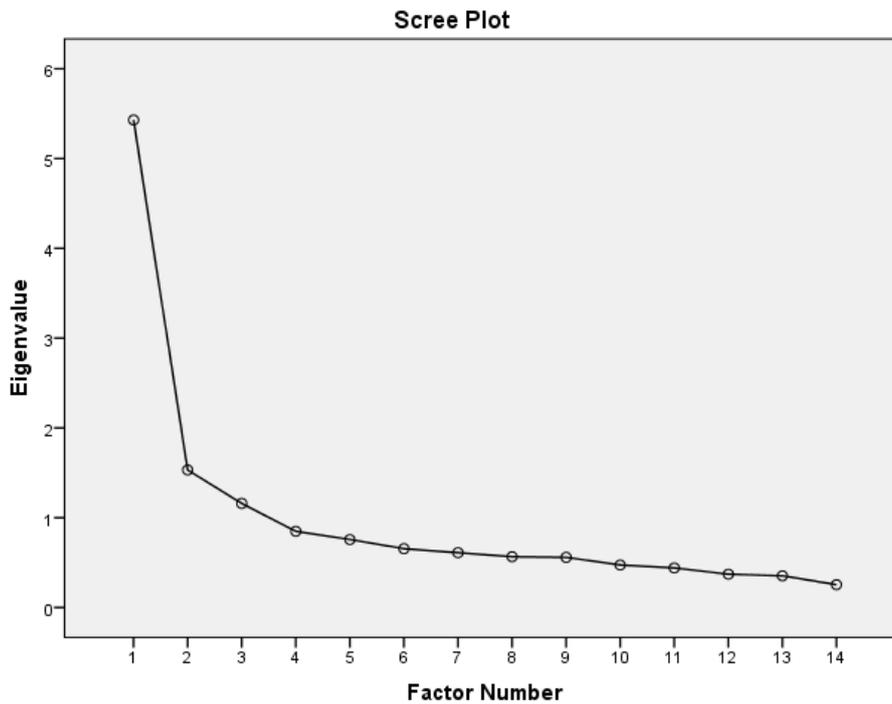


Figure 2. A scree plot of the data points toward a 3-factor solution.

Table 1

Parallel analysis of the eigenvalues

factors	real data eigenvalues	random data mean
1	4.86	0.66
2	0.98	0.52
3	.6	0.4
4	.25	0.31

A CFA was then conducted to further examine this three-factor structure of the data. A plot of the CFA is presented in Figure 3. An evaluation of the results based on the cutoff values (CFI and TLI $\geq .95$, RMSEA $\leq .06$, SRMR $\leq .08$; for more information, see section 5.4. Analyses) indicates a very good fit (CFI=1, TLI=1.03, RMSEA=0 [0; 0.04], SRMR=0.06). In other words, the results of the CFA further confirm the three-factor solution, as well as factorial validity.

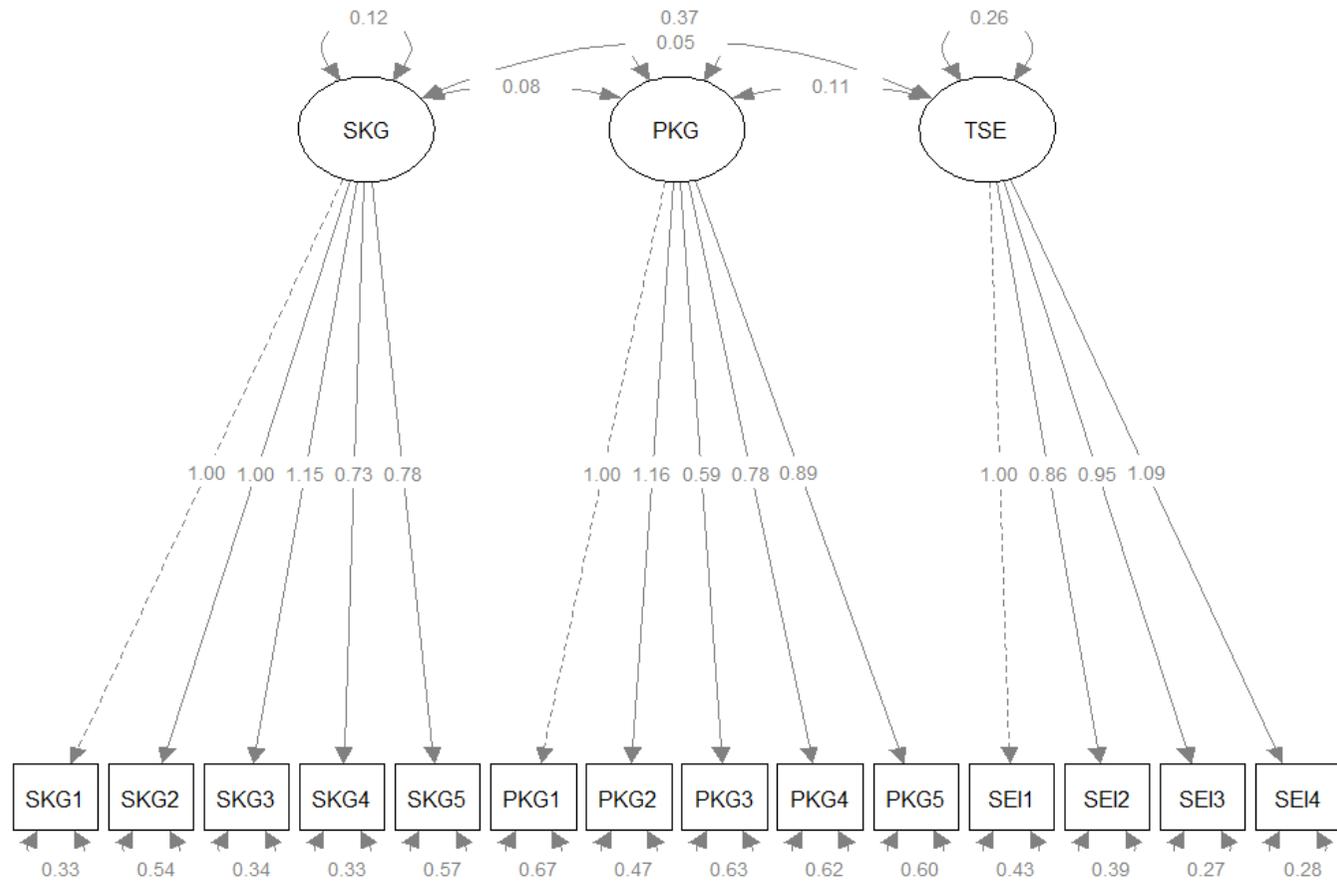


Figure 3. Plot of the confirmatory factor analysis.

Table 2

Loadings of the three-factor solution

Items	1	2	3
PKG1	.41	-.07	-.18
PKG2	.81	.16	-.03
PKG3	.42	-.28	-.05
PKG4	.6	-.1	.01
PKG5	.63	-.05	-.02
SKG1	.01	-.06	-.68
SKG2	.11	-.16	-.45
SKG3	.22	-.004	-.49
SKG4	-.1	.03	-.89
SKG5	.05	.004	-.59
SEI1	.07	-.76	.06
SEI2	.07	-.74	.02
SEI3	-.02	-.56	-.08
SEI4	-.1	-.73	-.09

Note. PKG: procedural content knowledge, SKG: substantive content knowledge, SEI: self-efficacy for inquiry.

Finally, Table 3 presents an overview of the scales' internal consistency, and indicates that, for each scale, Cronbach's Alpha during both pre- and posttest ranges from acceptable to good.

Table 3

Overview of the scales, each ranging from 1 (very unimportant/untrue) to 6 (very important/true)

scale	items	pretest		posttest	
		M (SD)	Cronbach's α	M (SD)	Cronbach's α
PKG	5	4.01 (0.68)	.71	4.25 (0.69)	.72
SKG	5	4.77 (0.55)	.74	4.81 (0.49)	.8
TSE	4	4.38 (0.61)	.77	4.58 (0.57)	.83

Note. N=298, after removing cases with missing values in the posttest. PKG: procedural content knowledge, SKG: substantive content knowledge, SEI: self-efficacy for inquiry.

Also presented in this table is an overview of each scale's mean. It appears that, at the time of the pretest, student teachers already attributed relatively high values to both substantive

and procedural knowledge goals, although substantive knowledge goals were clearly rated higher. Likewise, student teachers' pretest scores for self-efficacy were also relatively high. At the posttest, there was an increase in each of the three scale's average score, which is further investigated in the following section.

6.2. Impact of immersion in IBL on student teacher beliefs

A multivariate multilevel analysis was run to examine each of the three scale's difference scores from pre- to posttest. The results are reported in Table 4. First of all, the significant intercepts for procedural knowledge goals ($X^2=-56.65$, $df=1$, $p<.001$) and self-efficacy for inquiry ($X^2=23.45$, $df=1$, $p<.001$) indicate that the increase in scores is significantly different from 0, thus pointing toward a significant change in these beliefs from pre- to posttest. In contrast, student teacher beliefs about substantive knowledge goals did not change significantly from pre- to posttest ($X^2=1.03$, $df=1$, $p=0.31$). Last, the model indicates that, for all scales together, there is significant variance on the student level ($X^2=246.19$, $df=1$, $p<.001$), but not on the dyad level ($X^2=1.46$, $df=1$, $p=.23$), or school level ($X^2=0.82$, $df=1$, $p=.37$).

Table 4

Multivariate multilevel model of difference scores (pre-post).

	dependent variables		
	substantive knowledge goals (SKG)	procedural knowledge goals (PKG)	self-efficacy for inquiry (SEI)
fixed part			
intercept	0.03 (0.03)	0.25 (0.03)***	0.21 (0.04)***
random part			
intercept school σ^2_i	0 (0)	0 (0)	0.01 (0.01)
intercept dyad σ^2_k	0.01 (0.02)	0.03 (0.02)	0 (0)
intercept student σ^2_j	0.24 (0.03)	0.28 (0.03)	0.34 (0.03)

Note. N=298, *** significant at 0.001.

The multilevel estimates of the pre-and posttest scores, retrieved from multilevel growth curve models of each scale's scores (see appendix C), are presented in Figure 4. Similar to before, the data indicate a significant increase for both procedural knowledge goals ($X^2=54.31$,

df=1, $p < .001$) and self-efficacy for inquiry ($X^2=30.88$, df=1, $p < .001$), while the change is not significant for substantive knowledge goals ($X^2=1.18$, df=1, $p=.28$).

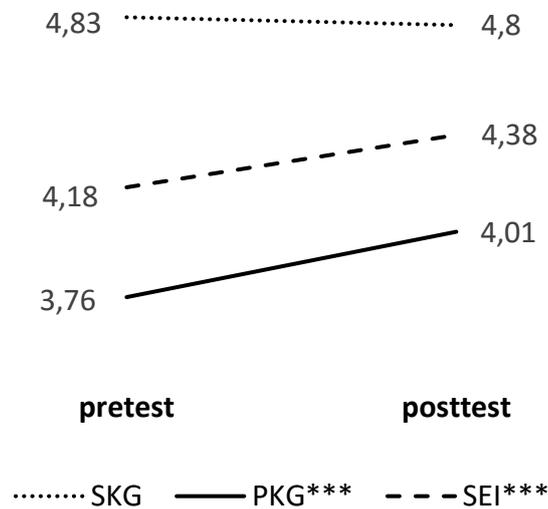


Figure 4. Evolution in student teacher beliefs (***) indicates $p < .001$, SKG: substantive knowledge goals, PKG: procedural knowledge goals, SEI: self-efficacy for inquiry).

6.3. Looking further into the impact of immersion in IBL

Although the analyses of the pre- and posttest scores paint a generally positive picture of the impact of immersion in IBL through the technology-enhanced inquiry environment, a qualitative analysis of the comments that student teachers gave during the posttest provides a more nuanced picture.

First of all, a large group of 65 students noted explicitly that their experiences in the technology-enhanced inquiry environment had positively changed their opinion about IBL, with answers such as: “[This task has shown me that] students should form their own opinion or even take a stance [about to topics in history]. It is a good idea to teach them how to conduct their own inquiries.”, or “Inquiry is a very useful to show students that different sources may have other things to say about a certain topic”, or even “Now I realize why our professor always emphasizes the use of sources”. In addition, several students also appeared to have developed a belief that IBL is more likely to lead to learning, compared to more traditional approaches. For example, one student teacher noted: “The potential of inquiry and ICT became a lot clearer to me. Students can learn more from this than just textbook content, but also certain skills. It is also a fun approach.” Similarly, another one wrote that: “When we

used to be in history class, we did not pay much attention. This, however, requires a lot of your time and effort.”

However, it appeared that immersion in IBL through the technology-enhanced inquiry environment did not have the same impact on all student teachers' beliefs, as a group of 25 student teachers' (about 8% of the sample) answers to the posttest indicated that they were not in favor of organizing IBL in the classroom. It appears that, to these student teachers, IBL was incompatible with their own, often content-oriented, conception of history education. For instance, one student teacher stated that: “I think that students should mainly understand the historical roots of today's society. Letting them conduct inquiries such as the one we did today, is not necessary.” Likewise, another student teacher argued that students mainly need to know, rather than experience, that history is interpretative: “School history should only concern itself with the major topics (in terms of time, space, and causality). Inquiries are not required, as long as the teacher explains that the content may not be entirely true”. In relation to this, some student teachers also seemed to assume that students would simply not be interested in IBL. To illustrate this, one student teacher wrote that: “You cannot have students conduct inquiries, because, in reality, only a few students are interested by history. I do believe that you can learn them that not everything should be trusted, but I would not go any further than that.” Likewise, another reported that: “Personally, I think that a captivating teacher who tells stories is really important to history.”

Table 5

Multivariate multilevel model for the subgroup expressing negative reactions to IBL.

	procedural knowledge goals (PKG)	
	pretest score	posttest score
fixed part		
intercept	4.03 (0.05)***	4.29 (0.05)***
negative reactions (n=25)	-0.28 (0.14)	-0.41 (0.15)**
random part		
intercept school σ^2_i	0.01 (0.01)	0 (0)
intercept dyad σ^2_k	0.04 (0.02)	0 (0)
intercept student σ^2_j	0.41 (0.04)***	0.47 (0.04)***

Note. N=297, * significant at 0.05, *** significant at 0.001.

Table 5 looks further into how the quantitative data of this subgroup of 25 student-teachers compared to the rest of the sample. It appears that their scores for procedural knowledge goals were both at pre- and posttest lower than the rest of the sample. However, this

difference was not significant at the pretest ($X^2=3.75$, $df=1$, $p=.05$), but only at the posttest ($X^2=7.98$, $df=1$, $p=.005$).

Finally, the qualitative data also provide more information as to why immersion in IBL may have had a positive impact on student-teachers' self-efficacy for inquiry. In total, 109 students explicitly stated that the experience had improved their understanding of how historical inquiry worked. In several cases, student teachers stressed that they now had a better understanding of history's interpretative nature. As one student teacher stated: "It has taught me that a historian's opinion is actually important. I used to think that sources should be approached objectively to gather reliable facts. But if you do not form your own opinion, you cannot think critically about or evaluate certain sources." Another response, stressing a different aspect of the interpretative work involved in history, stated that: "I used to believe that interpretation was not important in an analysis of sources. Now I realize that sources almost never provide a direct answer to a question, and that a source's content can be interpreted in different ways."

In relation to this, student teachers now also seemed to have a better idea of the complexity of IBL in history. This includes responses like: "Now I realize that historical inquiry is more than just searching for sources and copying their contents. It is up to you to determine what you believe, by comparing as much information as possible." or "I noticed that there are often different points of view or versions. This has shown me that you have to question everything, and that the world is full of stories that may not entirely correspond to what really happened."

7. DISCUSSION AND CONCLUSION

The present study examined how immersion in IBL in history education influences student teachers' beliefs about teaching history, as well as their self-efficacy for inquiry. During their work on the IBL-activity, student teachers collaborated in dyads to conduct their own inquiries within a technology-enhanced learning environment.

Even though some scholars have argued that immersion in IBL may fail to have an effect without a meta-commentary explaining its underlying ideas (Swennen et al., 2008), the findings of the present study show that a relatively short professional development initiative that immerses student teachers in IBL actually leads to a significant positive effect on their beliefs. After working in a technology-enhanced learning environment that immersed them in historical inquiry, student teachers attributed a significantly higher value to procedural knowledge goals (i.e. emphasizing the development of historical reasoning skills), and felt more capable to conduct historical inquiries. In line with what could be logically expected, immersion in IBL did not impact student teachers' beliefs regarding substantive knowledge goals (i.e. focused on the content of history). The significant effects found by the present study

are particularly relevant to professional development initiatives, as beliefs about procedural knowledge goals and self-efficacy related to organizing IBL are both predictors of teachers' implementation of IBL (Voet & De Wever, 2017b).

However, the positive effect of immersion in IBL should still be interpreted with some caution, as the results also point out that this approach may not be equally effective for every student teacher. In particular, it appears that immersion in IBL did not have much impact on the beliefs of a subgroup of about 8% of the student teachers, who started the intervention with, often content-oriented, conceptions of school history that were largely incompatible with IBL. As such, a more reflective approach appears to be required in order to alter the deeply rooted beliefs of this subgroup of teachers. According to previous research, this could be achieved through conceptual-change strategies, which (1) help to make often implicit beliefs explicit, (2) reveal the inadequacy or disadvantages of those beliefs, and (3) help to integrate alternative and logically sound perspectives (Kagan, 1992; Korthagen, 2013). In other words, a meta-commentary that makes explicit the ideas that underlie IBL does appear to be required for changing this particular subgroup of student teachers' beliefs.

Finally, the results suggest that immersion in IBL does not only positively influence student teachers' beliefs, but may also contribute to a better understanding of how disciplinary knowledge is constructed. This finding thus provides further evidence to the common assumption that engagement in IBL in history is a vital means of learning about the nature of the discipline itself (Levy et al., 2013). Several student teachers stressed that the work in the technology-enhanced inquiry environment had improved their understanding of history's interpretative nature. At first sight, this implies an evolution toward a more nuanced vision of history, which recognizes that history is inevitably constructed by historians. However, it is not yet clear whether this change could also result in what Maggioni, VanSledright, and Reddy (2009) described as subjectivism, or a belief that all of history is merely an opinion. Additional research is therefore necessary to get a better picture of the impact of immersion in IBL on student teachers' understanding of the nature of history.

In relation to this, another important limitation of the present study is the relative short duration of the intervention. The question remains whether additional immersion in IBL would have further impacted student teachers' beliefs, and, although it seems unlikely, whether it would have been able to alter the beliefs of the subgroup of student teachers reporting a negative view of IBL in history. Another question concerns the stability of the changes found in student teachers' beliefs, seeing that previous research has shown that the reality of the classroom often has a negative impact on student teachers' drive for trying out innovative approaches, such as IBL (e.g. Fehn & Koeppen, 1998; Voet & De Wever, 2017a). A longitudinal study design therefore seems recommended for future research, as such a design would make it possible to answer each of these questions.

Despite these limitations, the present study offers an important contribution to research on immersion in IBL in teacher education, as it shows that this approach may have a larger impact on student teachers' beliefs than is sometimes assumed. At the same time, however, the study also shows that this impact may differ depending on student teachers' initial conception of education, and the extent to which it allows room for IBL. The implications of these findings are discussed in the next section.

8. IMPLICATIONS

The findings of the present study hold several implications for professional development with regard to inquiry-based learning, both in terms of practice and future research.

With regard to practice, the results first of all indicate that immersion in IBL is, in general, an effective approach for positively influencing teachers' beliefs with regard to IBL. In relation to this, the overview of the principles underlying this approach, as well as their translation into a technology-enhanced inquiry environment, can inform professional development initiatives on how to design activities for immersing student teachers in IBL. Furthermore, as the present study also indicates that immersion in IBL may not be effective for student teachers who hold conceptions that are largely incompatible with IBL, it seems advised to first engage student teachers' in a reflection on their beliefs. As mentioned above, an approach that has generally been recommended by research on teacher education draws on conceptual-change strategies, which aim to alter beliefs by making them explicit, pointing out their flaws, and offering logically sound alternatives.

With regard to future research, the limitations mentioned in the previous section point toward a need for more longitudinal research on the effects of immersion in IBL on student teachers' beliefs. This would help to further examine several of the questions that the present study is unable to answer, including topics such as the impact of systematic use of immersion in IBL over a longer time period on student teacher beliefs, the stability of the reported changes in student teacher beliefs, or the effect on student teachers' conception of the nature of history.

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APPENDIX A: IMPACT OF CONDITIONS ON STUDENT TEACHER BELIEFS

Table 6

Multivariate multilevel model of difference scores (pre-post), taking conditions into account.

	dependent variables		
	substantive knowledge goals (SKG)	procedural knowledge goals (PKG)	self-efficacy for inquiry (SEI)
fixed part			
intercept	0.05 (0.06)	0.22 (0.07)**	0.21 (0.07)**
SOU support	0.05 (0.09)	0.01 (0.01)	-0.05 (0.1)
ARG support	0.02 (0.08)	0.04 (0.09)	0.05 (0.1)
SOU + ARG support	-0.05 (0.09)	0.09 (0.09)	-0.03 (0.1)
random part			
intercept school σ^2_i	0 (0)	0 (0)	0.01 (0.01)
intercept dyad σ^2_k	0.01 (0.02)	0.02 (0.02)	0 (0)
intercept student σ^2_j	0.24 (0.03)***	0.28 (0.03)***	0.33 (0.03)***

Note. N=294, **significant at 0.01, *** significant at 0.001.

10. APPENDIX B: OVERVIEW OF THE SCALES AND THEIR ITEMS

11.1 Substantive knowledge goals (SKG)

- SKG1 Students have to learn the characterizing aspects of historical periods.
- SKG2 Students must come to understand the key concepts used to describe the past.
- SKG3 Students should be able to point out similarities and differences between historical periods.
- SKG4 Teachers have to teach their students about the most important evolutions in history.
- SKG5 Teachers must let their students situate phenomena within the correct historical period.

11.2 Procedural knowledge goals (PKG)

- PKG1 Teachers should teach their students how to think like historians.
 SKG2 Students must learn to use the methods of historians.
 SKG3 Students have to be able to form arguments based on evidence about the past.
 SKG4 Teachers need to have their students conduct limited historical inquiries.
 SKG5 Teachers should show their students the criteria for good historical research.

11.3 Self-efficacy for inquiry (SEI)

- SEI1 I feel able to meet the challenge of analyzing historical information.
 SEI2 I am able to draw critical conclusions from information sources about the past.
 SEI3 I am capable of evaluating and using information about the past.
 SEI4 I feel confident in my ability to conduct an inquiry with historical information.

11. APPENDIX C: GROWTH MODELS FOR STUDENT TEACHER BELIEFS**Table 7**

Univariate multilevel growth models of the scales (from pre- to posttest)

	dependent variables		
	substantive knowledge goals (SKG)	procedural knowledge goals (PKG)	self-efficacy for inquiry (SEI)
fixed part			
intercept	4.83 (0.06)***	3.76 (0.07)***	4.18 (0.07)***
growth	-0.03 (.03)	0.25 (0.03)***	0.2 (0.04)***
random part			
intercept school σ^2_l	0.01 (0.01)	0 (0)	0.01 (0.02)
growth school σ^2_l	0 (0)	0 (0)	0.002 (0.01)
intercept dyad σ^2_k	0.01 (0.06)	0.19 (0.09)	0 (0)
growth dyad σ^2_k	0.01 (0.02)	0.03 (0.03)	0 (0)
intercept student σ^2_j	0.67 (0.08)***	0.88 (0.1)***	1.11 (0.09)***
growth student σ^2_j	0.25 (0.03)***	0.27 (0.03)***	0.34 (0.03)***

Note. N=298, *** significant at 0.001.

7

Preparing pre-service history teachers for organizing inquiry-based learning: The effects of an introductory training program

This chapter is based on:

Voet, M., & De Wever, B. (2017). Preparing pre-service history teachers for organizing inquiry-based learning: The effects of an introductory training program. *Teaching and Teacher Education, 63*, 206-217.

CHAPTER 7

Preparing pre-service history teachers for organizing inquiry-based learning: The effects of an introductory training program

ABSTRACT

The present study investigates a training program aimed at preparing pre-service history teachers for organizing inquiry-based learning (IBL) in class. This program consisted of a workshop and an assignment during the teaching internship period. Pre- and posttests indicate that the workshop had a significant effect on self-efficacy and attitude toward IBL, but also that most student teachers' attitudes had again changed after the assignment. Related to this, student teachers' lesson plans revealed three different templates, representing distinct interpretations of 'inquiry'. An analysis of reflection papers and interviews describes how the context of the teaching internship further shaped student teachers' thinking.

1. INTRODUCTION

History has been traditionally known, and sometimes feared, as a school subject dominated by teacher-centered activity and a strong focus on learning and understanding facts. In educational research, however, the focus has typically lain on student-centered approaches with a focus not only on content, but also on disciplinary thinking (see e.g. the review by VanSledright & Limón, 2006). As a process drawing on knowledge that lies behind the actual production of historical accounts (e.g. concepts such as evidence, cause and effect, significance), disciplinary thinking is regarded as essential for a meaningful organization of content knowledge, but also shapes one's understanding of what history is really about (Lee, 2005).

Over the years, different research strands have arisen across a number of countries, each with their own focus on disciplinary thinking in history. For example, the historical thinking heuristics used by several US-based researchers (e.g. Nokes, Dole, & Hacker, 2007; Reisman, 2012; Wineburg, 1991a) concentrate on strategies for reading historical sources (e.g. contextualizing, corroborating), whereas the 'big six' historical thinking concepts by Canadian authors Seixas and Norton (2012) introduce a number of meta-concepts that support thinking about the past (e.g. historical perspectives, the ethical dimension). Another example, this

time from Europe, is the historical reasoning framework by van Drie and van Boxtel (2008), which describes components of reasoning with historical information (e.g. using sources, forming arguments).

Regardless of these different, albeit complimentary, approaches, there is a general agreement across research strands that inquiry-based learning (IBL) is one of the most promising approaches for teaching both content and disciplinary thinking skills (Reisman, 2012; Seixas, 1999; van Drie & van Boxtel, 2008). At first, this common ground can be hard to notice because researchers have used various terms to refer to IBL-activities, with commonly used labels like: doing history (e.g. Seixas, 1999), document-based lesson (e.g. Reisman, 2012), and historical inquiry (e.g. van Drie & van Boxtel, 2008). In truth, each of these concepts can be grouped under the umbrella of inquiry-based learning, a teaching approach that engages students in discipline-specific investigations, and emphasizes practices of academic inquiry, in which it has its origins (Hmelo-Silver, Duncan, & Chinn, 2007). Within the context of history, IBL means that students are offered the opportunity to conduct their own investigations into the past, through an analysis of historical sources (Voet & De Wever, 2016).

One of IBL's main characteristics is that it confronts students with *ill-structured* problems, which cannot be resolved with a high degree of certainty. Contrary to well-structured problems, where there is a single correct answer, there usually are different solutions to IBL tasks, each with their particular strengths and weaknesses (King & Kitchener, 1994). Moreover, IBL is most effective in facilitating disciplinary thinking when it engages students in *knowledge transformation*, which calls for constructive mental activity that brings together information from various sources, in order to form and support one's own claims. This goes beyond knowledge telling, which essentially comes down to a re-telling of the available information (Wiley & Voss, 1996). Related to this, van Drie, van Boxtel, and Van der Linden (2006) reported that evaluative tasks, which require students to describe, but also make a judgement of historical events (e.g. Does responsibility for World War I solely lie with Germany?), are especially suited to stimulate this kind of constructive activity in history. Finally, IBL is, by definition, characterized by *extensive teacher scaffolding* (Hmelo-Silver et al., 2007). Because the combination of ill-structured problems and knowledge transformation implies a heavy cognitive burden to students, minimally guided investigations generally fail to produce learning (Kirschner, Sweller, & Clark, 2006).

According to the available evidence, IBL helps students to develop both historical and domain-general reasoning abilities, while also surpassing traditional teaching in terms of its contribution to students' factual knowledge (Reisman, 2012). Unfortunately, there is not much research available on how future teachers can be prepared to organize IBL-activities in history. Most of the work with history teachers has focused on the question why some teachers implement IBL into their classroom, whereas other teachers do not, even though the

latter group may well possess a strong knowledge of history (e.g. Barton & Levstik, 2003; McCrum, 2013; McDiarmid, 1994; Voet & De Wever, in press). The available findings indicate that teachers' beliefs about history and education in general play a central role in this process (Barton & Levstik, 2003), in addition to contextual factors, such as the curriculum (Van Hover & Yeager, 2003). Yet, a significant number of teachers also reports a limited knowledge or lack of experience with regard to IBL (Voet & De Wever, 2016). Teacher training is therefore regarded as a key factor for bringing IBL into the classroom (Martin & Monte-Sano, 2008; Yeager & Wilson, 1997).

A few studies have investigated training programs aimed at preparing student teachers to engage their students in reasoning with historical information. Some specifically cover the organization of IBL-activities (Levy, Thomas, Drago, & Rex, 2013), whereas others concentrate on related topics, such as the use of primary sources (Fehn & Koeppen, 1998; Seixas, 1998) or thinking critically about textbook accounts (Martin & Monte-Sano, 2008). Most importantly, these studies indicate that training programs can have a positive effect on students' beliefs and knowledge with regard to IBL (Fehn & Koeppen, 1998; Levy et al., 2013; Martin & Monte-Sano, 2008). Related to this, Levy et al. (2013) argued that such teacher training programs are particularly effective when they provide opportunities to observe models of IBL lessons, share ideas with and learn from peers, and prepare and organize IBL in real classroom settings (Levy et al., 2013).

However, it is still unclear how a training program focused on IBL influences student teachers' work in practice. Although studies have often investigated student teachers' experiences with a training program (e.g. Levy et al. 2013), there is not much known about whether and how these student teachers then proceed to organize IBL in practice, and why they do so. In fact, research suggests that the actual teaching context, with influences such as mentor teachers' suggestions, content coverage requirements, or students' reactions, may well have a negative impact on students' ability or willingness to attain a training program's goals (Fehn & Koeppen, 1998). In addition, it is not clear whether a training program would have the same effect for student-teachers across different types of training programs, as previous research indicates that teachers with an academic training may hold different conceptions of the field, compared to their non-academically trained counterparts (Yilmaz, 2010). The present study aims to further investigate these issues, in order to provide a more comprehensive picture of how a training program on IBL in history may affect student teachers' thoughts and practice.

2. AIMS

The present study takes a closer look at student teachers' beliefs, work, and experiences during a training program that introduces them to inquiry-based learning (IBL) in history. Central to this undertaking are the following four research questions:

- What are the training program's effects on student teachers' beliefs, including their attitude about the use of sources in class, but also their perceived competence for organizing IBL?
- What kind of IBL-activities do student teachers design after following the training program?
- Is there a difference in academically and non-academically trained student teachers' response to the training program?
- Are there general themes or patterns in student teachers' first experiences with planning and teaching an IBL-activity?

3. DESIGN AND METHODS

3.1. Intervention

Based on design principles drawn from the literature (e.g. Doyle, 2006; Kagan, 1992; Levy et al., 2013), a training program was designed to provide student teachers with the knowledge necessary to organize inquiry-based learning (IBL) activities during the history lesson. This training consisted of a workshop followed by an assignment during students' teaching internship. Two student groups from different teacher training programs participated in the intervention.

3.1.1. Context

The present study took place in Flanders (Belgium), where the government sets attainment targets for most subjects in secondary education, including history. According to one of the key principles behind these attainment targets, students should be introduced to disciplinary thinking as soon as they enter secondary education, through classroom inquiries. In practice, however, history teachers have a lot of freedom in determining the content of their lessons. There are no central exams, and inspections by government officials are limited to one partial evaluation of the school program (not necessarily including history) every four years (for more information on Flemish history education, see De Wever, Vandepitte, & Jadoulle, 2011). According to earlier research in Flanders, historical reasoning and inquiry-based learning do not yet appear to be common practice in classrooms (Van Nieuwenhuysse, Wils, Clarebout, Draye, & Verschaffel, 2015; Voet & De Wever, 2017).

3.1.2. Workshop

A four-hour workshop was developed based on research on (history) teacher training. More specifically, three design principles informed this work. In line with the suggestion by Levy et al. (2013) to provide student teachers with opportunities to reflect on the planning and teaching of IBL-activities, and to share their ideas with others, the first design principle was aimed at *stimulating active learning*. During the workshop, theory was alternated with hands-on tasks, requiring student teachers to think about and discuss the ideas that were presented during the workshop. The description of the second and third design principle provide several illustrations as to how this was done.

The second design principle centered around *changing beliefs*, given the strong connection between teachers' beliefs and classroom practice (e.g. Kagan, 1992). In essence, the goal was to convince student teachers of IBL's value for developing students' mastery of history, in addition to their problem-solving skills in general. The introduction of the workshop combined a reflection task with direct instruction to attain this goal.

Student teachers started the workshop with a reflection task based on the one used in the study by Wineburg (1991b), who compared students' reasoning with a set of historical documents to that of expert historians. Similar to the original task, student teachers were given contradictory sources about whom started hostilities during the Battle of Lexington (1775), one of the first skirmishes between American colonists and the British military during the American Revolutionary War. They were then asked to work in dyads and discuss the following questions: (1) 'What is your conclusion with regard to the problem statement and information sources?', (2) 'How do you think students performed? Explain why you think this.', and (3) 'What does this imply for the goals of history education?' The main aim was to make student teachers see the importance of introducing students to disciplinary thinking, and to point out that strong knowledge of the content of history does not automatically result in an ability to engage in disciplinary thinking (for more information, see Wineburg, 1991b). After students had completed the task, each dyad shared its ideas, which were then further addressed in a thorough classroom-wide discussion.

Next, the instructor switched to direct instruction, drawing on findings from previous studies to debunk a number of popular myths about IBL in history, such as beliefs that students are not yet mature enough for IBL (e.g. Booth, 1994), or that IBL is aimed at making historians out of students (e.g. Lee & Ashby, 2000). While doing so, the instructor also referred to the attainment goals set out by the Flemish government, which explicitly state that critical investigations of sources are fundamental to learning about history (also see De Wever et al., 2011). To further convince student teachers about the value of IBL, this part of the workshop also incorporated information from outside the field of history, such as economic studies

indicating a steady increase of jobs that require non-routine analytical skills, while routine cognitive jobs are on the decline (Autor, Levy, & Murnane, 2003).

The third design principle focused on *providing a practical guide*, as previous work has shown that teachers mainly judge a training by its practical value (e.g. Doyle, 2006). The workshop first of all used findings from a previous study (see Voet and De Wever, 2016) to provide concrete examples of what does and does not constitute IBL in history. This information was then used to form a definition of IBL, which emphasized the importance of knowledge transformation (see section '1. Introduction'), and described IBL in terms of its constitutive parts; requiring students to (1) investigate a problem statement about the past, (2) through an analysis of information sources, (3) in order to form and support their own conclusions.

The main body of the workshop presented student teachers with a stepwise approach to organizing

IBL in history, consisting of 5 steps based on earlier research: (1) finding alternative perspectives on the topic or different parts of the story (see e.g. examples by Bohan & Davis, 1998; Nokes et al., 2007); (2) formulating a problem statement calling for knowledge transformation (van Drie et al., 2006); (3) selecting and adapting information sources for classroom use, by adding information about a source's origin, or including a glossary of terms (see e.g. De La Paz & Felton, 2010; Monte-Sano, 2010); (4) providing instructions with regard to practical organization, conducting a historical inquiry (based on the framework by Voet and De Wever (in press), and assessment of students' work; and (5) supervising the learning activity from start to finish.

Each of these steps was taught through a combination of direct instruction and individual or group work. For example, work on the second step 'formulating a problem statement' started with the instructor presenting a theoretical introduction on students' ability to ask historical questions, based on previous work by Logtenberg (2012). Student teachers were then asked to form dyads, study the introduction of the Wikipedia article on the French Revolution (1789), and formulate questions that they thought were fit for an inquiry task. As student teachers responded, the instructor grouped each of their questions according to the framework by van Drie & van Boxtel (2008), which distinguishes between descriptive, explanatory, comparative and evaluative questions. The differences between these question types were then determined through a class-wide discussion, in which the instructor emphasized evaluative questions' ability to stimulate knowledge transformation (see van Drie et al., 2006). Under the guidance of the instructor, student teachers then attempted to reformulate other types of questions as evaluative questions.

3.1.3. Assignment

After the workshop had ended, student teachers were instructed to use what they had learned to prepare an IBL-activity, and teach it in a secondary school classroom, as a part of their teaching internship. This assignment was a mandatory part of the training program, and each of them thus had to complete it to receive a grade. Student teachers were informed that the IBL-activity had to take up at least one lesson period (i.e. 50 min). Apart from being instructed not to pick a topic that had been covered in one of the cases during the workshop, they were free to select a topic of their own choice. As part of planning this work, all student teachers were asked to confer with their mentor teacher (who received a formal letter from the teacher training program, requesting his or her cooperation with the assignment), and select a topic that was already on the curriculum planning for the period during which student teachers would be teaching the class.

3.1.4. Participants

In Flanders, two systems of teacher training programs exist. On the one hand, there is an academic training (AT) program referred to as the specific teacher training, while on the other, there is a non-academic training (NAT) program called the integrated teacher training. The AT program is a one-year program that can only be followed by students who have previously attained an academic degree of master at a university (here: a master in history). Most of the AT program consists of theoretical training in teaching methodology combined with practical training. In contrast, the NAT program is taught at university colleges, and can be followed right after secondary education. In this three-year program, students select two subjects, and are taught the content as it is instructed in secondary education, in addition to following courses on teaching methodology (for more information, see De Wever, Vandepitte, & Jadoulle, 2011).

In total, 54 student teachers started the workshop. Of these, 27 student teachers followed an AT program, and 27 followed an NAT program. Students in the NAT program had to be in the third year of their studies to participate, in order to ensure that they had adequate knowledge of history. Meetings with the history teacher trainers prior to the workshop suggested that both student groups had little experience with IBL in history (an assumption that was confirmed by student teachers' reactions to the workshops). Due to various reasons, there was some drop-out as the intervention proceeded. For instance, some student teachers were taking the course for the second time, but had already completed all of their teaching internships, while others simply dropped out of the program itself. In the end, 36 students completed the assignment.

3.1.5. Ethics

The present study was in line with the general ethical basic assumptions specified in the faculty's general ethical protocol for scientific research. As the protocol states that advice of the faculty's ethical committee should only be requested in case of doubt about a research project's conformity to these guidelines, no further ethical approval was necessary. Before the start of the intervention, all student teachers received an informed consent form that provided more information about the research. In addition, this document informed them that data that would be gathered for the study (1) would be used solely for scholarly purposes, (2) would not be passed on to third parties, and (3) would be de-identified in case of publication. Each student teacher gave permission to use his or her data, by freely signing the informed consent.

3.2. Instruments and data

In order to explore the outcomes of the intervention, several instruments were used to capture student teachers' beliefs related to IBL, and their experiences with preparing and carrying out an IBL-activity. Data were gathered through: a pretest and two posttests, the lesson plan of student teachers' IBL-activity, and two reflection papers. In addition, all student teachers who completed the assignment were invited to an interview afterwards.

3.2.1. Pre- and posttests.

Prior to starting the workshop, all participating student teachers completed a short questionnaire about (1) the way they thought sources should be used in class, and (2) their perceived competence for conducting IBL-activities in general, but also a number of specific aspects of IBL. The first part of this instrument was based on findings from a previous study (Voet & De Wever, 2016), while the second part was designed specifically with the workshop in mind, in order to ensure consistency with its contents. Right after the workshop had ended, student teachers completed the questionnaire a second time, together with (3) an anonymous evaluation of the workshop's content, based on the instrument developed by Ruys (2012). After student teachers had taught their IBL-activity in classroom, they were requested to complete the questionnaire a third and final time. More information about the contents of this questionnaire can be found in the results section.

3.2.2. Lesson plans

Student teachers were required to hand in the lesson plan of the IBL-activity that they organized during their teaching internship. This lesson plan included (1) a chronological overview of each learning activity that made up the lesson, together with its timing and

content; and (2) a copy of all materials that were used throughout the lesson, such as presentations, information sources, and student worksheets.

3.2.3. Reflection papers

Student teachers were asked to document their work on the assignment in two reflection papers (see appendix A for the papers' writing prompts). The first paper asked them to describe and reflect on their preparation process, and in particular: (1) their general approach to preparing the IBL-activity, but also the specific steps that they took; and (2) parts of their preparation that they thought were particularly easy or hard, as well as their ideas about possible explanations. The second reflection paper required student teachers to report on the implementation of their IBL-activity in the classroom, including: (1) a general overview of how the lesson proceeded, things that did or did not go well, and possible explanations; and (2) their feelings about the IBL-activity, and what they learned from the assignment. All student teachers were required to hand in these papers no later than 7 days respectively after having finished their work on the preparation, and having carried out the lesson in the classroom. This deadline was instated to make sure that student teachers wrote the reflection papers when the activities in question were still fresh in their memory. It is also important to note that all student teachers were explicitly invited to give an honest account of both their experiences and beliefs, after being informed that there would be no repercussions if they reported negative experiences or expressed a critical opinion. The fact that the first author, who gave the workshop and collected all data, was otherwise not involved in either of the training programs, provided further reassurance to student teachers.

3.2.4. Interviews

Finally, interviews were organized after students had handed in their lesson plans and reflection papers. All student teachers who had completed the assignment were invited to participate in these interviews, but unfortunately, only about three-fourths of them (N = 26 out of 36) were able to attend. Prior to the start of these interviews, the first author read each student teachers' assignment and marked unclear or interesting passages for further discussion. Each interview started with the question: "Can you explain why you chose [lesson topic] as the topic of your lesson". Afterwards, the interviews focused on the specific contents of each student teacher's paper, with questions varying across participants. To give some examples, this included questions such as: "I was very much intrigued by what you wrote in the first reflection paper. At some point, you say that: I chose to implement the activity in the third school, because the mentor in the second school was not willing to supervise this assignment. Could you please further explain this?" or "I also wondered, at the end of the second paper, you state that: Now that I am more aware of the importance of teaching critical

thinking to students, I will pay more attention to developing students' historical reasoning skills. So did your vision then change after taking the workshop and organizing that lesson?" All interviews were taped using a digital recorder, and subsequently transcribed.

3.3. Analysis

The analysis combines a quantitative and qualitative methodology. On the one hand, the results of the questionnaires, together with the workshop evaluation, provide an overview of the workshop's effectiveness. On the other hand, student teachers' lesson plans, reflection papers and interviews help to further illustrate the exact impact of the workshop on students' thinking and work in practice.

3.3.1. Approach.

The results of the questionnaires were analyzed using SPSS 23. When one or more responses were missing, cases were excluded from the analysis. The evaluations of the workshop could not be connected to the other data due to the anonymous responses, and were therefore analyzed separately. A qualitative approach was used to analyze student teachers' lesson plans, reflections, and interviews. A first reading of the lesson plans indicated that the main differences were situated on two dimensions (for more information, see Table 5): problem statement (i.e. ill- vs. well-structured) and student activity (i.e. knowledge telling vs. transformation). This resulted in three lesson templates that were subsequently used to code all lesson plans: fill in the blanks, synthesis, and critical inquiry (see the results section for more information). Student teachers' reflection papers and interviews, when available, were analyzed together, as the latter's main purpose was to elaborate on the reflection papers' contents. A first reading of this data allowed to mark all passages that provided information on student teachers' general experiences with implementing the task in their classroom, as well as their reasons for selecting a particular template. This information was used to construct a data matrix (see Miles & Huberman, 1994) containing a summary of the results for each participant. Similar results were then grouped together, until several themes surfaced.

3.3.2. Reliability

Contrary to the analysis of student teachers' interviews and lesson plans, which was primarily descriptive in nature, classifying student teachers' lesson plans into three templates required some interpretation. In order to check the reliability of the lesson plan analysis, about half of the lessons were independently examined by a second coder. This second coder was briefed about the three lesson templates, using the lesson plans from the cases that are presented in the results section. Afterwards, she independently coded 17 lesson plans (about half of the

lesson plans that remained). Percentage agreement for coding was 88.25 (15 out of 17), which is above the advocated threshold of 80 percent (Riffe, Lacy, & Fico, 1998). In the 2 cases where opinions differed, a comparison of the lesson's content to the three lesson templates suggested that one of the coders had made a mistake.

4. RESULTS

The first part of the results section takes a closer look at the training's effect through an overview of the pre-and posttests results. Student teachers' first attempts at organizing an IBL-activity in the classroom are then covered in the second part. In particular, this section outlines different templates that were found across their lesson plans. The third and final section looks further into student teachers' first experiences with IBL, and uses the information from the reflection papers and available interviews to provide suggestions as to why they differed in their approach to the IBL-activity.

4.1. Outcomes of the training

Looking first at student teachers' evaluation of the workshop, Table 1 provides an overview of the mean scores. These results indicate that student teachers appreciated the workshop, and felt that it provided an adequate preparation for organizing IBL-activities in the classroom. The output of a MANOVA indicates that there were no significant differences between the evaluations of the AT and NAT teacher groups ($F=1.14$, $p=.36$).

Table 1

Student teachers' (N=52) evaluation of the workshop

Item (scale from 1 – strongly disagree, to 5 – strongly agree)	M (SD)
1. I thought that the approach of this workshop was pleasant.	3.88 (0.68)
2. This workshop was interesting.	3.98 (0.71)
3. The difficulty and pace of this workshop were fitting.	3.65 (0.87)
4. I did not understand much of this workshop (<i>reverse worded</i>).	1.65 (0.83)
5. This workshop offers me a good guide for bringing inquiry-based learning into practice.	4 (0.63)
6. During this workshop we encountered new contents/approaches that I did not know yet.	3.5 (1)
7. Workshops of this kind are an added value to teacher education.	4.08 (0.76)
8. I feel that this workshop helps me to improve my pedagogic approach in the classroom.	3.82 (0.73)

Note. Items adapted from Ruys (2012).

Moving on to student teachers' perceived competence for organizing IBL-activities, a MANOVA shows that there was again no significant difference between the AT and NAT group prior to the start of the workshop ($F=2.12$, $p=.07$). It also appears that, in general, student teachers felt already quite capable to organize IBL-activities. Even so, the results in Table 2

show a significant increase in their perceived competence right after the workshop. The only exception is item 4, where the difference from pre- to posttest was no longer significant after applying the Bonferroni correction.

Table 2

Student teachers' (N=50) perceived competence for IBL, pre- and post-workshop.

How competent do you feel to...			
(scale from 1 – completely incapable, to 6 – completely capable)			
	M pre (SD)	M post 1 (SD)	1-tailed p
<i>IBL-activities in general</i>			
1. Organize and guide activities during which students conduct their own research about the past.	4.04 (0.7)	4.56 (0.58)	<.001*
<i>Specific components of IBL-activities</i>			
2. Use historical information to select a suitable and challenging topic that students can investigate in the classroom.	4.24 (0.8)	4.62 (0.86)	.002*
3. Formulate a problem statement that allows students to form their own conclusions about the past through self-directed study.	4.24 (0.8)	4.64 (0.75)	<.001*
4. Select and adapt information sources for tasks that require students to investigate a historical phenomenon by themselves.	4.23 (0.94)	4.47 (0.73)	.022
5. Create instructions so that students can critically analyze and process information about the past through a stepwise approach.	4.21 (1.07)	4.72 (0.76)	.001*
6. Develop teaching methods for guiding, managing and concluding inquiry-based learning activities for students.	4 (0.9)	4.35 (0.86)	.006*

Note. Bonferroni correction was applied to reduce the chance of a type 1 error due to the experiment-wise error rate (see Armstrong, 2014). Hence, * indicates $p < .008$ (i.e. α of .05 divided by N=6 comparisons).

Table 3 shows a comparison of the results obtained after the workshop with those of the second posttest, which was filled in by student teachers who had completed the internship assignment. This did not yield any significant result, and it thus appears that student teachers' perceived competence for organizing IBL-activities underwent no further changes during the assignment.

The pre- and posttests also asked student teachers about the use of sources in the classroom. More specifically, student teachers had to indicate whether their students should mainly: (1) 'read and try to understand sources, which are meant to illustrate or complement the contents of the lesson' (understanding); (2) 'critically evaluate sources, using a number of criteria to determine which information is reliable and which is not' (evaluating); or (3)

‘conduct stepwise investigations of sources, to reach their own conclusions through research questions and a thorough analysis of sources’ (investigating).

Table 3

Student teachers’ (N=33) perceived competence for IBL, pre- and post-assignment.

How competent do you feel to...			
(scale from 1 – completely incapable, to 6 – completely capable)	M post1 (SD)	M post 2 (SD)	1-tailed p
<i>IBL-activities in general</i>			
1. Organize and guide activities during which students conduct their own research about the past.	4.61 (0.61)	4.71 (0.76)	.19
<i>Specific components of IBL-activities</i>			
2. Use historical information to select a suitable and challenging topic that students can investigate in the classroom.	4.70 (0.85)	4.55 (0.83)	.17
3. Formulate a problem statement that allows students to form their own conclusions about the past through self-directed study.	4.70 (0.77)	4.61 (0.86)	.28
4. Select and adapt information sources for tasks that require students to investigate a historical phenomenon by themselves.	4.59 (0.79)	4.61 (0.93)	.46
5. Create instructions so that students can critically analyze and process information about the past through a stepwise approach.	4.82 (0.85)	4.64 (0.86)	.13
6. Develop teaching methods for guiding, managing and concluding inquiry-based learning activities for students.	4.5 (0.73)	4.45 (1)	.37

Note. Only 33 teachers completed the second posttest. Similar to the results in table 2, Bonferroni correction was used to reduce the chance of a type 1 error. As such, * indicates $p < .008$ (i.e. α of .05 divided by N=6 comparisons)

On average, student teachers from the AT group appeared to hold different beliefs at the start of the intervention, compared to the NAT group. A multinomial logistic regression confirmed that there was a significant difference between the two groups ($X^2=4.93$, $p=.03$). In particular, the odds for preferring ‘understanding’ or ‘evaluating’, relative to ‘investigating’ were 3.88 times higher for the AT group. However, by the time the workshop was finished, this significant difference had disappeared ($X^2=1.9$, $p=.17$). An overview of the pre- and posttest results of each group can be found in Table 4.

Table 4

Student teachers’ (N=50) preferred approach to using sources in class, prior to and after the workshop

use of sources	pretest		posttest 1	
	AT	NAT	AT	NAT
understanding	6	7	2	0
evaluating	12	6	4	3
investigating	5	14	17	24
total	23	27	23	27

Looking at the evolution in student teachers’ beliefs about the use of sources, Figure 1 shows how 23 (out of 50) student teachers’ beliefs about the use of sources in the classroom evolved from either ‘understanding’ or ‘evaluating’ to ‘investigating’. However, it also seems that the workshop was unable to convince all student teachers, as 9 of them still chose ‘understanding’ or ‘evaluating’ when taking the posttest.

Further analysis suggests that most student teachers’ beliefs changed again over the course of the assignment. Figure 2 shows the evolution in beliefs of student teachers who completed the internship assignment, and afterwards took part in the second posttest. This time, a large number of student teachers (N=18) who had selected ‘investigating’ during the first posttest, chose ‘evaluating’ or ‘understanding’ at the time of the second posttest.

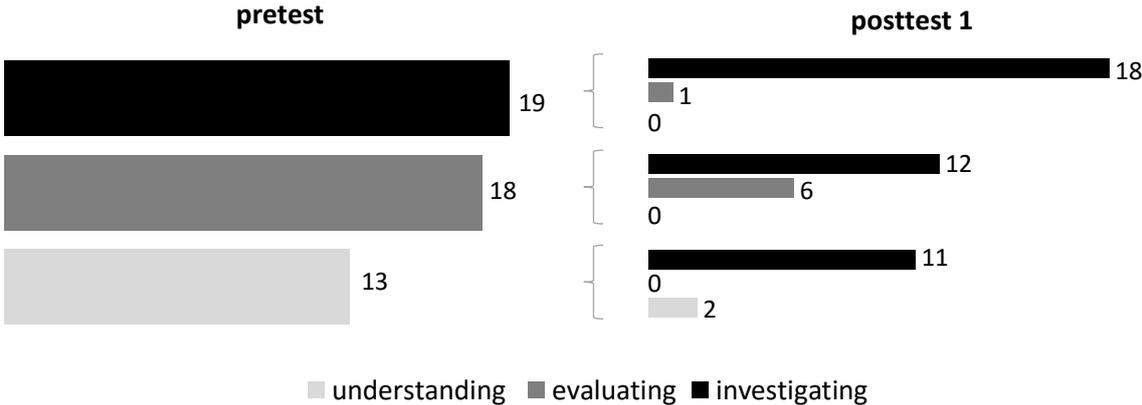


Figure 1. Evolution in student teachers’ (N = 50) beliefs about the use of sources in class.

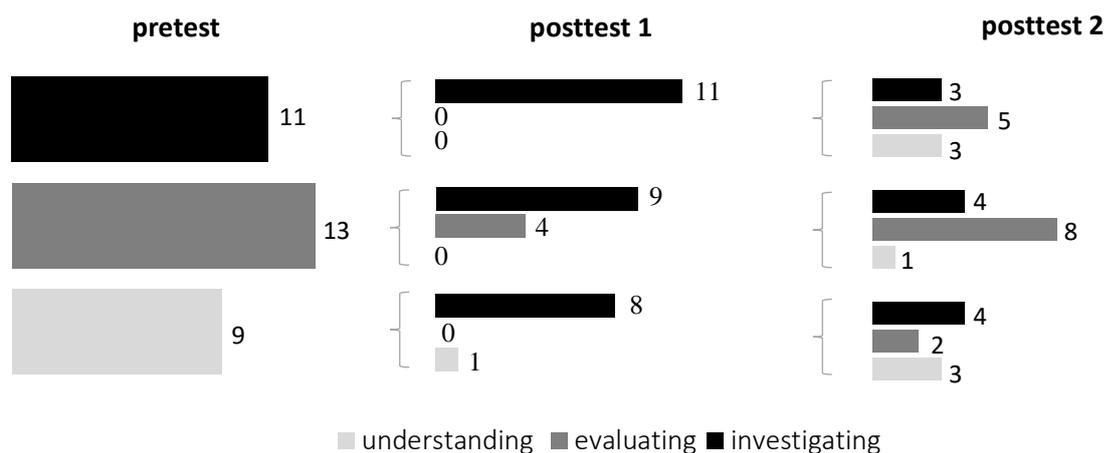


Figure 2. Further evolution in student teachers' (N = 33) beliefs about using sources in class.

4.2. Lesson plans for the IBL-activity

Student teachers' lesson plans covered a variety of topics, both in terms of time and space, with examples like: Christianity in the Roman Empire, the power of medieval European kings, the Age of Enlightenment, the downfall of the Chinese Empire, the rise of Fascism in Italy prior to World War II, the Israeli-Palestinian conflict, and the roots of Islamic fundamentalism.

Three templates were discovered across the lesson plans that were handed in by the students. Ordered from the template that least resembles the approach presented during the workshop to the one that most closely resembles it, these three are: fill in the blanks, synthesis, and critical inquiry. As Table 5 indicates, the main differences between these templates were related to the problem statement and required student activity. In what follows, the templates are further described and illustrated, using the representative cases of Marc, August and Cleo (pseudonyms).

Table 5

Overview of students' lesson templates

lesson template	problem statement	student activity
fill in the blanks	well-structured	knowledge telling
synthesis	ill-structured	knowledge telling
critical inquiry	ill-structured	knowledge transformation

In addition, Table 6 provides an overview of the extent to which each of these templates were found in lesson plans from the NAT and AT group, and in total. The differences between these two groups are rather small and, according to a multinomial logistic regression, not significant ($X^2=.19, p=.91$).

Table 6

Templates discovered across student teachers' (N=36) lesson plans.

frequency	lesson template					
	fill in the blanks		synthesis		critical inquiry	
	N	rel. %	N	rel. %	N	rel. %
NAT program	8	53	3	20	4	27
AT program	10	48	4	19	7	33
Total	18	50	7	19	11	31

4.2.1. Fill in the blanks

A fill in the blanks lesson presents students with a well-structured problem, and is characterized by a focus on telling a particular story rather than to engage students in disciplinary thinking. It bears a strong resemblance to a traditional, teacher-centered, storytelling approach, with the main difference that students can now go through the story at their own pace. As part of the preparation, the teacher selects a number of sources that correspond to the topics he or she would normally cover during a lesson. During the activity, students move from source to source and answer questions that correspond to the core of the story the teacher wants to impart. They are rarely confronted with sources containing contradictory information or different points of view, and are mainly required to retrieve information. In between each source, the teacher often provides students with additional information about parts of the story that are not covered by the sources. Sometimes, a fill in the blanks lesson literally takes the form of exercises where students have to discover and then fill in missing parts of the story. Given the well-structured nature of the problem, and focus on knowledge telling rather than knowledge transformation, fill in the blanks lessons can hardly be regarded as IBL.

Marc was one of the student teachers who prepared a task that was identified as a fill in the blanks lesson. His inquiry focused on the working and living conditions in Belgian cities during the industrial revolution (19th century), and, as is typical for this template, spanned a multitude of topics, such as: working conditions in factories, changes in voting rights, and common people's eating and drinking habits. During the inquiry, students moved from topic to topic, and were each time required to answer several questions that asked them to search for the correct information in the sources. For example, Figure 3 shows the questions that accompanied the topic of child labor. After students had completed this part, they moved on to the next topic of labor unions and voting rights.

Vergelijk bovenstaande interviews en vul onderstaande tekst aan.

In interview 1 toont dokter Turner dat hij kinderarbeid is. Welke argumenten geeft hij hiervoor?

In het tweede interview is dokter Ward duidelijk kinderarbeid. Wat zijn zijn belangrijkste argumenten?

Beide interviews werden in 1819 afgenomen in het Britse parlement en werden voorafgegaan door een onderzoekscommissie zoals in het filmfragment uit Daens. De historicus Gijs De Boeck toont aan dat kinderarbeid in België pas veel later op de politieke agenda komt. In wordt kinderarbeid verboden. Nochtans blijft kinderarbeid in de praktijk veel langer bestaan.

"Afhankelijk van de wetgeving op

Compare the interviews above and complete the following text.

In interview 1, doctor Turner shows that he is child labor. Which arguments does he provide?

In the second interview, doctor Ward is clearly child labor. What are his most important arguments?

Both interviews were taken in 1819 in British Parliament and were preceded by a Committee of Inquiry, as in the fragment from the movie 'Daens'. Historian Gijs De Boeck has shown that it took much longer for child labor to make the political agenda in Belgium. In, child labor is no longer allowed. Yet, in reality, child labor stayed around much longer.

Figure 3. Fill in the blanks lesson: case of Marc (original on the left and translation on the right).

4.2.2. Synthesis

Synthesis lessons are based on an ill-structured problem, but, like the previous template, do not require a transformation of knowledge. In organizing this type of lesson, the teacher selects several sources that provide information about a specific topic, and then formulates a problem statement that requires students to create a synthesis of the information. These problem statements mainly ask students to report about what they have read, rather than to evaluate the information or form their own conclusions. In some cases, the sources are also accompanied by a number of clarifying questions that are aimed at helping students to find the most important information. Similar to the previous template, the lack of knowledge transformation means that synthesis lessons are not in line with the present study's view of IBL.

August prepared a lesson that focused on the Khmer Empire during the Middle Ages. He selected a number of texts and images that came from two sources: 10 fragments from a book written by a Chinese emissary visiting the Empire at the end of the 13th century, and 7 pictures of bas-reliefs found at Angkor. Prior to the inquiry, August discussed both sources with the students, talking about their creators, and the specific purposes they might have had in mind when creating these artifacts. Afterwards, students moved on to the inquiry task (also see Figure 4), and were asked to investigate a problem statement: 'What did the Khmer society look like?' In order to help students answer this mainly descriptive question, the teacher provided students with five, also descriptive, sub-questions, such as: 'What did the housing of

crusades. These questions prompted students to try to imagine the historical context, and think about the impact this speech would have had at the time. Students were then again pointed toward the problem statement, and instructed to reconsider their conclusions based on this new information, something they had to do each time after having studied a new source. At the end of the inquiry, students had to report their findings and were informed that: “This is a personal interpretation, which can differ from that of other people. Please keep in mind that the participants in the crusades were very diverse. Also: (1) support your own opinion, explain why you think something, (2) always mention where you got the information and how trustworthy it is, and (3) try to think about counterarguments that someone else might give, and attempt to counter those in your report.”

<p>3. RELIGIEUZE MOTIEVEN</p> <p>Bron. Deus lo volt!</p> <p>? Vind je dit een overtuigende oproep voor gelovigen?</p> <p>.....</p> <p>? Kiezen ze kruisvaarders zelf of ze mee willen? (vul zowel bij ja als nee iets aan)</p> <p>Ja want,</p> <p>Nee want,</p> <p>? Er zitten twee motieven in deze tekst. Door mee te gaan op kruistocht doet men een gunst aan ...</p> <p>1. "Onze broeders":</p> <p>2. Zichzelf:</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>Jouw tussentijdse conclusie(s) (herlees de probleemstelling):</p> </div>	<p>3. RELIGIOUS MOTIVES</p> <p>Source. Deus lo volt [God wills it]!</p> <p>? Do you think that this call is convincing to religious people?</p> <p>? Do the crusaders have any choice in joining? (complete both yes and no)</p> <p>Yes, because.....</p> <p>No, because.....</p> <p>? There are two motives in this text. By joining the crusade, one lends a favor to...</p> <p>1. "Our brothers":.....</p> <p>2. "Himself":.....</p> <p>Your preliminary conclusion(s) (re-read the problem statement) :</p>
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Figure 5. Critical inquiry lesson: case of Cleo (original on the left and translation on the right).

4.3. Student teachers' thoughts about the IBL-activity

As Table 7 illustrates, differences in student teachers' approach to the IBL-activity do not seem to be connected to their beliefs about the use of sources in class, as measured right after the end of the workshop. No clear pattern can be derived from the data, as most of the teachers indicated that they wanted to conduct full-scale investigations with sources, but later created lessons that corresponded to different templates.

An analysis of student teachers' reflection papers, as well as the interviews that most of them participated in, was therefore conducted to find out more about what might have caused these differences. From this analysis, there emerged three main themes related to

student teachers' general experiences with organizing an inquiry. In addition, several cases suggest that differences between student teachers' lesson templates do not seem to have been merely a matter of limited experience with organizing IBL, but likely also one of influences associated with the context of teaching. The cases of Marc, August and Cleo are again used to illustrate this finding.

Table 7

Student teachers' (N=32) preferences for using sources (post-workshop) and lesson templates.

use of sources	lesson template		
	fill in the blanks	synthesis	critical inquiry
understanding	1	0	0
evaluating	0	2	3
investigating	16	3	7

4.3.1. General experiences

A topic that was noted by most student teachers was how the inquiry changed both teacher and student roles during the lesson. As one student teacher put it: "Students finally have to do something themselves, while you, as a teacher, have to do something other than classic teaching. You become more of a guide, enter into a dialogue with students, and go into the classroom among them. This enables you to interact on a more personal basis with the students, and you can spot problems more quickly." Overall, student teachers were positive about this change of roles, and described the IBL-activity as a more 'relaxed' approach to teaching. With a few exceptions, most did not seem to have felt uncomfortable in walking around the classroom, instead of directly teaching the whole group of students. Although none of the student teachers reported major problems, several did have some difficulties with the practicalities of their new role. For example, one of them reported how: "I focused all of my attention on student groups that asked a lot of questions, but now I realize those were actually the groups that were doing the task really well.", while another stated that: "When I was helping or answering questions, it was often difficult not to give the right answer away. I tried to avoid doing so, but sometimes I still caught myself saying too much."

Apparently, not all student groups were familiar with IBL, as became clear from one student teacher's report of how he overheard his students whispering: "And they are paying him to teach us." Still, students' reactions to the IBL-activity seemed to have been mainly positive, with student teachers describing their students as 'very enthusiastic', 'working diligently', 'enjoying the assignment', and 'all seeming in favor [of IBL]'. In particular, some student teachers were pleasantly surprised when they tried out the activity in classes that

were known as ‘tough crowds’. One of them reported that: “the first class in which I tried out the lesson was known as the worst class in school, with a rude and arrogant attitude toward the teacher, and a lack of cooperation. [...] This was one of the few moments that these students were not disturbing the lesson, and really involved with the lesson contents.” Similarly, another student teacher noted that: “[During the previous lessons] I had noticed quite a few times that the students really tried to test me, by talking out loud, sighing, and reacting provocatively. [...] Contrary to my expectations, I had no problems with classroom management. It was quite the opposite, with concentration and participation being higher than during the traditional lessons I had taught so far. [...] This may indicate that IBL and doing their own source work were a better fit for these students than direct instruction. The personal contact with the teacher, which is characteristic to this approach, also seemed to have been more agreeable to these students.” Only in a few cases did students not seem eager to work on the inquiry. In the first, the student teacher believed that this was mainly due to the lack of a captivating introduction, as time constraints forced her to start the inquiry straight away. In the other, the reason unfortunately remains unclear.

Preparing the IBL-activity proved to be the most difficult part for most student teachers. This first of all seemed to take up a lot more time compared to other lessons. One student teacher explained that: “Not only do you have to find a series of sources that students can understand and use to answer a problem statement, but you also have to think about the practical organization, make source booklets and questions, and write out the instructions.” However, the work did not seem to stop there, as another wrote that: “It is really an approach that requires a lot of time: before the lesson (preparation), during the lesson (spending a lot of time on something that you yourself could explain more quickly) and after the lesson (reading over students’ work).” In addition, student teachers often had problems with finding ‘good’ sources, estimating how difficult these documents would be for students, and how much time it would take students to work through them. For instance, one student reported that he quickly realized that not all topics were equally suited for an inquiry: “because, in my opinion, there was not much information available, and especially information that was on students’ level.” According to another student teacher, the main problem was that: “You can use a lot of materials to talk about the topic, but it is not evident to let students work with them if they don’t have the necessary background knowledge.”

4.3.2. Influences of the teaching context

Looking further into what might have caused student teachers to have taken different approaches toward the IBL-activity, the focus again returns to the cases of Marc, August, and Cleo. These teachers were selected because they chose different lesson templates, even though they had all indicated after the workshop that they wanted their students to ‘conduct

stepwise investigations of sources, to reach their own conclusions through research questions and a thorough analysis of sources' (*investigating*). Their accounts indicate that student teachers' work on the task was in part influenced by the context of the teaching internship, and are mainly used to illustrate the interactions between student teachers and their working environment. By no means does this mean that all student teachers who chose the same template did so for similar reasons, as student teachers may cope with contextual influences in different ways, and different combinations of beliefs and influences may underlie the choice for a particular lesson template.

In the reflection that followed his fill in the blanks lesson, Marc reported that: "I have my doubts about students' mastery of the content during these inquiry lessons. During the interview, he further explained that: "I think my main reason for choosing this approach was that I wanted them to be able to learn the content. [...] Because it has more structure, and because the story is clear, that is why I chose it." Marc thus chose this template because he believed that, otherwise, his students would not have a clear overview of the content after the lesson had ended. Although he appeared to have some doubts about students' ability to engage in historical thinking, this ultimately did not appear to be the main reason for his choice: "I don't know whether students are able to grasp the complexity of history, and whether they could do so during an inquiry. They probably would [be able to do it]..." As he later explained, it was mainly the mentor teacher's focus on covering the content that drove him to this decision: "I had received the lesson contents from my mentor in advance and then I... During my internship, they expected me to cover those contents, so it was not easy to organize an inquiry about just one topic."

Moving on to the second case, August's reflection on his synthesis lesson contained the puzzling statement that: "The assignment sticks to making a synthesis of the information that can be found in the sources. It was not my intention to achieve a higher level of inquiry competences with these students." When asked to further explain this during the interview, he replied that: "I was expecting you to comment upon that", indicating that he was well aware that his lesson was not completely in line with the contents of the workshop. The reason for his choice for this particular template did not appear to lie with his mentor, as he stated that: "My mentor teacher was relatively young, she had graduated about four years ago. [...] She was really open [to inquiry], and she used it herself, so..." Instead, August seemed to have significant doubts about the disciplinary thinking skills of the students in his internship classroom: "I really agree with everything you said [...], but I rather see it as a growing process. [...] They really need more training in learning to describe what they see, in relation to a historical question. They will be required to construct their own questions and make their own evaluations later on."

Finally, Cleo took a clear stance in the design of her critical inquiry, and wrote in her reflection paper that: “Learning to correctly apply ‘the historical method’ is not my central focus. They [students] are not academics, nor should they become judges of historical facts. Instead, I mainly want them, through collaboration, to experience the subjectivity and multiperspectivity of history, with a healthy dose of discussion.” Even though Cleo also appeared to have her doubts about students’ ability, she seemed to have found a way around it: “Because I put a lot of structure in the source booklets for these young students of the third grade, almost everything went according to plan. I put a great deal of effort into making sure that the objectives were clear and logical, so that students always knew what was expected of them.” She also noted how, during the inquiry, she went around the classroom and tried to keep her students’ motivation high: “I spent much of my time on positive reinforcement, which clearly had a lot of effect. [...] Through much feedback in between, so that they know they are proceeding in the right direction, or with a simple ‘well done’ after checking part of their work, even when you have just suggested a number of changes. “

5. DISCUSSION AND CONCLUSION

The present study explores the effects of a pre-service teacher training on inquiry-based learning (IBL) in history education. This introductory training consisted of a workshop and an assignment that required student teachers to prepare and implement an IBL-activity during their teaching internship.

Looking first at the quantitative analysis of the training, the results indicate that student teachers found the workshop valuable, and afterwards felt significantly more capable to organize IBL-activities in the classroom. This significant effect is particularly important, as previous research has indicated that teachers’ self-efficacy is a predictor of the extent to which they will ultimately implement IBL in their classroom (Voet & De Wever, 2017). The workshop was also able to convince student teachers of the value of IBL. After its ending, almost all participants indicated that they mainly wanted to use sources for conducting full-scale investigations, whereas, previously, about half of them had held a different opinion. An explanation as to why the workshop had this effect may be found in its design principles. Next to stimulating active learning, the program was specifically designed to change student teachers’ attitude toward IBL, and provide them with a practical guide necessary for organizing such activities. These design principles, which complement those unearthed by earlier work (e.g. Levy et al., 2013), therefore appear to provide a good starting point for the development of training initiatives for stimulating (student) teachers to adopt IBL into their teaching repertoire.

Similar to previous studies (Barton & Levstik, 2003; McDiarmid, 1994) the results also warn educators not to assume that student teachers with a strong knowledge of history and

its methods of inquiry will be more inclined to teach these topics to their students. On the contrary, it appears that students from the AT program, who had previously obtained an academic degree of master in history, were less inclined to conduct full-scale investigations with sources in their classrooms, compared to non-academic students from the NAT program. Although teachers' knowledge of history influences the way they organize their inquiry activities (McCrum, 2013; Voet & De Wever, in press), the present study appears to confirm that beliefs about teaching and learning history develop relatively separately from this knowledge (McDiarmid, 1994).

Moving on to the data that were gathered after student teachers had completed the assignment, the analysis indicates that their perceived competence for organizing IBL did not change over the course of their teaching internship. In contrast, there was again an important change in student teachers' beliefs about the use of sources. Whereas most of them had, at the end of the workshop, indicated that they wanted to conduct full-scale investigations, they now reported that they mainly wanted to use sources to provide additional information about a topic, or to teach their students how to assess the reliability of information. It thus appears that the internship, which confronted student teachers with the reality of the classroom, caused them to reconsider their beliefs. This finding echoes those of previous work (e.g. Fehn & Koeppen, 1998), which suggests that the context of teaching internships may discourage student teachers from trying out innovative methods for teaching history.

The qualitative data help to shed more light on this issue. An analysis of student teachers' lesson plans revealed three different lesson templates, of which the third is the closest match to the approach presented during the workshop: fill in the blanks, synthesis, and critical inquiry. The main differences between these approaches are related to the (1) problem statement (see King & Kitchener, 1994), and (2) required student activity (see Wiley & Voss, 1996). In short, a fill in the blanks lesson is based on a well-structured problem, asking students to retrieve parts of a particular story, whereas the other two templates draw on ill-structured problems to which there are no clear-cut answers. However, unlike critical inquiry lessons, synthesis lessons do not require a transformation of knowledge from sources into arguments.

When considering what may have caused student teachers to select different templates, the reflection papers and interviews suggest that at least a part of the differences can be connected to the contextual influences that student teachers experienced during their internship. In line with previous research (Crawford, 2007), it was found that the teaching context generally imposed a number of constraints to IBL, related to, for example, mentor teacher requirements or students' ability to engage in historical thinking. Furthermore, student teachers noted that the preparation of IBL-activities proved to be more challenging compared to traditional lessons. Similar to what Levy et al. (2013) found, the biggest hurdle to organizing an IBL-activity was to find the 'right' sources, by which student teachers meant

sources that: contained the relevant information, complemented each other, and could be easily adapted to students' level. Several student teachers therefore reported that organizing the inquiry had taken considerably more time and effort than they normally spent on lesson planning. In short, the combination of contextual constraints and higher workload may help to explain why student teachers selected different lesson templates, but also why a significant number of them were less predisposed toward organizing classroom investigations after their teaching internship had ended.

Even so, an important limitation of the present study is that the relative impact of each of these influences on student teachers' thinking remains somewhat unclear. Making generalizations is difficult, as student teachers worked in varying contexts, which imposed different mixtures of constraints, and seemingly coped with difficulties in different ways. Another limitation is that it is not clear why, before the training took place, dispositions toward IBL differed between the NAT and AT student groups. Although this did not impact the present study, as student groups no longer differed after the training, it is still puzzling why academically trained teachers were initially less inclined to organize IBL-activities. One possible explanation is offered by previous research (Voet & De Wever, 2017), which found that academically trained history teachers' rated students' competence for IBL significantly lower than their non-academically trained counterparts. These teachers might thus have been less inclined to organize IBL-activities, because they were less likely to think that students might be able to engage in reasoning with historical information. On the other hand, there might also be an influence of the teacher training program at work here. Even though both student groups had little experience with IBL, their predisposition toward this teaching approach may still have been influenced by differences between the two programs' curricula. Future research is therefore required to provide more clarity as to what may have caused this difference. Finally, a last limitation is that, due to various reasons, a number of student teachers (18 out of 54) dropped out over the course of the training program. Although the number of remaining teachers was sufficient to evaluate the outcomes of the training program, the question remains how these drop-outs would have performed on the assignment.

To summarize, the results demonstrate that even short training programs hold considerable potential for encouraging student teachers to implement IBL. However, the results also suggest that a confrontation with the constraints presented by the actual teaching context, together with a higher workload associated with IBL, can negatively influence some student teachers' thinking about IBL. These findings hold a number of implications for teacher education programs, both in terms of practice and future research.

6. IMPLICATIONS

Building on previous work examining teacher training on inquiry-based learning (IBL) in history education (Levy et al., 2013), the present study offers three design principles to teacher educators who aim to encourage the adoption of inquiry-based learning (IBL) into student teachers' arsenal of teaching methods. The results indicate that a training focusing on (1) stimulating active learning, (2) changing beliefs, and (3) providing a practical guide results in a positive effect on student teachers' attitudes toward IBL, and their perceived competence for organizing such activities. Although one may assume that the second design principle is irrelevant for student teachers who already have a strong background in history, the results of the study suggest that student teachers' beliefs about teaching and learning history actually develop relatively separate from their knowledge of disciplinary thinking.

In addition, the results suggest that challenges associated with putting IBL into practice may dissuade student teachers from further experimenting with this innovative approach. Extended support during the implementation of IBL in class therefore seems necessary, in order to overcome possible negative influences of contextual constraints and a higher workload on student teachers' thinking. A first approach could be to carefully select the mentor teachers that support student teachers during their first forays into practice. As Abell, Dillon, Hopkins, McInerney and O'Brien (1995) note, one of the roles that mentor teachers play to student teachers is that of a scaffolder, who uses his knowledge and experience to help solve classroom problems. To be able to do this, however, mentor teachers not only need to be supportive of IBL, but also have a strong knowledge base with regard to this teaching approach. In cases where it is not possible to make such a selection, another approach could be to plan regular follow-up activities within the teacher training program. Multiple opportunities for practice, alternated with practical support and feedback that prompts reflection on student teachers' work and beliefs, may also help to consolidate the effects of a training on IBL. More specifically, the present study's framework of two task dimensions (i.e. problem statement and student activity), and the resulting three lesson templates (i.e. fill in the blanks, synthesis, and critical inquiry), can act as a tool for helping student teachers to think about their own work.

The result of the study emphasize that it is important for future research to further investigate what happens after a training on IBL. More information is needed about how student teachers' first attempts at implementing IBL in class influence their work and beliefs, and how extended support provided by either the mentor teacher or teacher education program may impact this process. In particular, longitudinal studies could provide more information on the long-term effects of a training program on IBL, after student teachers have graduated and entered into practice.

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8. APPENDIX A: INSTRUCTIONS FOR THE REFLECTION PAPERS

8.1. Assignment 1

For this assignment, you are asked to reflect on your **approach to the preparation** of the IBL activity during your teaching internship. **Shortly after** having completed your lesson plan, you are asked to write a report in which you provide an answer to the following 2 main questions:

(1) *What did you do as a part of your preparation? Through which steps did your work proceed?*

The objective is **not** to copy the approach presented during the workshop, but to give a step-by-step description of how **you** tackled the assignment. Be clear: give a sufficiently thorough report of what you did and why (e.g. not: “I made instructions for the students and printed them”, but rather: “I chose to let students work together in dyads, and asked them to assume and switch between roles of ‘summarizer’ and ‘critic’, because I think this is something they will not do spontaneously”). Do not be afraid to be honest: you will not get a negative evaluation if your own approach differs from the one presented during the workshop. This part has to be **at least 1 page** in length.

(2) *What went well, and what proved to be a challenge? How do you explain this?*

Try to maintain a **balance** between positive and negative experiences: in other words, report the things that went well, but also those that did not go so well. Be clear about what exactly you thought was easy or hard, and, above all, try to explain why you think so (e.g. not: “I thought it was hard to make instructions”, but rather “when making instructions, I was not sure whether to design roles or a step-by-step plan, because both have their respective advantages). This part has to be **at least 1 page** in length.

Please hand in this assignment **no later than 7 days** after having completed your lesson plan.

8.2. Assignment 2

For this assignment, you are asked to reflect on **the actual implementation** of the IBL activity during your teaching internship, as well as **your own approach** to this activity. **Shortly after** having finished the lesson in your classroom, you are asked to write a report in which you provide an answer to the following 2 main questions:

(1) *How did the lesson go? What went according to plan, what did not, and why?*

Give, **for each phase of the lesson**, a description of how the learning activities turned out. Try to focus on what went well, or things that posed a challenge to the students or yourself. Also, try to explain why you think this was the case (e.g. not: “The part where the students had to read through the information did not go well”, but rather “I had a feeling that the students were not really motivated to go through the information. I had noticed earlier that there was not much enthusiasm for my introduction of the topic, so that might have been the cause. Maybe I should have given a different introduction, for example by...” This part has to be **at least 1 page** in length.

(2) *What are your experiences with this approach to teaching and what did you learn? What is your final conclusion?*

Write a **conclusive reflection** in which you focus on your experiences during the workshop, but also the preparation and implementation of the lesson. What has remained stuck in your memory and why? What did you learn, and what topics would you like to learn more about? How did teaching this lesson feel, compared to other lessons you taught during your teaching internship? End with a **general conclusion** in which you clarify whether you still want to use this approach to teaching (or certain elements of it) in your future lessons and why (not). Again, do not be afraid to give your honest opinion: you will not receive a negative evaluation if you feel that this approach to teaching does not suit you. This part has to be **at least 1 page** in length.

Please hand in this assignment **no later than 7 days** after having completed the lesson in your classroom.

8 | **General discussion and conclusion**

CHAPTER 8:

General discussion and conclusion

“It is of the highest importance in the art of detection to be able to recognize, out of a number of facts, which are incidental and which vital. Otherwise, your energy and attention must be dissipated instead of being concentrated.”

Sherlock Holmes, *The Adventure of the Reigate Squire*

ABSTRACT

This eighth chapter presents an integrated overview and discussion of the findings reported in this dissertation. The chapter starts with a brief recapitulation of the aims and structure of the dissertation, of which the central focus lies on history teachers' use of inquiry-based learning (IBL). This central focus can in turn be split up into a number of research objectives that span three domains of study: (1) the cognitive processes involved in IBL in history, (2) teachers' current use of IBL in practice, and (3) the effects of professional development (PD) with regard to IBL in history. The main body of the chapter provides a discussion of the findings in light of these three domains of study, which is then followed by a general conclusion. The chapter concludes with an overview of limitations of the research, directions for future work, and implications.

1. RECAPITULATING THE AIMS AND STRUCTURE

1.1. Aims

This dissertation can be situated against the backdrop of contemporary perspectives on teaching and learning history (see also chapter 1, section '1.1. On teaching and learning history'), which stress that students should not only acquire strong knowledge of history, but should also learn to reason with historical information (van Drie & van Boxtel, 2008).

The dissertation's general aim is to investigate and promote history teachers' use of inquiry-based learning (IBL) in class. In short, IBL is an instructional approach that, when applied to history education, engages students in (1) an investigation of an open-ended historical question, through (2) an analysis of multiple sources that represent different perspectives on the topic, and (3) a synthesis of this information into an argumentative account (see also chapter 1, section '1.2. Conceptualizing inquiry-based learning in history'). Seeing that these activities strongly resemble the work historians do, IBL is commonly

regarded as a particularly effective approach to developing students' general understanding of history, and their ability to reason with historical information (Levy, Thomas, Drago, & Rex, 2013). Over the years, empirical evidence provided by a number of studies has demonstrated that this is indeed the case (e.g. Reisman, 2012; J. Wiley & Voss, 1999; Wiley & Voss, 1996).

A closer look reveals that the general aim of the dissertation in fact stretches across three distinct domains of study: (1) theoretical conceptualization of IBL in history, (2) history teachers' use of IBL in practice, and (3) the effects of professional development (PD) with regard to IBL in history. Based on the research challenges outlined in the first chapter of this dissertation (see also chapter 1, section '1. Theoretical framework'), a number of research objectives (RO) were formulated with regard to these three study domains:

- **RO 1.** To construct and validate an integrative framework of cognitive processes involved in IBL in history.
- **RO 2.** To investigate secondary school history teachers' use of IBL within their classrooms. This research objective is split up into three sub-objectives.
 - **RO 2a.** To examine the relation between history teachers' conceptions of IBL in history, and their epistemological understanding of history, knowledge of historical inquiry, as well as the context in which they work.
 - **RO 2b.** To study the influence of beliefs about the subject, self, and social context on history teachers' use of IBL.
 - **RO 2c.** To explore history teachers' use of technology to support learning activities, and IBL in particular.
- **RO 3.** To examine the effectiveness of PD with regard to IBL in history, within the context of pre-service teacher education. This research objective is split up into two sub-objectives.
 - **RO 3a.** To determine the effects of immersion in an IBL-environment on pre-service history teachers' beliefs.
 - **RO 3b.** To measure the effects of an introductory training program with regard to IBL on pre-service history teachers' beliefs and work in practice.

1.2. Structure

Figure 1 presents an overview of how the research objectives were examined throughout the chapters of this dissertation, and how each chapter builds on the ones preceding it.

RO 1 is studied in **chapter 3**. Based on a review of the literature on reasoning during a historical inquiry, an integrative framework of core cognitive processes involved in IBL in history is constructed. The validity of this framework is examined using data on 20 history teachers' performance during an assessment engaging them in an inquiry on the English Peasants' Revolt of 1381, and makes it possible to construct a typology of approaches toward historical inquiry.

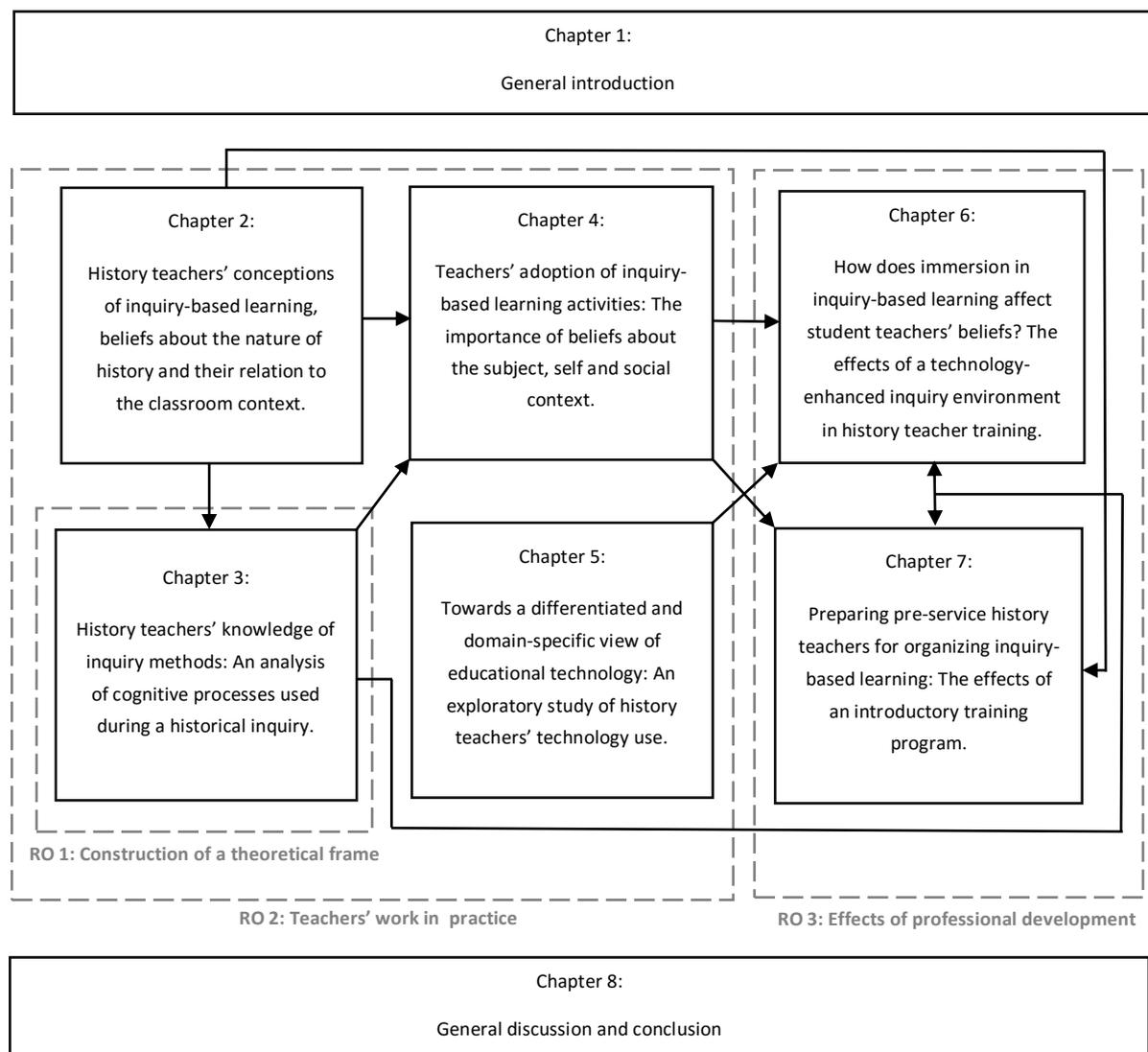


Figure 2. Structure of the dissertation.

RO 2 is tackled in **chapters 2 to 4**, through three sub-objectives referring to distinct topics with regard to teachers' use of IBL in class.

RO 2a focuses on how teachers conceive of IBL in history, and is primarily investigated through **chapter 2**, which analyzes these conceptions in relation to history teachers' epistemological understanding of the subject, and the context in which they work. Furthermore, this chapter also gives an overview of the issues that teachers encounter when trying to organize IBL. Research question 2a is further investigated in **chapter 3**. As the data for this chapter were gathered from the same teachers as those in chapter 2, chapter 2's data are re-used to compare history teachers' performance during the inquiry task, which can be regarded as an indicator of their knowledge of historical inquiry, to their epistemological understanding and conceptions of IBL in history.

RO 2b looks into teachers' reported adoption of inquiry activities. To be more specific, **chapter 4** explores how classroom implementation of IBL-activities is determined by teachers' beliefs, and in particular their orientation to teaching, self-efficacy for organizing IBL, perceptions of students' ability with regard to IBL, and contextual hindrances to IBL. This analysis also considers the influences of a number of predictors of teachers' beliefs, which were derived from the findings of chapters 2 and 3, and include teachers' epistemological understanding, highest obtained degree, and the study track in which they work. In addition, the chapter also provides an overview of the goals and approaches that history teachers tend to favor most.

RO 2c centers around history teachers' use of technology, and is examined in chapter 5, which provides an overview of history teachers' rationales for using technology, types of technology use, and factors inhibiting the use of technology. Adopting a domain-specific and differentiated view of technology, further analyses are carried out to conduct an evaluation of teachers' technology use.

RO 3 focuses on the effectiveness of professional development (PD) promoting IBL in history, and is investigated in **chapters 5 to 6**.

RO 3a is concerned with immersion in IBL, a practice that has often been emphasized in research on PD with regard to IBL (e.g. see the review by Capps, Crawford, & Conostas, 2012). Chapter 5 describes the design of a technology-enhanced inquiry environment, based on the frameworks presented in chapters 2 and 5, and explores the impact of immersion in this environment on pre-service teachers' beliefs. In line with chapter 4, these beliefs are operationalized in terms of orientation toward history teaching, and self-efficacy for conducting historical inquiries.

RO 3b revolves around the effects of an introductory training on IBL in history, and is covered in chapter 6. This chapter looks into the impact of a training, which was designed based on findings from chapters 2 and 3, on pre-service teachers' beliefs and work in practice. Beliefs are operationalized as conceptions of IBL in history (i.e. based on chapter 2), and self-efficacy for organizing inquiry activities (i.e. based on chapter 4). The analysis of student teachers' work in practice mainly focuses on distinct types of implementation of IBL into the classroom, and factors that might help to explain these differences.

2. DISCUSSION OF THE FINDINGS

2.1. RO 1. Cognitive processes associated with inquiry-based learning in history

A review of recent research on the topic of reasoning during historical inquiries (e.g. De La Paz & Felton, 2010; Hicks, Doolittle, & Ewing, 2004; Poitras & Lajoie, 2013; van Drie & van Boxtel, 2008) shows that knowledge of reasoning during IBL in history has so far remained fragmented

across different research reports. Apart from using different terms to refer to similar activities, it turns out that some studies even use similar terms to refer to different activities (e.g. see Hicks et al., 2004; Wineburg, 1991, for different interpretations of the term 'contextualizing'), which further adds to the confusion created by this fragmentation.

In relation to this, a first important outcome of chapter 3 is the introduction of a process model of IBL in history, outlining five core cognitive processes associated with this kind of activities. This model was constructed based on a synthesis of research on reasoning during historical inquiries (i.e. De La Paz & Felton, 2010; Hicks et al., 2004; Perfetti, Britt, Rouet, Georgi, & Mason, 1994; Poitras & Lajoie, 2013; van Drie & van Boxtel, 2008; Wineburg, 1991, 1994, 1998), and then validated through an analysis of think-aloud protocols of history teachers (N=20) carrying out an inquiry task on the English Peasants' Revolt of 1381. Drawing on academic debate surrounding the topic, this task asked teachers to study four information sources to determine whether the name of 'Peasants' Revolt' is appropriate for this uprising.

An overview of the process model, and the corresponding five core cognitive processes, is presented in Table 1. In line with what previous work on historical reasoning has argued, some of the core processes can be considered as characteristic of history, while others might be regarded as more domain-general (van Drie & van Boxtel, 2008). Furthermore, as is the case with most inquiry models (Pedaste et al., 2015), the way the model is presented should not be interpreted as if the core cognitive processes are used in a linear sequence. Instead, individuals engaged in a historical inquiry can go through each process in the order that best corresponds to the particular inquiry task, and may return to them at any time.

Even though the model unites findings on cognitive processes associated with IBL in history, two concessions have to be made with regard to claims of its comprehensiveness. First, the model does not consider how individuals' use of the core cognitive processes is influenced by the resources available for an inquiry, such as the nature of available sources (e.g. Rouet, Britt, Mason, & Perfetti, 1996; Wiley & Voss, 1999), or individuals' knowledge of the topic under investigation (e.g. van Boxtel & van Drie, 2004; Wineburg, 1998). The main reason is that the model's general purpose is the identification of core cognitive processes, rather than to investigate how these vary across inquiry tasks. In addition, findings on the influences of these resources have already been reported elsewhere (see e.g. Paxton, 2002; Rouet et al., 1996; Wiley & Voss, 1999; Wiley & Voss, 1996; Wineburg, 1998). Second, despite its clear distinction of core cognitive processes associated with IBL in history, the process model does not provide criteria for the relative quality of the cognitive activities that underlie each of these core processes. Such criteria could include, for example, correctness of inferences, or appropriate use of first-order (e.g. peasant, feudality, middle ages) and second-order (e.g. evidence, cause and effect, empathy) concepts (see also van Drie & van Boxtel, 2008). To summarize, this means that, while the process model moves forward the

Table 1

Process model of historical inquiry

Core process	Definition	Underlying cognitive activities
<i>Sourcing</i>	Sourcing involves making assumptions about what might be expected of a source, both in terms of reliability and content. These assumptions are made through a consideration of a source's appearance and origin.	Considering the appearance and origin of a source involves examining and making assumptions based on: <i>SO1</i> the author's background and credentials, <i>SO2</i> the period in which the source was produced, and <i>SO3</i> the type of source.
<i>Appraising</i>	Appraising refers to attaining an in-depth understanding of a source's reliability and content, through an assessment of the information it presents. Based on this assessment, previous assumptions about the source may be verified or rejected.	An assessment of information presented by a source aims to make inferences based on an evaluation of: <i>AP1</i> the point of view or bias expressed by the source, <i>AP2</i> the logic and accuracy of the reasoning presented by the source, <i>AP3</i> the evidence underlying the source's claims, and <i>AP4</i> a comparison of information across sources.
<i>Specifying</i>	The main goal of specifying is to optimize understanding of information, by adopting a focused approach to information processing. This approach allows to direct the search for answers, and actively process new information.	A focused approach to information processing involves: <i>SP1</i> asking questions about inquiry objectives or missing information, and <i>SP2</i> activating prior knowledge to interpret new information.
<i>Constructing</i>	Constructing is concerned with retrieving particular bits of information from sources, which shed more light on the topic under investigation. This allows to build a mental model of events that goes beyond individual sources.	Building a mental model of the topic under investigation requires: <i>CO1</i> Synthesizing information related to a particular historical question, and <i>CO2</i> Reconstructing the historical context in which the question can be situated.
<i>Arguing</i>	Arguing centers around reporting conclusions with regard to the topic under investigation. More specifically, this involves a use of information as evidence to form arguments that back a particular claim.	Using source information as evidence to form arguments includes: <i>AR1</i> Presenting arguments in support of a specific claim, and <i>AR2</i> Rebutting arguments running counter to the claim.

Note. This framework integrates findings of De La Paz and Felton (2010), Hicks et al. (2004), Perfetti et al. (1994), Poitras and Lajoie (2013), van Drie and van Boxtel (2008), and Wineburg (1991a, 1994, 1998)

observation, classification, and evaluation of reasoning during IBL in history, it makes little distinction with regard to the relative quality of cognitive activities that underlie the core cognitive processes associated with IBL.

A second finding of chapter 3 involves a typology of approaches to IBL in history, which was obtained through application of the process model of historical inquiry to teachers' performance. Although this typology has already been hinted at by previous research (Yeager & Davis, 1996), the process model now offers clear criteria for the classification of approaches. The first approach is defined as an *integral approach*, and corresponds to use of all five core cognitive processes during an inquiry task. As such, this approach can be regarded as the standard of performance, required to successfully engage in IBL in history. The second approach can be described as a *fragmentary approach* and describes individuals who, even though they do not draw on all five core cognitive processes during an inquiry task, still try to determine the value of sources through sourcing, appraising, or both. Contrary to what previous research suggests (e.g. Yeager & Davis, 1996), fragmentary approaches may thus take different forms, depending on the specific core cognitive processes that are overlooked. The third approach is named a *cursorial approach*, and, as its name indicates, corresponds to cases where most core cognitive processes, including those of sourcing and appraising, are overlooked. In such cases, individuals simply read through the information without adopting an analytical stance. Above all, this typology thus indicates that differences in individuals' approaches to IBL in history are not merely a matter of more or less historical reasoning (see e.g. Yeager & Davis, 1996), but rather of the specific core cognitive process that they do or do not use.

To summarize, chapter 3 contributes to the theory on historical reasoning by putting forward a model of core cognitive processes associated with IBL in history. Based on the processes outlined by this model, it becomes possible to construct a typology of performance related to IBL, which provides more information on the different approaches individuals may take to a historical inquiry.

2.2. RO 2. History teachers' use of inquiry-based learning in class

Although some studies suggest that, in Western Europe, source work receives considerable attention during the history lesson (e.g. von Borries, 2000), others have made the case that Flemish history teachers tend to oversimplify (e.g. De Wever, Vandepitte, & Jadoulle, 2011) or misrepresent (e.g. Wils, 2009) inquiry-based learning (IBL) to students. As a consequence, several questions remain with regard to history teachers' general ideas about the subject, including the use of educational technology for teaching history (R2c), conceptions of IBL (R2a), and actual implementation of IBL (R2b).

2.2.1. History teachers' ideas about teaching the subject

Based on semi-structured interviews with history teachers (N=22) from the fourth grade of secondary education (i.e. average student age: 16 years old), chapter 2 provides more information on teachers' understanding of the nature of history, and their ideas about how the subject should be taught. The resulting data reveal six learning goals driving teachers' work in the classroom: (1) increasing students' understanding of society, through an explanation of its historical roots (N=17), (2) contributing to students' development as cultural beings, by developing their general knowledge of the world (N=13), (3) stimulating a critical attitude in students (N=12), (4) preparing students to become citizens, through an overview of their country's history (N=11), (5) stirring up students' interest in history (N=11), and, finally, (6) familiarizing students with the interpretative nature of history, or the basics of historical inquiry (N=3). In short, this finding suggests that the instruction given by most history teachers is largely driven by goals that concentrate on transferring knowledge of the past, be it of the world, Western civilization, or the Belgian nation, rather than learning to reason with historical information. In the minds of most teachers, the latter remains limited to the development of a general critical attitude. As such, this finding reflects previous studies arguing that, in general, history teachers tend to give priority to covering the vast expanse of the past, while the practice of historians is generally overlooked (e.g. Bain, 2000; Lee, 2005; Monte-Sano, 2011; Peck, 2014; Seixas, 2000; Van Nieuwenhuysse et al., 2015; VanSledright & Limón, 2006).

Drawing on a large-scale survey of secondary school history teachers (N=526), chapter 4 adds a more comprehensive overview of teachers' ideas about instruction to the discussion. It indicates that, according to many teachers, being good at history comes down to knowing chronology, facts and concepts (36.45%), although a large group sees this as part of a balance between knowledge and skills, arguing that students should also be capable of analyzing and criticizing historical information (41.33%). In comparison, only a minority equals competence in history to an ability to tackle new contents, involving the use of prior knowledge and an investigation of information sources to answer a historical question (22.22%). When asked about the most effective approach to teaching history, a significant number of teachers indicate a preference for lectures that present facts and concepts in a clear and structured way (19.88%), even though many of them add that this should be alternated with an analysis of sources (62.77%). Only a minority of the teachers appears to favor more student-centered lessons that draw on practices of historical inquiry (17.35%). To conclude, these findings thus appear to confirm those reported in chapter 2, signifying that, even though most teachers have integrated analysis and criticism of sources into their lessons, providing an overview of human history remains predominant in many history classrooms. As regards history teachers' preferred modes of instruction, the findings are not entirely consistent with international studies reporting that the subject is dominated by lectures and storytelling (e.g. VanSledright

& Limón, 2006). Instead, they are a closer match to more recent studies arguing that the instruction given by most Belgian teachers is based on a discourse-discovery model, which combines teacher lecture with brief analyses of sources that are relatively one-sided, not too complex, and studied one by one under the teacher's guidance (De Wever et al., 2011).

The findings of chapters 2 and 4 can further be related to those of chapter 5, which employs semi-structured interviews to investigate teachers' (N=22) technology use. Most of these teachers state that they use technology because it enables them to use new teaching approaches (N=17), next to other reasons, such as bridging the gap between school and students' daily life (N=12), increasing efficiency and reducing workload (N=11), or complying with expectations of influential others (N=4). However, when looking at teachers' examples of classroom practice, it turns out that their technology use actually remains relatively low-level. With respect to teacher use, technology is mainly used to let students experience the past, through media such as pictures and audio fragments (N=17). In addition, teachers also use technology as a tool for presenting and structuring the learning content (N=5), and looking up information to answer student questions (N=6). When it comes to student use, technology is generally employed as a resource for looking up information (N=15), or presenting findings of an assignment (N=9).

Surprisingly, none of the teachers referred to use of educational technology as a way of scaffolding inquiry-based learning (IBL), through, for example, the design of multimedia-supported environments that give support to the inquiry process (see e.g. Saye & Brush, 2002), or the use of computer-supported collaborative learning to facilitate historical reasoning (see e.g. van Drie, van Boxtel, Jaspers, & Kanselaar, 2005; van Drie, van Boxtel, & van der Linden, 2006). In short, this finding indicates that, similar to history teachers' general ideas about teaching the subject, the main focus of teachers' technology use does not lie on facilitating disciplinary thinking in history, but rather on covering the story of the past. In particular, technology appears to be used mainly as a way to facilitate teachers' narration of the story of the past, or to have students process information about specific parts of this story on their own.

To put it briefly, the findings of chapters 2, 4, and 5 all paint a similar picture of the way history education is generally organized in Flemish classrooms. According to these findings, history teachers' goals and instruction focus primarily on covering the 'story' within 'history'. Even though many teachers are also attentive to reasoning with historical information, this facet of history seems to be commonly condensed to teaching goals that emphasize the development of a critical attitude, and concise, teacher-centered analyses of sources during the history lesson.

2.2.2. History teachers' conceptions of inquiry-based learning

The findings of chapter 2 also provide more information on history teachers' specific ideas with regard to inquiry-based learning (IBL). In particular, three distinct conceptions of IBL are identified: (1) In line with the literature on IBL in history, a first type of conceptions equals inquiry to an *investigation* in which students use information sources to answer particular historical questions, and support their claims using evidence drawn from these sources. Yet, only a relatively small number of teachers (N=4) hold this kind of conceptions. (2) In contrast, most teachers (N=16) tend to reduce inquiry to an *evaluation* of information sources, devoid of any historical question. According to this second type of conceptions, the main goal of an inquiry is simply to find out whether the information presented by a source is reliable. (3) Finally, a third type of conceptions further downsizes inquiry to *comprehension*. In such cases, inquiry revolves around retrieving and synthesizing factual information from sources. However, only few teachers (N=2) subscribe to this kind of conceptions.

Even though the evaluation of sources is an important aspect of IBL in history, the finding that, in the mind of the majority of teachers, IBL is reduced to an evaluation of sources' reliability can be argued to be problematic for two reasons. First, this type of conceptions erroneously presents IBL in history as an almost mechanical evaluation of information, while in reality, IBL-activities center around forming a claim about the past, through a process in which interpretations are formed and evaluated based on evidence (Kuhn, Weinstock, & Flaton, 1994). Second, the preoccupation with a source's reliability also misrepresents source work in history. As Barton (2005) has argued, all sources are biased to some degree, and the presence of a bias does not necessarily imply that a source is useless. On the contrary, most historians actually seek out sources precisely because of their bias, as this gives an indication of the ideas, attitudes and beliefs of people in the past. Building on this argument, Wils (2009) further explains that objectivity and reliability are therefore not synonyms, but that sources' reliability and usefulness instead depend on the historical questions asked.

Similar to before, the findings from chapter 4 provide a more comprehensive picture of history teachers' conceptions of IBL. Asked about the position of sources in the history lessons, most teachers respond that they regard historical sources as a way to develop students' competence in analyzing information, through activities led by the teacher (51.27%). To a smaller group of teachers, sources are mostly illustrations that help to imagine a situation or to clarify an idea (26.32%). Only another minority agrees that sources need to be extensively analyzed, with students asking historical questions, searching for and discussing information (22.41%). To summarize, the findings of chapter 4 thus again confirm those of chapter 2, indicating that for most teachers, IBL centers primarily around an analysis of sources, rather than answering a historical question.

These findings raise the question as to why, then, most history teachers reduce IBL to a critical evaluation of sources. To find out the answer to this question, chapter 2 considers teachers' conceptions of IBL in relation to their epistemological understanding of history, and the context in which they work, while chapter 3 adds teachers' knowledge of inquiry methods into the equation.

Teachers' epistemological understanding of history, also referred to as an understanding of the nature of history, was investigated based on the framework by Maggioni and colleagues (Maggioni, VanSledright, & Alexander, 2009; Maggioni, VanSledright, & Reddy, 2009), which allowed to assign each teacher to one out of three epistemological stances. In line with the current academic perspective, the majority of teachers (N=17) hold a *criterialist* stance, reporting that historians reconstruct the past through an interpretation of sources, which can be evaluated based on the plausibility of the underlying arguments. The remaining teachers' epistemological understanding deviates from this academic view, and can be identified as either an *objectivist* stance (N=3), stating that history should be based on facts, and not interpretation, or a *subjectivist* stance (N=2), maintaining that all historical accounts are mere opinions. Seeing that most history teachers hold an epistemological understanding that is consistent with current academic views (i.e. a criterialist stance), this variable does not help to explain why many teachers reduce IBL to a critical evaluation of sources. However, similar to what scholars such as Yilmaz (2010) have argued, the findings do appear to show that a nuanced epistemological understanding is nevertheless an important precondition to developing conceptions of IBL that are in line with disciplinary practice. In particular, the findings show that the only teachers regarding IBL as investigations centering around forming and supporting a claim in answer to a historical question, are in fact teachers who were later identified as holding a criterialist stance. In other words, the findings suggest that, although a nuanced understanding of history is a precondition to conceptions of IBL that are consistent with scholarly views, this understanding is far from the only or most important factor that influences these conceptions. Somewhat paradoxically, this finding thus provides support to previous studies suggesting that history teachers' epistemological understanding shapes their conceptions of IBL (e.g. Bouhon, 2009; McCrum, 2013), but at the same time, also lends credence to a larger number of studies demonstrating that teachers' conceptions of IBL develop relatively separate from their epistemological understanding of the subject (e.g. Barton & Levstik, 2003; Hartzler-Miller, 2001; McDiarmid, 1994; VanSledright, 1996).

History teachers' knowledge of inquiry was operationalized as their use of the five core cognitive processes of historical inquiry, during the inquiry task described above (see section '2.1. RO 1. Cognitive processes associated with inquiry-based learning in history'). Similar to teachers' epistemological understanding of the subject, a comparison reveals no clear pattern between teachers' knowledge of inquiry and their conceptions of IBL. Once more, these

findings are thus consistent with research suggesting that teachers' classroom practice is not necessarily in line with their knowledge of the subject (e.g. Barton & Levstik, 2003; Hartzler-Miller, 2001; McDiarmid, 1994; VanSledright, 1996). What is most interesting, is that a comparison of teachers' knowledge of inquiry methods and their epistemological understanding shows that each teacher who used all five core cognitive processes (N=8), could also be identified as holding a criterialist stance. Yet, conversely, not all teachers with a criterialist stance (N=16) used each of the core cognitive processes. On the one hand, this finding is consistent with previous research suggesting that a sound epistemological understanding of history is key to successfully engaging in historical inquiry (e.g. Wineburg, 1991b). On the other, it points out that a distinction must be made between a general epistemological understanding of history, and a more particular understanding of historical inquiry, as the findings show that possession of the former does not guarantee that of the latter. This conclusion is especially important seeing that, so far, research on history teachers' knowledge of their subject has mainly focused on their epistemological understanding of history, rather than their actual understanding of inquiry methods (e.g. McCrum, 2013; Yilmaz, 2010). Finally, the finding that less than half of the teachers within the sample used all five core cognitive processes during the inquiry task also agrees with previous work, which suggests that a significant number of history teachers are unable to successfully engage in a historical inquiry (Bohan & Davis, 1998; Wineburg, 1991b; Yeager & Davis, 1996). Chapter 2 is able to partly explain this finding, as analyses indicate that teachers' performance can, in part, be related to their prior training. In particular, the findings show that, with one exception, all history teachers using each of the five core cognitive processes (N=9) had received an academic training in history at university. Even so, it also turns out that not all teachers with an academic training (N=14) were able to successfully engage in the inquiry, suggesting that other factors are also at play.

Lastly, chapter 2 also compares teachers' conceptions of IBL to the context in which they work. Most important, the findings show that all teachers regarding IBL as an investigation of sources to form and support a claim about a historical question (N=4) taught in classes with two periods (i.e. a period lasts 50 minutes) of history each week, rather than in one-period classes. Even though this group is only a part of all teachers working in two-period classes (N=14), most of whom reduced IBL to an evaluation of a source's reliability (N=9), this finding still suggests that time available for teaching may hold some influence over teachers' conceptions of IBL. Teachers' comments during the semi-structured interviews appear to confirm this conclusion, as most of them mention a limited amount of time (N=18) when explaining their ideas about IBL in class. Other contextual influences that were brought up include: poor student inquiry competences (N=17), limited availability of 'good' sources (N=12), weak student content knowledge (N=11), and low student motivation for conducting

inquiries (N=9). In line with previous work (e.g. Hicks, 2005; Van Hover & Yeager, 2003), it thus appears that history teachers' conceptions of IBL are, to some extent, influenced by contextual factors. Furthermore, the findings of chapter 2 also suggest that teachers may cope differently with these contextual factors, which can help to further explain the differences between teachers.

In relation to this conclusion, recent research offers a complementary explanation for the finding that most history teachers tend to reduce IBL to a critical evaluation of sources. Compared to the history standards set by the government, the textbooks that translate these standards into practice are said to play an equally, if not more important, role in teachers' instructional decisions (De Wever et al., 2011). In this respect, a study by Van Nieuwenhuysse et al. (2015) found that: "When looking for example at the way in which [Flemish] textbooks deal with historical sources, one can notice that sources are widely questioned. A lot of questions, however, are purely content-related, while others refer to *the* historical method, and aim to determine to what extent a historical is 'reliable, impartial, complete and thus useful' (Van Nieuwenhuysse et al., 2015, p. 236)". Seeing that this overview of how IBL is presented in history textbooks bears a lot of similarities to the conceptions held by the majority of teachers, it seems that history textbooks thus form another important contextual influence.

To sum up, the findings of chapters 2 and 4 indicate that most teachers' conceptions of IBL tend to reduce inquiry to a critical evaluation of sources' reliability. In an attempt to explain this finding, chapters 2 and 3 show how, even though epistemological understanding of history, and knowledge of inquiry seem to be important preconditions to teachers' capability for successfully engaging in, and accurately representing IBL, these variables do not seem to explain differences in teachers' conceptions of IBL. Instead, the findings of chapter 2 point out that a part of these differences may instead be attributed to influences of the context in which teachers work, including factors such as time, student level, and available learning materials.

2.2.3. History teachers' implementation of inquiry-based learning activities.

Offering another perspective on the status of inquiry-based learning (IBL) in history education, chapter 4 provides more information on history teachers' reported implementation of IBL-activities. In line with disciplinary practice, this includes activities in which students carefully scrutinize information sources to answer a historical question, or in which the teacher demonstrates how to do so. In contrast to chapters 2 and 3, chapter 4 thus focuses less on how teachers translate inquiry into the classroom, but rather investigates why they implement IBL activities that match the general characteristics of disciplinary inquiry.

The responses to a number of scales included in the survey were used to estimate a structural equation model (SEM) that attempts to explain teachers' implementation of IBL-

activities based on their beliefs. In total, this SEM model accounts for 38% of the variance in reported implementation of IBL. To be more specific, the model indicates that three types of beliefs have a significant effect on teachers' decision to implement IBL-activities: (1) the value attributed to procedural knowledge goals, which emphasize mastery of historical reasoning skills, (2) self-efficacy for organizing IBL-activities, and (3) perceived contextual hindrances to IBL. In addition, the model reveals that these beliefs influence one another, with more attention to procedural knowledge leading to higher self-efficacy, which in turn results in less perceived contextual hindrances. The discovery that teachers' implementation of IBL is, to a large extent, governed by their subject-related beliefs, is in line with a large body of research showing that teachers' work in practice generally mirrors their beliefs about teaching (e.g. see the review studies by Fang, 1996; Kagan, 1992; Pajares, 1992), and in particular with studies arguing that individuals' approach to a certain subject is determined by beliefs about the subject, self, and social context (Op 't Eynde, De Corte, & Verschaffel, 2002; Schoenfeld, 1983). Moreover, this discovery is particularly relevant to professional development (PD) promoting teachers' use of IBL, which has so far been characterized by a general neglect of systematical assessments of teachers' beliefs (see Capps et al., 2012).

Furthermore, the SEM-model looks into how history teachers' subject-related beliefs are in turn affected by three variables covered in chapters 2 and 3. These include: the context in which teachers work (i.e. one- or two-period classrooms), teachers' understanding of the nature of history, and their highest obtained degree.

First, the number of lesson periods that teachers have available for teaching history do not have a significant effect on their beliefs with regard to students' ability, nor on their perceptions of contextual hindrances to organizing IBL-activities. This finding is seemingly in contrast with that of chapter 2, which suggested that the context in which teachers work, with the time available for teaching as one of the most important factors, shapes their conceptions of IBL. Still, these findings are not necessarily incompatible, as chapter 4 suggests that it is not the actual teaching context, but rather how teachers perceive it, that drives teachers' implementation of IBL. When viewed from this perspective, chapter 2's finding that teachers may cope with contextual influences in different ways actually confirms this explanation.

Second, the SEM model also investigates how history teachers' beliefs are affected by their epistemological understanding of the subject. Teachers' epistemological understanding was examined based on a scale composed of statements corresponding to an objectivist stance (i.e. a view that history is an objective account of the facts, devoid of interpretation). Surprisingly, the model indicates that, the more teachers' epistemological understanding is in line with an objectivist stance, the more value they tend to attach to goals that stress mastery of historical reasoning skills, as well as goals that focus on learning the story of the past. This finding is hard to explain, as there is no clear-cut explanation as to why teachers who equal

history to an objective study of facts would attach more value to the teaching of inquiry competences. Previous research actually points to the contrary, suggesting that teachers who have a good understanding of history's interpretative nature are more likely to engage students in IBL-activities that let them draw their own interpretations (e.g. McCrum, 2013). Furthermore, this finding also contradicts those of chapter 2, which suggested that a well-developed understanding of history is a precondition to the development of ideas about inquiry that are in line with disciplinary practice. Looking further into this matter, a second possible explanation may be found in the instrument used. Even though scales have been commonly used to measure epistemological beliefs (e.g. Hofer, 2000; Maggioni, VanSledright, & Alexander, 2009; Schommer, 1990), some have criticized the use of recognition measures that offer a limited number of choices for capturing epistemological understanding (see e.g. Wood, Kitchener, & Jensen, 2002). Put shortly, this unexpected finding could thus also be due issues with validity (for more information, see section '4.2.2. Limitations of the methodology of RO 2').

Third, the SEM model examines how teachers' highest obtained degree influences their subject-related beliefs. In line with chapter 2's finding that all teachers who were able to successfully complete a historical inquiry held a master degree, the estimates of the SEM model suggest that, compared to other teachers, teachers with an academic training feel more capable of organizing IBL-activities in their class. Consistent with the breadth and depth of their training, these teachers also appear to attach more value to learning to reason with historical information, as well as acquiring an overview of the past. Finally, academic teachers score significantly lower on statements that are in line with an objectivist stance. Even though some doubt can be expressed with regard to the validity of the instrument used to measure epistemological understanding, this finding is nevertheless in line with previous research showing that teachers with an academic training tend to have a more nuanced understanding of history (Yilmaz, 2010). Next to these positive effects, an academic training program also seems to have one major drawback, as teachers with this kind of training are more inclined to perceive their students as less capable of conducting IBL, which in turn contributes to an increase in perceived contextual hindrances to IBL. In keeping with research that has stressed the importance of student teachers learning to assess students' prior historical understanding (e.g. Bain & Mirel, 2006; Seixas, 1994), a plausible explanation is that, due to their focus on scholarly history, academic training programs pay less attention to discussions of secondary school students' historical reasoning abilities, which in turn results in lower expectations on behalf of the teachers graduating from such programs.

Shortly put, chapter 4 indicates that teachers' implementation of IBL is governed by the value they attach to procedural knowledge goals, self-efficacy for organizing IBL in class, and perception of contextual hindrances to IBL. In this respect, this chapter nuances findings

of chapter 2, suggesting that it is not the actual context, but rather teachers' perception of it, that influences their thinking about IBL. Furthermore, chapter 4 indicates that, next to attaching more value to goals that stress the acquirement of both inquiry competences and an overview of the past, academically trained teachers also feel more capable of organizing IBL. This finding corresponds to chapter 3, which revealed that all teachers who were able to successfully complete a historical inquiry had previously obtained a degree of an academic training. However, chapter 4 furthermore suggests that academically trained teachers also seem to have a tendency to underestimate their students' historical reasoning abilities.

2.3. RO 3. Effects of professional development on inquiry-based learning in history

So far, there have been several studies on professional development (PD) that sets out to promote inquiry-based learning (IBL) in history (e.g. Fehn & Koeppen, 1998; Levy et al., 2013; McDiarmid, 1994), and a significant body of research on PD focusing on IBL in other subject domains, and science learning in particular (see e.g. the review by Capps et al., 2012). Yet, as Peck (2014) recently argued: "In terms of PD programs focused on teaching history specifically, research is spotty and limited in its conclusions" (p. 250). In particular, it is still largely unclear how PD initiatives may impact history teachers' subject-related beliefs (i.e. given chapter 4's finding that these beliefs play an important role in teachers' decision to implement IBL), and actual work in practice. In this respect, two of the most important questions are related to the effects of immersion in IBL (RO 3a) and an introductory training to IBL (RO 3b).

Chapter 6 reports the findings of an intervention study during which pre-service history teachers (N=302) were immersed in IBL. During this intervention, student teachers collaborated in dyads within a technology-enhanced inquiry environment that was constructed using the WISE (Web-based Inquiry Science Environment) platform (for more information, see Slotta & Linn, 2009). Similar to the inquiry described in chapter 3, student teachers' main task was to study a number of sources in order to form a claim about appropriateness of the name given to the English Peasants' Revolt of 1381. The findings indicate that, apart from presenting student teachers with 'good practices' that they may use in their own teaching (Struyven, Dochy, & Janssens, 2010), immersion in IBL also affects their beliefs. In particular, the findings show that the intervention resulted in an increased value attached to procedural knowledge goals, which center around learning to reason with historical information, and an increased self-efficacy for conducting historical inquiries. Consistent with this increased self-efficacy for conducting inquiries, a large number of students (N=109) reported afterwards that their work in the technology-enhanced inquiry environment had improved their epistemological understanding of history, and the interpretative nature of the subject in particular. Seeing that chapter 4 has shown that the weight attached to procedural knowledge goals, and self-efficacy for organizing IBL-activities

are both important determinants of history teachers' reported use of IBL in class, chapter 6 indicates that immersion in IBL may promote teachers' adoption of this instructional approach. As such, the findings of this quasi-experimental study confirm an assumption common to PD with regard to IBL, which suggests that "to be able to teach effectively, teachers need to be given the opportunity to learn (or relearn) [the subject] in a manner consistent with how they are supposed to teach (McDermott, 2006, p. 759)". Yet, the findings also show that, for a subgroup of student teachers who mainly held teaching goals related to telling the story of the past (N=25), the intervention had little to no effect. It therefore seems that immersion in IBL is not an effective approach for stimulating IBL if teachers' prior beliefs oppose the organization of IBL in class.

Chapter 7 looks further into the effects of PD with regard to IBL, by exploring the impact of an introductory training on student teachers' (Npost training=54, Npost intervention=36) subject-related beliefs, and work in practice. A first peculiar finding is that, prior to the training, academically trained student teachers' conceptions of IBL differed significantly from those of their non-academically trained counterparts. To be more specific, student teachers in the academic training program were less inclined to conceive of IBL as investigations aimed at forming and supporting a claim about a historical question. At first sight, this finding seems contradictory to the findings of chapter 4, which suggests that academically trained teachers generally hold beliefs that are more favorable to IBL. It is important to bear in mind, however, that whereas chapter 4 reports findings related to in-service teachers' beliefs, chapter 7 focuses on pre-service teachers who have yet to finish their training. In this respect, previous work has shown that teachers' ideas about instruction evolve over the course of their teacher training (Lemberger, Hewson, & Park, 1999), but also keep on developing afterwards, during the transition between teacher training and practice (Ensor, 2001), as well as the first years of teaching in the field (Volkman & Anderson, 1998). Coupled to findings of chapters 2 and 4, which show that a number of influences within teachers' working context often discourage them from organizing IBL, this might explain why these findings seemingly differ from those in chapter 4. In this case, the reported difference between students in the academic and non-academic teacher training is thus likely due to a difference in program foci.

A posttest administered right after the training indicates that the training had a significant positive effect on teachers' self-efficacy for organizing IBL in class. In addition, the training changed most student teachers' conceptions of IBL (see also section '2.2.2. History teachers' conceptions of inquiry-based learning'), with the majority (N=41) indicating at posttest that they wanted to use sources to organize investigations that require students to form and support a claim about a historical question. Yet, similar to what was reported in chapter 6, a number of student teachers (N=8) did not change their opinion, and mainly wanted to use sources for letting students process the content or their own (N=2), or learn to evaluate the

reliability of information (N=6). Again, it thus appears that some student teachers' are more 'resistant' to PD than others. Seeing that both immersion and actual training appear to have little impact on this specific group of teachers, a more pervasive approach focusing on subject-related beliefs seems in order to procure a change in this subgroup's beliefs. In this regard, the literature on conceptual change seems particularly helpful, as it explains how even deeply rooted beliefs can be changed through strategies that help to make these beliefs explicit, reveal their inadequacy or disadvantages, and offer logically sound alternatives (e.g. Korthagen, 2013).

When looking at the inquiry lessons that student teachers prepared and taught after the training, three different templates can be discerned, of which the differences can be situated on two dimensions. The first dimension covers the structure of the problem statement, which can be either well- or ill- structured. Whereas well-structured problems have a single correct answer, ill-structured problems cannot be resolved with a high degree of certainty (King & Kitchener, 1994). The second dimension is related to required student activity, and makes a distinction between knowledge transformation, a constructive mental activity that brings together information from various sources to form one's own claims, and knowledge telling, which comes down to a re-telling of the available information (Wiley & Voss, 1996). Based on these two dimensions, it becomes possible to describe the three templates that were discovered. (1) The first template, *fill in the blanks* (N=18), refers to inquiry lessons that are based on a well-structured problem, and are characterized by a focus on telling a particular story, rather than engaging students in disciplinary thinking. During the lesson, students are therefore mainly expected to retrieve information, in order to answer series of questions that correspond to the core of the story the teacher wants to impart. (2) The second template is defined as *synthesis* (N=7), and is based on an ill-structured problem, but does not require knowledge transformation. In cases such as this, the teacher provides several sources of information about a specific topic, and then presents students with a central problem statement that requires a synthesis of evaluation, rather than students' own claims supported by evidence. (3) The third template is referred to as *critical inquiry* (N=11), and draws on ill-structured problems that call for knowledge transformation. In this kind of lessons, students are required to evaluate information from different sources, and then use this information as evidence to support their ideas with regard to a central historical question.

In short, it thus appears that the work of a significant group of student teachers is not consistent with the expectations of the training (i.e. a critical inquiry template). Next to student teachers' varying interpretations of IBL, a second posttest administered after all of them had carried out an IBL-lesson in class, suggests that many student teachers' conceptions of IBL had again changed since the first posttest (i.e. whereas 28 student teachers had reported at the first posttest that they wanted to organize investigations that require students

to form and support their own claim about historical question, only 11 remained at the second posttest). Similar to what chapter 2 reports, the findings point out that this change may in part be explained by a confrontation with practice. This is also in line with previous research, which suggests that the influence of the context of teaching may undermine the impact of professional development (Fehn & Koeppen, 1998). To be more specific, chapter 7 suggests that an increased workload associated with IBL, together with contextual influences, such as students' ability, and the mentor teachers' expectations, often seemed to discourage student teachers from implementing IBL in the class.

In a nutshell, chapters 6 and 7 indicate that, in general, PD has a positive effect on student-teachers' beliefs related to the use of IBL in class. Even so, it also appears that for a subgroup of student teachers, whose initial, mainly content-oriented, beliefs oppose the use of IBL, the effects of PD remain rather limited. Looking at the outcomes of professional development with regard to student teachers' work in practice, the findings indicate that a higher workload and influences within the context of teaching often cause student teachers to deviate from the training program's expectations.

3. GENERAL CONCLUSION

3.1. Toward a clear definition of inquiry-based learning in history education

The outcomes of research objectives (RO) 1, 2, and 3 provide more information with regard to the conceptualization of inquiry-based learning (IBL) in history. In previous work, IBL has been described as: an "open-ended investigation [that] involves using evidence to build supportable accounts of the past" (Barton, 2005, p. 751), or as: a set of activities where students "interrogate, and then reconcile historical accounts" (Reisman, 2012, p. 86), which "shed light on the historical question from different perspectives" (Reisman, 2012, p. 90). Compared to these definitions, the findings connected to RO 3 (i.e. chapter 7) provide further clarification of the general appearance of IBL in history, through a description of two key characteristics. First, IBL revolves around ill-structured problems (King & Kitchener, 1994), which, similar to authentic historical questions, may have multiple plausible answers (Kuhn et al., 1994). Second, IBL requires the construction of a personal interpretation, through a process of knowledge information, which judges and draws together information from different sources, and then uses it as evidence to support a particular point of view (Wiley & Voss, 1996).

What this process of knowledge transformation exactly entails is further explained by the conclusions regarding RO 1 (i.e. chapter 3), which put forward a model of five core cognitive processes associated with IBL in history. In short, this includes (1) *sourcing*, or considering and making assumptions about a source's content and reliability based on its appearance and

origin, (2) *appraising*, or further assessing the content and reliability of a source based on an evaluation of the information it presents, (3) *specifying*, or using a focused approach to information processing that aims to direct the search for answers and actively processes information, (4) *constructing*, or building a mental model of the historical event under investigation, and (5) *arguing*, or using source information as evidence to form arguments. Taken together, these findings are able to provide a clear theoretical overview of IBL in history.

The findings with regard to RO 2 (i.e. chapter 2, 3, and 5) further point out that, in practice, history teachers often tend to prioritize coverage of the human past over teaching inquiry competences. In addition, the concept of IBL is framed in varying ways that often deviate from the theoretical outline presented above. In particular, the findings indicate that the key characteristics of ill-structured problems and knowledge transformation are often not present in the general appearance that IBL takes in classrooms. Moreover, most teachers' approach to IBL tends to be preoccupied with the core processes of sourcing and appraising, which focus on evaluating a source, while other core processes, such as constructing and arguing are overlooked.

3.2. Balancing the historiographical and the pedagogical in teacher training

The conclusions with regard to research objectives (RO) 1, 2, and 3 provide a number of directions for professional development (PD) that aims to prepare teachers for organizing inquiry-based learning (IBL) during the history lesson. The findings with regard to RO 2 (i.e. chapters 2 and 4) first of all provide several arguments for the inclusion of an academic component in history teacher training, in order to introduce teachers to academic discourse on the nature of history, as well as standards of historical inquiry. Most important, chapter 2 suggests that a well-developed understanding of the nature of history appears to be a precondition for developing conceptions of IBL that are in line with disciplinary practice. Furthermore, chapter 4 indicates that teachers who have followed an academic training generally feel more able to organize IBL activities in their class, and attach more weight to goals of developing students' inquiry competences.

However, by itself, inclusion of an academic component in history teacher training is not enough to achieve adoption of IBL. The findings of RO 2 and 3 clearly indicate the importance of a pedagogical component that not only addresses teachers' knowledge of how to organize IBL, but also their beliefs on the purpose of history education, and the context of teaching. The main reason is that the findings of RO 2 (i.e. chapter 4) show that it should not be assumed that a lack of knowledge is the only thing keeping teachers from implementing IBL, as a large part of the variance in teachers' decision to implement IBL can actually be explained based on their beliefs.

With regard to knowledge of IBL, the outcomes of RO 1 (i.e. chapter 3) and 3 (i.e. chapter 7) indicate that PD initiatives should familiarize teachers with both the key characteristics of IBL-activities, and the core cognitive processes associated with reasoning during such activities. The question as to how PD might impact teacher beliefs is covered by the findings of RO 3 (i.e. chapter 6 and 7). To be more specific, it appears that both immersion in IBL, as well as explicit instruction on the importance of IBL to learning history, might bring about a change towards goals and self-efficacy beliefs that are more supportive of IBL. Unfortunately, it also turns out that the impact of such interventions is rather limited for a particular subgroup of teachers, who hold mainly content-oriented beliefs that are not complementary with IBL. These findings thus indicate, that for this subgroup of teachers, more pervasive approaches, such as the use of conceptual change strategies (see e.g. Korthagen, 2013), with an explicit focus on discussing teachers' current beliefs and pointing out their flaws, are required. Finally, the findings regarding RO 2 (i.e. chapters 2 and 4) and 3 (i.e. chapter 7) also indicate that it is important to explicitly discuss the context of teaching, and students' ability in particular (see e.g. Seixas, 1994), as teachers' beliefs with regard to this context form another important factor that influences their implementation of IBL.

3.3. On trying to change the self-perpetuating system that is history education

The findings on research objectives (RO) 2 and 3 further suggest that, even though professional development is clearly able to impact teachers' beliefs, enduring changes in the way teachers instruct history are hard to achieve. As the findings related to RO 2 (i.e. chapters 2 and 4) point out, the context of teaching, which is characterized by influences such as colleagues' expectations, and textbooks' prescriptions, often has a negative impact on teachers' decisions with regard to the use of inquiry-based learning (IBL). Even more, the findings regarding RO 3 (i.e. chapter 7) indicate that the positive evolution that training effected in teachers' conceptions of IBL, often appears to revert after teachers' first attempt at implementing IBL within particular contexts of teaching. History education thus appears as a self-perpetuating system, in which innovation is not only discouraged, but also results in pressure to return to the original state. As a consequence, promoting history teachers' use of IBL seems to become a daunting undertaking.

Yet, the findings at the same time suggest two approaches that seem promising for bringing durable change to history education. In line with what earlier research has noted (see e.g. Capps et al., 2012), a first approach focuses on consolidating the effect of PD, by, for example, providing extended support after teachers' initial training. Seeing that PD initiatives can have a positive impact on teachers' beliefs, it seems likely that periodical meetings, in which teachers' experiences are discussed and framed based on the goals of the PD initiative, can help teachers to move beyond the restraining effects of contextual influences, and thus

create a more durable effect. In comparison, a second approach focuses on directly altering the teaching context, by, for example, providing teachers with custom curriculum materials that incorporate IBL into history instruction (see e.g. Reisman, 2012). The expectation is then that, if teachers feel that the use of IBL fits in well with the context of history education, they will be more inclined to use this instructional approach. A combination of both approaches is likely to have the largest impact, as it would be able to eliminate barriers in both teachers' mind and environment.

4. LIMITATIONS AND FUTURE RESEARCH

4.1. RO 1. Cognitive processes associated with inquiry-based learning in history

4.1.1. Limitations of the sample of RO 1

The use of a teacher sample for validating the process model introduced as a result of the work on research objective (RO) 1 can be seen as a first limitation of this research. More specifically, it can be argued that the same task, when carried out by a sample of professional historians, might reveal a more complex picture of reasoning processes during a historical inquiry. While this could certainly be true, the general aim of the research on RO 1 was to outline the core cognitive processes associated with historical inquiry. After all, inquiry-based learning (IBL) does not imply that students should carry out work at the same level of historians (Perfetti et al., 1994), as this is simply not possible (Willingham, 2010; Wils, 2009), but rather that they employ a 'disciplinary way of thinking' to historical questions and information (Bain & Mirel, 2006). In other words, the main purpose of the process model that was introduced in answer to RO 1 is to provide an overview of this disciplinary way of thinking, rather than to picture the reasoning underlying the work of professional historians in all its complexity.

4.1.2. Limitations of the methodology of RO 1

A first methodological limitation with regard to RO 1 lies with the method of analysis used to classify teachers' approaches to inquiry into a typology. Whether teachers had or had not used a core cognitive process was decided based on counts of codes that identified the underlying cognitive activities within the data. The extent to which the cognitive activities corresponding to a particular core process were carried out, thus functioned as a basic indicator of the quality of reasoning during the IBL-activity. Building on this, additional, more elaborate, criteria for quality of reasoning during IBL, like the accuracy of the inferences drawn, could help to make more accurate judgments of whether one has successfully used a particular core cognitive

process. Future research should therefore further look into formulating and operationalizing performance standards for each of the core cognitive processes.

A second methodological limitation is also connected to the methods used to classify teachers' approaches to inquiry into a typology. In particular, the use of a single inquiry task for assessing performance could be criticized based on previous research, which has demonstrated that reasoning during an inquiry is in part dependent on the resources that are available, including influences such as the nature and detail of the available information (e.g. Rouet et al., 1996; Wiley & Voss, 1996). As such, this raises the question whether a classification of one's approach to IBL based on performance on a single inquiry task is reliable. Even though it is not likely that one would take an entirely different approach to what are ultimately similar tasks, even though they differ with regard to their central questions and information offered, the data that were gathered to investigate RO 1 do not allow to make a conclusive judgment. As such, future research could investigate whether individuals' approach to IBL actually does remain consistent over different inquiry assignments.

4.1.3. Limitations of the results of RO 1

Similar to what was noted in the previous section, the lack of attention to specific criteria of quality related to the cognitive activities underlying the core cognitive processes associated with IBL can be seen as an important limitation of the results related to RO 1. In addition, another limitation of the results, is that the study of RO 1 focuses on IBL-activities in which both the problem statement and information sources are preselected by the teacher. This means that it does not cover certain cognitive processes associated with IBL-activities in which this content has yet to be determined, such as, for example, looking up information or forming a problem statement. Yet, it can be argued that, even in this kind of IBL-activities, the core cognitive processes outlined above still form the heart of the inquiry (see e.g. Wiley et al., 2009).

4.2. RO 2. History teachers' use of inquiry-based learning in class

4.2.1. Limitations of the sample of RO 2

Research objective (RO) 2 is investigated through both qualitative and quantitative methods. There is, however, a limitation to the teacher sample that forms the basis of the qualitative investigation. The participating teachers were contacted through a call asking them to register their participation through a website provided by the researcher. Once a sufficient number of teachers had registered, the website was closed, and anyone visiting the website afterwards received a message saying that it was no longer possible to register. This system allowed to avoid situations in which certain teachers' participation would have to be declined after they

had taken the effort to register, but may at the same time have resulted in a sampling bias. Even though the findings are generally consistent with those of earlier research (e.g. De Wever et al., 2011; Van Nieuwenhuysse et al., 2015), the possibility that the first responding teachers were among the most motivated history teachers, and therefore more familiar with recent developments in history, cannot be entirely ruled out. To conclude, this limitation could have been avoided by randomly selecting a number of schools for participation, rather than contacting all schools within a certain region.

4.2.2. Limitations of the methodology of RO 2

One of the most important limitations of the dissertation is related to the methodology used to tackle RO 2. An overview of the research methods reveals that history teachers' work in class is investigated largely based on self-reports (i.e. interviews and surveys). The only exception is history teachers' knowledge of inquiry-based learning (IBL), which was examined using think-aloud protocols of teachers' performance during an inquiry task. As is commonly known in social sciences, self-reports hold an inherent risk of painting a distorted picture of the topic under investigation, as participants may forget pertinent details, or may answer untruthfully to conform with what they believe is socially desirable (see e.g. Peterson, 2000). Even though a number of countermeasures (e.g., explicitly asking for personal opinion, ensuring anonymity or confidentiality) were taken to avoid influences like a social desirability bias (see e.g. the reviews by Krumpal, 2013; Nederhof, 2006), it is still possible that some teachers' reports do not entirely correspond to reality, even though, as was already noted above, the findings correspond to those of previous research (e.g. De Wever et al., 2011; Van Nieuwenhuysse et al., 2015). In other words, future research that investigates history teachers work in practice should aim to triangulate self-reports to measures of teachers' actual work in practice, including observations (e.g. Martell, 2013) and classroom artefacts, such as lesson plans and teaching materials (see e.g. the work related to RO 3), or assessments (e.g. Monte-Sano & Budano, 2013; Van Nieuwenhuysse et al., 2015). This would not only allow to build an image of history teachers' work in classroom that is directly based on their actual instruction, but would also provide more information about the reliability of self-reports on this topic.

A second important limitation concerning the methodology is related the question as to how epistemological understanding of history teachers can best be captured. The qualitative work on RO 2 attempted to map epistemological understanding based on a number of open questions that were derived from debates in historiography (e.g. how is it possible that historians sometimes draw strikingly different conclusions?), whereas the quantitative research used a Likert scale, which asked teachers to indicate their agreement with a number of statements about the nature of history (e.g. historical research comes down to reporting objective data). The findings of the quantitative study raise some doubt about the latter

method, however, as the outcomes of the Likert scale suggested that teachers who were more inclined to regard history as a science devoid of interpretation, were more likely to stress the teaching of inquiry competences. This is rather peculiar, as research has suggested that these teachers are more likely to regard the story of the past as fixed, and therefore narrate it to their students (e.g. Bouhon, 2009; McCrum, 2013). In relation to this, some have criticized the use of scales for measuring epistemological understanding, arguing that the limited number of options offered by such recognition measures do not allow individuals to make their own meaning (see e.g. Wood et al., 2002). While this may to some extent be true, the actual problem seems to lie somewhere else. Many studies have demonstrated that epistemological understanding develops over different stages (King & Kitchener, 1994; Kuhn, Cheney, & Weinstock, 2000), a finding that has also been reported by research on history education (Lee & Ashby, 2000; Lee & Shemilt, 2003). This means that, depending on the stage of individuals' epistemological development, they will either agree with or reject particular statements about knowledge. It can therefore be argued that Likert scales that ask individuals to indicate the extent to which they agree with certain statements might not be the best approach to capturing epistemological understanding. A far better approach to pinpoint individual' current stage of epistemological understanding, seems to lie in asking individuals to choose between contrasting statements. For example, in the work of Kuhn et al. (2000), participants are presented with two different judgements and then asked to select either: 'only one can be right' or 'both can have some rightness'. Future research could further look into this matter by comparing Likert scales to other instruments based on contrasting items, and possibly also other measures, such as interview items, in order to find out whether these measures do indeed lead to different results.

4.2.3. Limitations of the results of RO 2

A first limitation of the results related to RO 2 is that, building on previous work on teacher thinking (Fang, 1996; Kagan, 1992; Pajares, 1992), the variance in history teachers' use of IBL is explained mainly in terms of conceptions or beliefs, and the context of teaching. In contrast, teachers' affect and motivation with regard to IBL are not examined in this dissertation. As such, this might explain why a certain proportion of the variance in teachers' implementation of IBL remains unexplained. Teachers' motivation seems particularly interesting for further research investigating this variance as, compared to the filter-like function of the beliefs that govern teachers' thinking (Nespor, 1987), motivation represents teachers' actual intention to perform activities, either for its inherent satisfaction, or for its external consequences (Ratelle, Guay, & Vallerand, 2007). In other words, a motivation-oriented approach could help to further explain why some teachers organize IBL-activities, whereas others do not. Seeing that teachers' beliefs are likely to influence their motivation (e.g. Han & Yin, 2016), an integration

of a beliefs- and motivation-based framework for the investigation of history teachers' work in the classroom, seems to be one of the most promising approaches to further advancing understanding of teachers' instructional decisions.

A second limitation is related to the findings of the impact of the teaching context on history teachers' use of IBL. Although the findings related to RO 2 suggest that the context in which teachers work affects both teachers' conceptions and use of IBL, it remains somewhat unclear how the context of teaching exactly influences teachers' thinking. Although the quantitative findings point out that teachers' perceptions of students' ability are likely one of the most important contextual influences, qualitative findings suggests that other contextual influences, such as colleagues' expectations, and the available curriculum materials also play a role. The question as to which of these influences is most important, is further complicated by the finding that these influences may differ across contexts of teaching, and that teachers may also cope with them in different ways. Even so, future research that looks further into the general effects of each of these contextual influences on teachers' decision-making could still contribute to an understanding of the topic, and at the same time inform the design of professional development (PD) initiatives.

4.3. RO 3. Effects of professional development on inquiry-based learning in history

4.3.1. Limitations of the sample of RO 3

A limitation to the sample of research objective (RO) 3 is that it consists entirely out of pre-service rather than in-service teachers. The main reason for this choice is that professional development (PD) that is part of the initial teacher training program is expected to have a greater and longer-lasting impact on teachers' work in practice (see also chapter 1, section '2.2.2. Research context'). Of course, PD of experienced teachers is valuable in its own right. Due to the sample choice, however, this dissertation is not able to say to what extent the effects on the sample of pre-service teachers are also applicable to more experienced teachers, who, over the course of their careers, have developed beliefs systems that are likely more elaborate and entrenched compared to those of pre-service teachers (Kagan, 1992; Pajares, 1992). Future work on PD of history teachers could therefore look further into how PD initiatives on inquiry-based learning (IBL) impact experienced teachers, and how these effects compare against those on pre-service teachers.

4.3.2. Limitations of the methodology of RO 3

Another one of the most important limitations of this dissertation can be found in the methodology used to examine RO 3, and in particular the duration of the PD activities that were designed to tackle this research objective. Both the intervention that immersed student

teachers in IBL, and the introductory training with regard to IBL were relatively short in duration (i.e. respectively four hours, and four hours in combination with a classroom assignment). Even though positive effects were found in both cases, this raises the question how more extended PD initiatives might further impact students' thinking and work in practice. In particular, the main question is whether extended support offered after the end of PD might be able to counteract the averse influence that the context of teaching has on student teachers' willingness to implement IBL. A second, but equally important, question is whether thoughtful changes to this context of teaching, such as, for example, the introduction of curriculum materials that incorporate IBL, might also contribute to teachers' willingness to implement IBL. Even though there thus seem to be two avenues that future research can take to further investigate how the use of IBL in history education can be stimulated, the most effective approach is likely the one that combines both.

4.3.3. Limitations of the results of RO 3

Similar to what was noted above, the finding that the effect of different influences within the context of teaching on student teachers' work remains somewhat unclear, is a first limitation related to the results of RO 3.

Another limitation of the results related to RO 3 is that outcome measures of the PD are operationalized largely in terms of teachers' beliefs. Even though previous research (e.g. Kagan, 1992; Pajares, 1992), as well as the findings on RO 2, indicate that these beliefs play a key role in teachers' instructional decisions, it would also be interesting to know how the PD initiatives impact teachers' knowledge about the content and pedagogy related to IBL in history. As it stands, the conclusions with regard to the training on IBL assume that student teachers have successfully internalized its contents, and although the increase in student teachers' self-efficacy beliefs appears to support this, there is no hard evidence available that confirms this conclusion. Even though teachers' beliefs still remain an important variable for determining the effectiveness of PD, it is therefore recommended that future research also takes a closer look at the evolution in student teachers' knowledge, as the result of PD.

5. IMPLICATIONS

5.1. Theoretical

With regard to theory development, this dissertation first of all points out a need for more conceptual clarity regarding the concept of inquiry-based learning (IBL), as the work on research objectives (RO) 1 and 2 shows how both research and practice give meaning to the concept in various ways. In answer to this problem, the combined efforts on RO 1 and 3 present a clear definition of IBL in history. Based on a review of literature on reasoning during

IBL in history, an analysis of history teachers' performance during IBL, and a classification of inquiry lessons in history, IBL can be defined as: *an instructional approach that centers around ill-structured historical problems, which engage students in knowledge transformation, through five core cognitive processes of sourcing, appraising, specifying, constructing and arguing* (see also section '3.1. Toward a clear definition of inquiry-based learning in history education'). On the one hand, this clear definition of IBL in history, which is grounded in both theory as well as the data of this dissertation, can help to bring more clarity to discussions on the topic. On the other, it also makes further theoretical development possible, such as, for example, a typology of approaches to historical inquiry (RO 1) or a set of templates for studying inquiry lessons in history (RO 3).

A second important theoretical implication is related to the framework of teachers' subject-related beliefs that was used to examine RO 2 and 3. Building on previous research demonstrating that teachers' work in class is largely consistent with their beliefs (Kagan, 1992; Pajares, 1992), this theoretical framework shows how teachers' use of IBL is determined by three constitutive dimensions of subject-related beliefs: beliefs about the subject, self, and social context. As such, this framework may move forward research that aims to explain variance in teachers' work in practice, or to examine the impact of professional development (PD) initiatives. This framework of subject-related beliefs is especially innovative to research on PD with regard to IBL, seeing that such studies have often overlooked to systematically assess teachers' beliefs during training (see e.g. Capps et al., 2012).

A third theoretical implication can be found in the framework of teachers' use of technology that was used to investigate RO 2. Although policy documents often describe teachers' technology use in terms of quantity (European Commission, 2013; OECD, 2014), several researchers have argued that the added value of technology use largely depends on how well it fits with goals of the subject (Haydn & Barton, 2007), and the extent to which it offers new possibilities for teaching higher-order thinking (Ertmer, 1999; Maddux & Johnson, 2006). In this respect, this dissertation's framework on history teachers' use of technology describes how this kind of domain-specific and differentiated technology use might take shape in history. This framework can both serve as a theoretical basis for future research on history teachers' use of technology, but may also inform research that aims to make a classification of technology use in other domains.

5.2. Methodological

On the methodological level, this dissertation goes beyond the qualitative approach that is characteristic to most of the research on history teachers' instruction (for recent examples, see e.g. Martell, 2013; McCrum, 2013; Monte-Sano & Budano, 2013), and instead employs a combination of qualitative and quantitative approaches to investigate its research objectives.

The main reason is that, even though it is beyond a doubt that the 'rich' data offered by qualitative methods can contribute to an understanding of the topic, quantitative methods giving a general overview of the relative weight of different factors on teachers' decision-making may in turn further improve this understanding. In this respect, the findings of RO 2 demonstrate how scales measuring teachers' subject-related beliefs further clarify findings of previous qualitative research on differences in history teachers' use of IBL. To conclude, these findings thus suggest that complex topics such as history teachers' instructional decisions may likely be best understood through a combination of qualitative and quantitative approaches, and therefore call out to scholarly work on history teachers' practice to incorporate more quantitative approaches into its research design and methodology. In relation to this, the scales that were constructed and validated for this dissertation can act as a stepping stone for future quantitative research on the topic.

A second methodological consideration lies with the questions this dissertation raises with regard to the measurement of epistemological understanding of history. Even though Likert scales on this construct have been around for some years (e.g. Maggioni, VanSledright, & Alexander, 2009), the work on RO 2 raises some doubts about the validity of such instruments (see also section '4.2.2. History teachers' implementation of inquiry-based learning activities'). Until the questions with regard to these quantitative measures for epistemological understanding have been settled, it seems recommended for research to use other methods, such as interviews (see e.g. McCrum, 2013; Yilmaz, 2010) to explore this kind of understanding.

A final methodological implication is that, apart from the scales designed to measure teachers' beliefs, the work on this dissertation has also led to a number of more qualitative instruments, such as an interview questionnaire for probing teachers' understanding of history and conceptions of IBL, or a scheme for coding students' reasoning during inquiries, based on the framework of core cognitive processes associated with IBL in history. These can also be used by future research that aims to further investigate inquiry-based learning (IBL) in history education.

5.3. Policy

When it comes to policy, one of the main messages of this dissertation is that the ambitious attainment goals the Flemish government sets for history education do not seem to be fully realized in practice. To be more specific, one of the central assumptions behind the rationale is that: "[...] critical study of sources is fundamental. This is done by locating, organizing and selecting, analyzing, connecting (comparing), and evaluating varied materials. Throughout this process, hypotheses are formulated, interpretations of others are evaluated, and a personal explanation is advanced (Curriculum, 2002)". However, the findings related to RO 2 indicate

that in practice, history education often tends to focus on coverage of the story of the past, while the development of competence in disciplinary thinking is frequently reduced to stimulation of a critical attitude, and brief, teacher-led investigations of sources.

Apart from providing policy with an overview of the current situation in practice, this dissertation provides a few directions that can contribute to making an informed decision on the facilitation of teaching approaches, such as IBL, that develop students' competence in reasoning with historical information.

As a logical first step, it seems advised that the local pedagogical advisory services, who are responsible for offering and coordinating PD programs for schools, evaluate their current catalogue of PD activities for history teachers, with regard to the extent that disciplinary thinking and IBL are part of the activities that are currently on offer. Seeing that the work on RO 3 shows that PD can positively influence teachers' willingness to use IBL, making sure that there are sufficient PD initiatives available seems especially important. In case the current PD program is found wanting, new initiatives could be designed based on the interventions described in this dissertation.

A second approach that is likely to be effective is the creation of an atmosphere in history classrooms that is supportive to organizing IBL-activities. As it is now, the findings of RO 2 and RO 3 show that, rather than stimulating teachers to use IBL, the reality of the classroom generally has an adverse influence on teachers' willingness to organize IBL-activities. Although this undesired effect could certainly be alleviated through PD that creates professional learning communities for passing on good practices (Capps et al., 2012; Desimone, 2009), more structural support, such as the implementation of mentoring programs (Achinstein & Fogo, 2015) would certainly also be helpful.

5.4. Practical

The work reported in this dissertation also holds a number of practical implications. First, the findings of RO 1, 2, and 3 suggest that PD with regard to IBL is most effective when it combines an academic component, focusing on the development of epistemological understanding and knowledge of inquiry, with a pedagogical component that aims to increase teachers' understanding of IBL as an instructional approach, and to positively influence their subject-related beliefs (see also section '3.2. Balancing the historiographical and the pedagogical in teacher training').

Looking further into the pedagogical component, the framework of IBL that was outlined above (see also section '3.1. Toward a clear definition of inquiry-based learning in history education') can help teachers to get an overview of what IBL involves. In addition, it can assist them in making systematic assessments of IBL-activities, and in particular students' reasoning during such activities. When it comes to teachers' beliefs, the work related to RO 3 shows how

both immersion in IBL, and an introductory training on IBL can have positive effects on the subject-related beliefs governing the use of IBL. However, the findings also indicate that the effects of such interventions may remain rather limited for a particular subgroup of student teachers, whose initial, often content-oriented, beliefs strongly oppose the use of IBL. In such cases, more pervasive approaches seem necessary, such as, for example, conceptual change strategies that center around making explicit and pointing out the fallacies of existing beliefs, and then offering logical alternatives as a replacement (e.g. Korthagen, 2013).

Finally, as has been already noted in the previous section, the finding that the context of teaching often adversely influences teachers' willingness to organize IBL-activities calls for extended support after a training has ended, as this can help teachers to overcome the hindrances that they encounter in the classroom. Initial teacher training programs could also support student teachers' training of IBL by carefully selecting mentor teachers, or by providing them with PD that puts them on the same page as the teacher training program.

6. IN CLOSING

Even though research on history education has generally presented inquiry-based learning (IBL) as a vital means of learning about key content and the nature of the subject (Levy et al., 2013), previous research did not offer a clear definition of this instructional approach. In addition, the question why some history teachers organize IBL, whereas others do not, as well as the question how professional development (PD) might be able to change this, remained largely unanswered.

Providing an answer to these questions, this dissertation advances current scholarly knowledge on three distinct domains of study: (1) reasoning during IBL in history, (2) history teachers' implementation of IBL in practice, and (3) the effectiveness of PD initiatives aiming to stimulate IBL in history. Even though this dissertation is thus an important step forward in understanding history teachers' implementation of IBL, the work is far from done. In relation to this, the limitations section provides an agenda for future research on each of the three domains of study. Together with the frameworks and instruments that were constructed as a part of this dissertation, this can hopefully contribute to further advances in research with regard to IBL in history education.

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Nederlandstalige samenvatting

Dutch summary

Parts of this chapter are based on:

Voet, M., & De Wever, B. (2017). Onderzoekend leren, wat is dat? Naar een concrete invulling voor het schoolvak geschiedenis. *Hermes*, 61, 12-18.

NEDERLANDSTALIGE SAMENVATTING

Onderzoekend leren in geschiedenisonderwijs: Verkenning van opvattingen, kennis en technologiegebruik van leraren, en voorbereiding van toekomstige leraren op implementatie in de klas.

1. INLEIDING

1.1. Achtergrond

Geschiedenis ontleent zijn naam aan het Middelnederlands 'gescienesse', hetgeen zoveel betekent als 'gebeurtenis, beschrijving, verhaal'. Een wat archaïsch klinkend synoniem, dat nog vaak gebruik wordt in afgeleide vorm, is historie. Dit woord heeft zijn wortels in het Oudgrieks 'historia', dat zich op zijn beurt laat vertalen als 'onderzoek, wetenschap, en kennis op die manier verworven' (Philippa, Debrabandere, Quak, Schoonheim, & van der Sijs, 2007). Hoewel ze beide hetzelfde vakgebied aanduiden, houden deze termen elk een aparte invulling van geschiedenis in: 'gescienesse' verwijst naar het verwerven van een overzicht van het verleden, terwijl 'historia' eerder betrekking heeft op het redeneren met informatie uit het verleden. In de publieke opinie wordt het schoolvak geschiedenis doorgaans met het eerste geassocieerd (Lee, 2004), hoewel zowel onderzoekers (bv. Haydn, 2011; van Drie & van Boxtel, 2008; VanSledright & Limón, 2006) als beleidsmakers (Curriculum, 2002) in de voorbije jaren sterk geïnteresseerd hebben om naast het verwerven van een overzicht van het verleden ook voldoende aandacht te besteden aan het leren redeneren met historische informatie.

De redenen daarvoor vallen te situeren op zowel maatschappelijk, pedagogisch, als historiografisch vlak. Als eerste wordt, op maatschappelijk vlak, de competentie om kritisch te denken en eigen conclusies te trekken steeds belangrijker om geïnformeerde beslissingen te kunnen nemen, onder meer door een toenemend aanbod aan informatie in zowel woon- als werkomgevingen door technologische vooruitgang (Autor, Levy, & Murnane, 2003; Laville, 2004; Peter Seixas, 2000). Als tweede wordt, op pedagogisch vlak, door hedendaagse leertheorieën, zoals het constructivisme, benadrukt dat kennis niet zomaar doorgegeven kan worden, maar geconstrueerd wordt door de lerende (Perkins, 1999). Een diep begrip van de leerstof kan met andere woorden enkel bereikt worden via een aanpak die inzet op actief nadenken en reflectie door leerlingen (Jonassen, 1994). Als derde wordt, op historiografisch

vlak, aangegeven dat hét verleden niet bestaat. Hoewel bronnen uit het verleden wel kunnen bijdragen tot een beter begrip van het verleden (Wineburg, 1994), kunnen ze het verleden nooit in zijn totaliteit vatten. In tegendeel, vaak zijn bronnen juist onvolledig, gekleurd, of zelfs tegenstrijdig (Rouet, Marron, Perfetti, & Favart, 1998). Wie het verleden wil bestuderen, moet daarom terugvallen op een proces van ‘theorie-bewijs coördinatie’ (Kuhn, Weinstock, & Flaton, 1994). Dit houdt in dat er verschillende interpretaties worden gevormd over wat er gebeurde, die vervolgens geëvalueerd kunnen worden op grond van het beschikbare bewijs, en afgewogen worden tegen eventuele alternatieven (Cronon, 1992). Inzicht in dit proces is dan ook noodzakelijk om de claims die historici en anderen maken over het verleden naar waarde te kunnen schatten (Lee & Ashby, 2000).

Onderwijsonderzoek uit de voorbije decennia schuift *onderzoekend leren* naar voor als een veelbelovende aanpak om leerlingen te leren redeneren met historische informatie. Onderzoekend leren is een werkvorm waarin leerlingen zelf een probleem onderzoeken, volgens een aanpak die de grondbeginselen van wetenschappelijk onderzoek in zich draagt (Hmelo-Silver, Duncan, & Chinn, 2007). Toegepast op geschiedenis, betekent onderzoekend leren dat leerlingen aan de slag gaan met historische informatie, om een bepaalde gebeurtenis te onderzoeken. Vanzelfsprekend zijn er, naast onderzoekend leren, ook andere didactische aanpakken die kunnen bijdragen aan de competentie om te redeneren met historische informatie (zie bv. Wils, 2009), maar er zijn een aantal redenen te noemen om onderzoekend leren te verkiezen. Als eerste tonen meta-studies, die bevindingen van eerder onderzoek vergelijken, aan dat, wanneer de leraar voldoende begeleiding voorziet, onderzoekend leren tot betere prestaties van leerlingen leidt dan meer docerende onderwijs-aanpakken (Alfieri, Brooks, Aldrich, & Tenenbaum, 2011; Furtak, Seidel, Iverson, & Briggs, 2012; Lazonder & Harmsen, 2016). Meer specifiek tonen andere studies aan dat onderzoekend leren een effectieve aanpak is voor het ontwikkelen van wetenschappelijke redeneervaardigheden (Kuhn, 2010), en dat blijkt ook het geval te zijn voor de ontwikkeling van historische redeneervaardigheden (Reisman, 2012). Ten slotte is er ook nog het argument dat het vormen van onderbouwde interpretaties op basis van historische informatie nu eenmaal is waar geschiedenis om draait (Levy, Thomas, Drago, & Rex, 2013).

Over onderzoekend leren doen ten slotte ook een aantal misverstanden de ronde. Eerst en vooral betekent onderzoekend leren uiteraard niet dat leerlingen verwacht worden om werk te verrichten dat van hetzelfde niveau is als dat van historici, maar eerder dat ze een onderbouwde conclusie kunnen vormen met historische informatie (Lee, 2011). Verder wordt soms ten onrechte gedacht dat onderzoekend leren eenzijdig gericht is op de ontwikkeling van redeneervaardigheden, maar het onderzoeken van een historische gebeurtenis veronderstelt natuurlijk ook het opbouwen van een referentiekader over het probleem (Martin & Monte-Sano, 2008). Ten slotte wordt soms ook gezegd dat leerlingen nog niet rijp

zouden zijn voor onderzoekend leren. Nochtans stelt onderzoek expliciet dat de mate waarin leerlingen bekwaam zijn om te redeneren met historische informatie niet zozeer een kwestie is van intellectuele maturiteit, maar wel van de aard van de leeromgeving, het gebruik van geschikte leermaterialen, en de onderwijsaanpak en kennis van de leraar (Booth, 1994).

1.2. Probleemstelling

Hoewel onderzoekend leren een veelbelovende aanpak is, is er jammer genoeg nog maar weinig onderzoek gedaan naar het gebruik van deze werkvorm door geschiedenisleraren. Daardoor blijven een drietal belangrijke vragen tot op heden onbeantwoord.

Als eerste is het weinig duidelijk hoe onderzoekend leren nu precies gedefinieerd moet worden. Een literatuurstudie naar recent wetenschappelijk werk over redeneren tijdens onderzoekend leren in geschiedenis (bv. De La Paz & Felton, 2010; Hicks, Doolittle, & Ewing, 2004; Poitras & Lajoie, 2013; van Drie & van Boxtel, 2008) laat zien dat de kennis over het onderwerp gefragmenteerd is over verschillende publicaties. Daarbij valt ook op dat studies gebruik maken van verschillende termen om naar gelijkaardige activiteiten te verwijzen, of, in sommige gevallen, dezelfde activiteiten benoemen met verschillende termen (zie bv. het gebruik van 'contextualiseren' in Hicks et al., 2004; Wineburg, 1991), wat vaak voor nog meer verwarring zorgt.

Als tweede is niet duidelijk in welke mate geschiedenisleraren in hun onderwijs gebruik maken van onderzoekend leren, en hoe mogelijke verschillen tussen leraren in het gebruik van onderzoekend leren verklaard kunnen worden. Los van het weinige onderzoek dat voorhanden is, leveren de beschikbare studies soms tegenstrijdige resultaten op. Zo beweren sommige studies bijvoorbeeld dat het West-Europese geschiedenisonderwijs, met inbegrip van het Vlaamse, heel wat aandacht besteed aan onderzoek van bronnen (von Borries, 2000), terwijl andere stellen dat Vlaamse geschiedenisleraren onderzoek van bronnen vaak erg vereenvoudigen (De Wever, Vandepitte, & Jadouille, 2011) of zelf verkeerd voorstellen (Wils, 2009).

Als derde is onderzoek naar professionele ontwikkeling van geschiedenisleraren erg beperkt (Peck, 2014). Hoewel er al heel wat onderzoek gebeurde naar professionele ontwikkeling over onderzoekend leren in andere vakgebieden, zoals natuurwetenschappen (zie bv. Capps, Crawford, & Constatas, 2012), en er ook een aantal studies voorhanden zijn voor het vakgebied geschiedenis (Fehn & Koeppen, 1998; Levy et al., 2013), is het nog erg onduidelijk in welke mate initiatieven voor professionele ontwikkeling het gebruik van onderzoekend leren door geschiedenisleraren kunnen bevorderen.

2. ONDERZOEKSDOELEN EN –AANPAK

2.1. Doelen

Het hoofddoel van dit proefschrift is om het gebruik van onderzoekend leren in de geschiedenisles te onderzoeken en te bevorderen. Op basis van de hierboven beschreven probleemstelling kunnen drie verschillende studiegebieden (SG) onderscheiden worden, elk met hun eigen onderzoeksdoelen:

- **SG 1** heeft betrekking op de theoretische invulling van onderzoekend leren in geschiedenis, en meer bepaald op de vraag welke denkprocessen hierin centraal staan. Het bijhorende onderzoeksdoel is:
 - Ontwikkelen en valideren van een raamwerk van denkprocessen die de kern uitmaken van onderzoekend leren in geschiedenis.
- **SG 2** gaat over het gebruik van onderzoekend leren door geschiedenisleraren, en mogelijke verklaringen voor verschillen in dit gebruik. Hierbij kunnen drie onderzoeksdoelen geformuleerd worden:
 - Onderzoeken hoe opvattingen van geschiedenisleraren over onderzoekend leren gerelateerd zijn aan hun begrip van kennisconstructie in geschiedenis, hun kennis van onderzoekend leren, en de omgeving waarin ze werken.
 - In kaart brengen hoe opvattingen van geschiedenisleraren over het vak, zichzelf, en de klasomgeving, hun gebruik van onderzoekend leren beïnvloeden.
 - Nagaan hoe geschiedenisleraren technologie gebruiken om hun onderwijs te ondersteunen, en de organisatie van onderzoekend leren in het bijzonder.
- **SG 3** heeft te maken met de effectiviteit van initiatieven voor professionele ontwikkeling die het gebruik van onderzoekend leren in geschiedenis promoten. Twee onderzoeksdoelen zijn hierbij van belang:
 - Meten hoe onderdompeling in onderzoekend leren de opvattingen van student-leraren geschiedenis beïnvloedt.
 - Bestuderen hoe effecten van een training in onderzoekend leren de opvattingen en de klaspraktijk van student-leraren geschiedenis beïnvloeden.

2.2. Aanpak

De studiegebieden en hun bijhorende onderzoeksdoelen worden aangepakt in zes studies, die elk gerapporteerd worden in een afzonderlijk hoofdstuk. De onderzoeksmethoden worden daarbij telkens bepaald in functie van het specifieke studiegebied. Van de zes studies, zijn er drie gebaseerd op kwalitatieve onderzoeksmethoden, maken er twee gebruik kwantitatieve methoden, en hanteert er een een combinatie van beide aanpakken.

SG 1 wordt behandeld in *hoofdstuk 3*. Op basis van een literatuurstudie wordt een integratief raamwerk van centrale denkprocessen voor onderzoekend leren in geschiedenis opgesteld. Dit raamwerk wordt vervolgens verder gevalideerd aan de hand van hardopdenkprotocollen van de aanpak van een onderzoeksopdracht door 20 geschiedenisleraren, die concreet onderzocht worden via directe en conventionele inhoudsanalyse (zie Hsieh & Shannon, 2005). Op basis van deze analyses wordt vervolgens ook een typologie van verschillende aanpakken van onderzoekend leren opgesteld.

SG 2 worden uitgediept in hoofdstukken 2, 3, 4, en 5. In *hoofdstuk 2* wordt aan de hand van semigestructureerde interviews met 22 leraren gepeild naar hun opvattingen over hoe onderzoekend leren vormgegeven kan worden in de klas. Vervolgens wordt via summatieve inhoudsanalyse (zie Hsieh & Shannon, 2005) nagegaan hoe deze opvattingen zich verhouden tot hun begrip van kennisconstructie in geschiedenis, en de omgeving waarin ze werken. Deze leraren namen ook deel aan de studie in *hoofdstuk 3*, wat verder toelaat om te onderzoeken hoe hun opvattingen over onderzoekend leren gerelateerd zijn aan hun prestatie tijdens de onderzoeksopdracht. *Hoofdstuk 4* gaat, in tegenstelling tot de vorige hoofdstukken, niet in op opvattingen van geschiedenisleraren over onderzoekend leren, maar op hun gerapporteerde gebruik van leeractiviteiten die beantwoorden aan de hierboven beschreven kenmerken van onderzoekend leren. Dit wordt in kaart gebracht via een vragenlijst bij 526 geschiedenisleraren. Deze vragenlijst probeert verder ook verschillen in gebruik van onderzoekend leren te verklaren, door te peilen naar de opvattingen van geschiedenisleraren over doelen van het vak, hun eigen bekwaamheid voor onderzoekend, en barrières voor onderzoekend leren die worden opgelegd door de klasomgeving. Ten slotte wordt er ook nog gekeken naar hoe deze opvattingen beïnvloed worden door variabelen die in de vorige hoofdstukken van belang bleken te zijn voor de implementatie van onderzoekend leren, met name: het hoogst behaalde diploma, het aantal uren in een week om een klas geschiedenis te geven, en het begrip van kennisconstructie in geschiedenis. Om deze analyses te kunnen uitvoeren worden verschillende schalen gevalideerd via exploratieve en confirmatorische factoranalyse, en daarna gebruikt om een structureel vergelijkingsmodel te schatten. *Hoofdstuk 5*, ten slotte, stelt een vakspecifiek en gedifferentieerd model voor om technologiegebruik door leraren te onderzoeken, en past dit toe op technologiegebruik in de geschiedenisles, dat wordt onderzocht op basis van semigestructureerde interviews met 22 geschiedenisleraren. De verzamelde data worden geanalyseerd via directe inhoudsanalyse.

SG3 wordt aangepakt in hoofdstukken 6 en 7. *Hoofdstuk 6* rapporteert over een interventiestudie waarin 302 student-leraren geschiedenis worden ondergedompeld in onderzoekend leren. Concreet wordt aan deze studenten gevraagd om per twee een onderzoeksopdracht uit te voeren in een digitale leeromgeving. Een pre-posttest design geeft meer informatie over veranderingen in opvattingen van student-leraren over de doelen van

het vak geschiedenis, en hun eigen bekwaamheid om een onderzoeksopdracht tot een goed einde te brengen. Om deze analyse te kunnen uitvoeren, worden opnieuw eerst een aantal schalen gevalideerd via EFA en CFA, en vervolgens gebruikt om multilevel modellen van de data te schatten. *Hoofdstuk 7* gaat in op de concrete effecten van een training in onderzoekend leren op de opvattingen van 54 student-leraren geschiedenis over de vormgeving van onderzoekend leren in de klas, en hun waargenomen bekwaamheid om onderzoekend leren te organiseren. Daarnaast wordt ook nagegaan wat de effecten zijn op het werk van student-leraren in de praktijk. De effecten worden in kaart gebracht via een pre-posttest design, waarbij er een posttest onmiddellijk na de training werd afgenomen, en een tweede nadat student-leraren een onderzoekend leren-activiteit in een stageklas hadden georganiseerd. Om meer informatie te verzamelen over de effecten van de training, worden daarnaast ook van elke student-leraar een concrete lesvoorbereiding van de onderzoekend leren-activiteit en twee reflectiepapers (een over de voorbereiding, en een over de uitvoering van de activiteit) gevraagd. Een deel van deze gegevens wordt geanalyseerd met statistische methodes, zoals variantieanalyses en t-testen, en het ander met behulp van conventionele inhoudsanalyse.

3. BELANGRIJKSTE BEVINDINGEN

3.1. SG 1. Essentiële denkprocessen van onderzoekend leren in geschiedenis

Een eerste belangrijke bevinding van het onderzoek in het eerste studiegebied, is de ontwikkeling van een theoretisch kader van essentiële denkprocessen van onderzoekend leren in geschiedenis, dat eerder onderzoek over het onderwerp integreert. Dit kader geeft een overzicht van vijf essentiële denkprocessen, en is terug te vinden in Tabel 1.

Zoals eerder onderzoek al aangeeft, valt op dat een aantal van deze denkprocessen specifiek behoren tot geschiedenis, terwijl andere ook in andere vakgebieden kunnen worden teruggevonden (van Drie & van Boxtel, 2008). Daarnaast is het ook belangrijk om te beseffen dat, zoals bij veel raamwerken voor onderzoekend leren het geval is (zie bv. Pedaste et al., 2015), de voorstelling van het raamwerk niet impliceert dat de denkprocessen in een bepaalde volgorde doorlopen moeten worden. Integendeel, tijdens onderzoekend leren in geschiedenis activeert men de denkprocessen in een volgorde die het best aansluit bij de taak, en kan men ze op ieder moment heractiveren.

Tabel 1

Essentiële denkprocessen van onderzoekend leren in geschiedenis

Denkproces	Invulling
<i>Bronnen inschatten</i>	Het beschouwen van het uiterlijk en de oorsprong van een bron, door het achterhalen van, en assumpties te maken over: <ul style="list-style-type: none"> • de achtergrond van de auteur, • de periode waarin de bron gemaakt werd, en • het type bron.
<i>Bronnen beoordelen</i>	Het beoordelen van informatie uit een bron, door conclusies te trekken uit een evaluatie van: <ul style="list-style-type: none"> • het standpunt of eventuele vooroordelen van de auteur, • de logica en nauwkeurigheid van de gepresenteerde redenering, • het bewijs dat gebruikt wordt om claims te onderbouwen, en • een vergelijking van informatie over verschillende bronnen heen.
<i>Onduidelijkheden ophelderen</i>	Het gericht verwerken van informatie, door het: <ul style="list-style-type: none"> • stellen van vragen over de probleemstelling of ontbrekende informatie, en • activeren van voorkennis om nieuwe informatie te interpreteren.
<i>Een beeld vormen</i>	Het bouwen van een mentaal model over het onderzoeksonderwerp, via het: <ul style="list-style-type: none"> • synthetiseren van informatie gerelateerd aan de probleemstelling, en • reconstrueren van de historische context van het onderzoeksonderwerp.
<i>Argumenten formuleren</i>	Het gebruik van informatiebronnen als bewijs om argumenten te vormen, met als doel het: <ul style="list-style-type: none"> • geven van argumenten die een specifieke claim helpen onderbouwen, en • weerleggen van argumenten die de claim tegenspreken.

Noot. Dit theoretisch raamwerk is gebaseerd op onderzoek van De La Paz en Felton (2010), Hicks et al. (2004), Perfetti, Britt, Rouet, Georgi, en Mason (1994), Poitras & Lajoie (2013), van Drie & van Boxtel (2008) Wineburg (1991, 1994, 1998).

Een tweede uitkomst van het onderzoek naar het eerste studiegebied is een typologie van drie verschillende aanpakken van onderzoekend leren in geschiedenis, die bekomen werd door het bovenstaande raamwerk toe te passen op hardopdenkprotocollen van geschiedenisleraren die een onderzoeksopdracht oplosten. De eerste aanpak kan gedefinieerd worden als een *integrale aanpak*, waarbij elk van de vijf essentiële denkprocessen gebruikt wordt. Deze aanpak kan bijgevolg beschouwd worden als de standaard voor een succesvolle uitvoering van onderzoekend leren in geschiedenis. De tweede aanpak laat zich omschrijven als een *fragmentarische aanpak*, en verwijst naar een aanpak waarbij men een aantal essentiële denkprocessen over het hoofd ziet, hoewel men, vanuit een besef dat het kritisch analyseren van informatie een belangrijk deel is van onderzoekend leren, wel aandacht besteed aan het inschatten en beoordelen van bronnen. De derde aanpak, ten slotte, wordt benoemd als een

cursorische aanpak, en, zoals de naam al doet vermoeden, verwijst naar een aanpak waar de meeste essentiële denkprocessen, met inbegrip van het inschatten en beoordelen van bronnen, niet gebruikt worden. In dergelijke gevallen leest men dus gewoon doorheen de informatie, zonder een analytische houding aan te nemen. Kort samengevat, wijst deze typologie er op dat verschillende prestaties in onderzoekend leren in geschiedenis niet zomaar een kwestie zijn van meer of minder historisch denken, maar vooral van welke essentiële denkprocessen al dan niet geactiveerd worden

3.2. SG 2. Huidige status van onderzoekend leren in geschiedenisonderwijs

In overeenstemming met eerder onderzoek in Vlaanderen (bv. De Wever et al., 2011; Van Nieuwenhuysse, Wils, Clarebout, Draye, & Verschaffel, 2015), suggereren de bevindingen met betrekking tot het tweede studiegebied dat het verwerven van een overzicht van het verleden doorgaans sterk benadrukt wordt in geschiedenisonderwijs, terwijl redeneren met historische informatie minder aandacht krijgt, en bovendien vaak herleid wordt tot het kritisch evalueren van informatie.

Uit een studie naar de opvattingen van 22 geschiedenisleraren komen er eerst en vooral drie verschillende soorten opvattingen naar voor over hoe onderzoekend leren in geschiedenis vormgegeven kan worden. Het eerste type van opvattingen beschouwt onderzoekend leren als het *onderzoeken* van een historische vraag, waarbij leerlingen informatiebronnen gebruiken om een eigen claim te vormen en te onderbouwen door informatie uit de bronnen als bewijs te gebruiken. Dit soort opvattingen leunt dan ook het sterkst aan bij het hierboven beschreven raamwerk. Uit de resultaten blijkt echter dat slechts een minderheid van de leraren (n=4) dit soort opvattingen aanhangt. De meeste leraren (n=16) onderschrijven het tweede type van opvattingen, waarin onderzoekend leren gereduceerd wordt tot het *evalueren* van informatiebronnen, los van een centrale historische vraag. Op die manier wordt onderzoekend leren vaak een kwestie van achterhalen of een bron al dan niet betrouwbaar is. Net als het eerste, wordt ook het derde type van opvattingen slechts door een minderheid van de leraren (n=2) aangehaald. Hier wordt onderzoekend leren verder herleid tot het zelfstandig kunnen *begrijpen* van informatie over het verleden. Het centrale doel is dan vaak om gevraagde informatie in bronnen te kunnen vinden en samen te vatten.

Het technologiegebruik van deze 22 leraren bevestigt het beeld van geschiedenis als een schoolvak dat vooral draait om het verwerven van kennis over het verleden. Uit de resultaten blijkt immers dat geen enkele leraar technologie gebruikt als een manier om leerlingen tijdens onderzoekend leren te ondersteunen, bijvoorbeeld via digitale leeromgevingen die het onderzoeksproces in goede banen leiden (zie Saye & Brush, 2002), of het gebruik van computer ondersteund samenwerkend leren als middel om historisch denken te stimuleren

(zie van Drie, van Boxtel, & van der Linden, 2006). Technologie wordt daarentegen vooral gebruikt om een overzicht van het verleden aan te leren, of om leerlingen zelfstandig specifieke delen van dit overzicht te laten verwerven (bv. om beelden of audio te presenteren, de leerstof te structureren, informatie op te zoeken, of een taak te presenteren).

De bevindingen van deze kleinschalige studie worden bevestigd door de resultaten van een vragenlijstonderzoek dat werd afgenomen bij 526 geschiedenisleraren. Als deel van dit onderzoek werden leraren onder meer bevraagd over de positie van bronnen in de klas. Uit de resultaten blijkt dat slechts een minderheid van de leraren (22.41%) vindt dat bronnen uitgebreid geanalyseerd moeten worden, als deel van opdrachten waarin leerlingen historische vragen stellen, en relevante informatie zoeken en bediscussiëren. De meeste leraren (51.27%) willen bronnen eerder gebruiken als een deel van activiteiten die door de leraar geleid worden, waarbij de leerlingen moeten leren om informatie kritisch te analyseren. Ten slotte vindt een andere minderheid van leraren (22.41%) dat bronnen eerder dienen als illustraties bij de les, die de leerstof kunnen verhelderen.

Deze grootschalige studie verduidelijkt ook waarom sommige geschiedenisleraren meer geneigd zijn om onderzoekend leren in de klas te gebruiken, in vergelijking met andere. Uit een structureel vergelijkingsmodel, dat geschat werd op basis van de vragenlijstdata, blijkt dat een groot deel van de verschillen tussen leraren (38%) verklaard kan worden aan de hand van hun opvattingen over het vakgebied. Meer bepaald neemt hun gebruik van onderzoekend leren toe, naarmate ze meer belang hechten aan het verwerven van kennis over de methoden van historisch onderzoek, en naarmate ze hun eigen bekwaamheid om onderzoekend leren te organiseren in de klas hoger inschatten. Hun gebruik van onderzoekend leren daalt daarentegen naarmate ze zich meer door hun werkomgeving gehinderd voelen in het organiseren van onderzoekend leren.

Ten slotte blijkt de opleidingsachtergrond van de leraren een belangrijke voorspeller te zijn van deze opvattingen. Uit de resultaten blijkt dat, vergeleken met hun collega's, leraren met een diploma van universitaire studies in geschiedenis (master of het vroegere licentiaat) meer belang hechten aan het aanleren van onderzoekscompetenties, en zichzelf meer bekwaam achten om onderzoekend leren te organiseren. Langs de kant blijkt echter ook dat leraren met een academisch diploma de competenties van hun leerlingen met betrekking tot onderzoekend leren lager inschatten, en daardoor aanzienlijk meer hinder voor het organiseren van onderzoekend leren percipiëren in de klasomgeving.

3.3. SG 3. Impact van professionele ontwikkeling over onderzoekend leren in geschiedenis

Uit de resultaten van het onderzoek naar het derde studiegebied blijkt dat professionele ontwikkeling een positieve impact kan hebben op de opvattingen die geschiedenisleraren erop nahouden over onderzoekend leren. Dit is vooral belangrijk, omdat de bevindingen die

hierboven besproken werden, aangeven dat deze opvattingen een belangrijke rol spelen in de beslissing van geschiedenisleraren om onderzoekend leren al dan niet te implementeren.

Concreet blijkt dat een onderdompeling in onderzoekend leren, waarin 302 student-leraren zelf onderzoeksopdrachten uitvoeren, een positief effect heeft op het belang dat ze hechten aan kennis van onderzoeksmethoden, en op de inschatting van hun eigen bekwaamheid om een onderzoeksopdracht tot een goed einde te brengen. Bij een training voor 54 student-leraren, over het gebruik van onderzoekend leren in de klas, werd een gelijkaardig effect vastgesteld. Waar dat vooraf nog niet het geval was, beschouwden de meeste leraren, na afloop van de training, onderzoekend leren als een onderzoek van een historisch vraag, waarbij leerlingen een eigen mening dienen te vormen en te onderbouwen. Daarnaast zorgde de training er ook voor dat leraren zich bekwaamer voelden om onderzoekend leren in de klas te organiseren.

Bij deze algemene positieve effecten van professionele ontwikkeling moet echter wel een kanttekening geplaatst worden. In beide gevallen blijkt immers dat de impact van de training op een kleine subgroep van leraren (respectievelijk 25 van de 302, en 8 van de 54) relatief beperkt blijft. Op het eerste zicht, lijken initiële opvattingen die sterk gericht zijn op het overdragen van kennis over het verleden, en dus niet echt compatibel zijn met onderzoekend leren, hiervan de oorzaak te zijn. Voor deze subgroep van leraren lijkt dus een aanpak aangewezen die dieper ingaat op hun opvattingen. Een voorbeeld hiervan zijn conceptuele veranderingsstrategieën (zie Korthagen, 2013), die er expliciet op gericht zijn om onbewust gedragen opvattingen aan de oppervlakte te brengen, de problemen of tekorten ervan duidelijk te maken, en logische alternatieven aan te bieden.

Na de training in onderzoekend leren werd ook concreet nagegaan hoe student-leraren onderzoekend leren tijdens een van hun stagelessen gebruikten. Uit een analyse van de lesvoorbereidingen komen 3 aanpakken naar voor. Geordend volgens de mate waarin ze aansluiten bij de principes van onderzoekend leren (oplopend), gaat het om: invuloefening, synthese-opdracht, en kritisch onderzoek. Zoals Tabel 2 aangeeft, zijn de verschillen tussen deze sjablonen vooral te vinden in de aard van het probleem en de activiteiten die de leerlingen dienen uit te voeren.

Tabel 2

Verschillende sjablonen in de lesvoorbereidingen

sjabloon	probleem	leerlingactiviteit
invuloefening	volledig gestructureerd	kennisweergave
synthese-opdracht	ondergestructureerd	kennisweergave
kritisch onderzoek	ondergestructureerd	kennistransformatie

Als het gaat over de aard van een probleem, kan een onderscheid gemaakt worden tussen onder- en volledig gestructureerde problemen. In tegenstelling tot volledig gestructureerde problemen, waar er vaak één juist antwoord is, kunnen ondergestructureerde problemen niet met zekerheid opgelost worden, doordat de informatie onvolledig is, of zich tot verschillende interpretaties leent (King & Kitchener, 1994). Daarnaast kan in de vereiste leerlingactiviteit ook een onderscheid gemaakt worden tussen kennisweergave en –transformatie. Terwijl kennisweergave neerkomt op het repliceren van informatie, verwijst kennistransformatie naar een constructieve redeneeractiviteit die informatie uit verschillende bronnen integreert, met als doel een eigen conclusie te vormen en te verdedigen (Wiley & Voss, 1996). Uit de manier waarop onderzoekend leren in de vorige delen beschreven wordt, wordt duidelijk dat deze werkvorm draait rond een ondergestructureerd probleem, dat kennistransformatie vereist.

De bevinding dat de lessen van een deel van de student-leraren niet voldoen aan de verwachtingen (kritisch onderzoek), loopt parallel met de vaststelling dat de opvattingen van heel wat student-leraren, over hoe onderzoekend leren vormgegeven moet worden, in negatieve zin wijzigden in de periode na de training. Concreet bleek dat een aantal student-leraren meer geneigd waren om onderzoekend leren te beperken tot het evalueren of zelfstandig verwerken van informatie. Een analyse van reflectiepapers en interviews met de student-leraren wijst erop dat dit te wijten is aan de invloeden in de stageomgeving, zoals verwachtingen van de mentor-leraar, en percepties van de competentie van de leerlingen, maar ook aan een verhoogde werkdruk die het organiseren van onderzoekend leren blijikbaar met zich meebrengt.

4. ALGEMENE CONCLUSIE

De bevindingen van dit proefschrift dragen drie belangrijke conclusies in zich, die richting kunnen geven aan verder onderzoek, en het werk in de praktijk.

Als eerste helpen de theoretische kaders uit Tabel 1 en Tabel 2 om onderzoekend leren duidelijk te definiëren, namelijk: als een didactische werkvorm die uitgaat van een ondergestructureerd probleem, en vraagt om kennistransformatie. Deze kennistransformatie gebeurt via vijf denkprocessen die essentieel zijn voor onderzoekend leren in geschiedenis: bronnen inschatten, bronnen beoordelen, onduidelijkheden verhelderen, een beeld vormen, en argumenten formuleren.

Als tweede geven de resultaten een aantal argumenten voor zowel een historiografische als pedagogische component in professionele ontwikkeling over onderzoekend leren in geschiedenis. Wat de historiografische component betreft, veronderstelt het organiseren van onderzoekend leren eerst en vooral dat leraren zelf een goed begrip hebben van het vakgebied, en de denkprocessen die essentieel zijn in onderzoekend leren in geschiedenis. Dit

wordt bevestigd door resultaten die aantonen dat leraren met een academische opleiding in geschiedenis, in vergelijking met hun collega's, meer waarde hechten aan het onderwijzen van onderzoekscompetenties, en zichzelf meer bekwaam voelen om onderzoekend leren te organiseren. Het theoretisch kader in Tabel 1, over de vijf denkprocessen die centraal staan in onderzoekend leren, kan een eerste opstap vormen bij de ontwikkeling van een dergelijke component. Met betrekking tot de pedagogische component, tonen de resultaten dat professionele ontwikkeling niet enkel dient in te zetten op kennis over onderzoekend leren, maar ook op de opvattingen die geschiedenisleraren hebben over hun vakgebied. Deze opvattingen blijken immers een belangrijke rol te spelen in de beslissing van geschiedenisleraren om onderzoekend leren al dan niet te gebruiken. Aansluitend hierbij, tonen de resultaten dat zowel onderdamping in onderzoekend leren, als training in het gebruik van onderzoekend leren in de klas, bij de meeste leraren een evolutie kunnen teweeg brengen in de richting van opvattingen die het gebruik van onderzoekend leren aanmoedigen.

Als derde is het belangrijk om op te merken dat de omgeving waarin leraren werken, met verschillende invloeden, zoals de verwachtingen van collega's, beschikbare leermaterialen, en de competentie van leerlingen, leraren vaak demotiveren om onderzoekend leren in de klas in te zetten. Om die reden lijkt het belangrijk om leraren blijvende ondersteuning aan te bieden na een training, die hen kan helpen om hindernissen in de klasomgeving te overwinnen. Daarnaast kan er ook ingezet worden op het creëren van een omgeving die de organisatie van onderzoekend leren ondersteunt, bijvoorbeeld via de invoering van aangepaste curriculummaterialen, of mentorprogramma's.

Naast deze drie conclusies, dient ten slotte te worden opgemerkt dat dit proefschrift, zoals alle wetenschappelijk onderzoek, uiteraard niet zonder beperkingen is. Meer bepaald zijn er twee belangrijke beperkingen op te noemen. De eerste beperking is dat het onderzoek over de praktijk van geschiedenisleraren vooral gebaseerd is op wat de leraren rapporteerden, en niet op een analyse van lesobservaties of -materiaal. Hoewel er geen aanwijzingen zijn dat de respons van leraren afwijkt van de realiteit, kunnen de data geen uitsluitsel geven of dit ook effectief het geval is. De tweede beperking is dat het effect van professionele ontwikkeling enkel werd nagegaan bij student-leraren, en niet bij ervaren leraren. De vraag over hoe deze resultaten zich laten vertalen naar deze tweede doelgroep blijft dus onbeantwoord, hoewel het aannemelijk is dat de effecten in dezelfde lijn zullen liggen.

Ondanks de beperkingen, levert dit proefschrift een waardevolle bijdrage aan onderzoek over onderzoekend leren in geschiedenisonderwijs. Concreet dragen de bevindingen bij aan een beter begrip van drie studiegebieden die hierbij van belang zijn: de denkprocessen verbonden met onderzoekend leren in geschiedenis, het gebruik van onderzoekend leren door geschiedenisleraren, en de effecten van professionele ontwikkeling voor onderzoekend leren in geschiedenis. Samen vormen deze drie studiegebieden een kader, dat richting kan

geven aan initiatieven die het redeneren met historische informatie in geschiedenisonderwijs willen bevorderen.

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Academic output

ACADEMIC OUTPUT

Output integrated in this dissertation

Journals (A1)

- Voet, M., & De Wever, B. (submitted). How does immersion in inquiry-based learning affect student teachers' beliefs? The effects of a technology-enhanced inquiry environment in history teacher training. *Instructional Science*.
- Voet, M., & De Wever, B. (accepted for publication pending minor revisions). Teachers' adoption of inquiry-based learning activities: The importance of beliefs about the subject, self and social context. *Journal of Teacher Education*.
- Voet, M., & De Wever, B. (in press). Towards a differentiated and domain-specific view of educational technology: An exploratory study of history teachers' technology use. *British Journal of Educational Technology*.
- Voet, M., & De Wever, B. (in press). History teachers' knowledge of inquiry methods: An analysis of cognitive processes used during a historical inquiry. *Journal of Teacher Education*.
- Voet, M., & De Wever, B. (2017). Preparing pre-service history teachers for organizing inquiry-based learning: The effects of an introductory training program. *Teaching and Teacher Education*, 63, 206-217.
- Voet, M., & De Wever, B. (2016). History teachers' conceptions of inquiry-based learning, beliefs about the nature of history, and their relation to the classroom context. *Teaching and Teacher Education*, 55, 57-67.

Journals (A4)

- Voet, M. & De Wever, B. (2017). Onderzoekend leren, wat is dat? Naar een concrete invulling voor het schoolvak geschiedenis. *Hermes*, 61, 12-18.

Conference contributions

- Voet, M., & De Wever, B. (2016, August). *History teachers' adoption of inquiry-based learning activities: Toward a predictive model*. Paper presented at the joint meeting of the European Association for Research on Learning and Instruction (EARLI) Special Interest Groups (SIG) 20 and 26, Gent, Belgium.
- Voet, M., & De Wever, B. (2015, August). *Using good practice as a basis: Development and adaptation of a framework for historical reasoning*. Paper presented at the 16th biennial

- conference of the European Association for Research on Learning and Instruction (EARLI), Limassol, Cyprus.
- Voet, M., & De Wever, B. (2015, August). *History teachers' beliefs about inquiry learning: Learning goals, inquiry orientations, and teaching*. Paper presented at the 16th biennial conference of the European Association for Research on Learning and Instruction (EARLI), Limassol, Cyprus.
- Voet, M., & De Wever, B. (2015, June). *Ontwikkeling en gebruik van een analyseschema voor onderzoekend leren in de geschiedenisles*. Poster presented at the Onderwijs Research Dagen (ORD), Leiden, The Netherlands.
- Voet, M., & De Wever, B. (2015, April). *Investigating historical inquiry in secondary education: Development of an analysis and assessment scheme*. Paper presented at the American Educational Research Association (AERA) annual meeting, Chicago, ILL.
- Voet, M., & De Wever, B. (2014, September). *Investigating the past through inquiry: History teachers' beliefs and practice*. Paper presented at the European Conference on Educational Research (ECER), Porto, Portugal.
- Voet, M., & De Wever, B. (2014, August). *Structuring pre-service teachers' historical inquiry: A script for source analysis*. Paper presented at the meeting of the European Association for Research on Learning and Instruction (EARLI) Special Interest Group (SIG) 20, Malmo, Sweden.
- Voet, M., & De Wever, B. (2014, June). *Historisch onderzoek in de geschiedenisles? De rol van vakspecifieke opvattingen in de praktijk van geschiedenisleraren*. Poster presented at Onderwijs Research Dagen (ORD), Groningen, The Netherlands.
- Voet, M., & De Wever, B. (2013, August). Examining pre-service history teachers' subject-specific beliefs. Poster presented at the 15th biennial conference of the European Association for Research on Learning and Instruction (EARLI), Munich, Germany.
- Voet, M., & De Wever, B. (2013, July). *Supporting pre-service history teachers' historical reasoning through computer-supported collaborative learning*. 16th biennial conference on of the International Study Association on Teachers and Teaching (ISATT), Gent, Belgium.
- Voet, M., & De Wever, B. (2013, June). *Enhancing pre-service history teachers' historical reasoning through a computer-supported collaboration script*. Poster presented at the 10th international conference on Computer-Supported Collaborative Learning (CSCL), Wisconsin, MA.
- Voet, M. & De Wever, B. (2012, June). Computer-ondersteund onderzoekend leren in de opleiding tot leerkracht geschiedenis. Round table organized at Onderwijs Research Dagen (ORD), Wageningen, The Netherlands.

Other academic output

Journals (a1)

- Voet, M., Gielen, M., Boelens, R., & De Wever, B. (submitted). Using feedback requests to actively involve assessees in peer assessment: Effects on the assessor's feedback content and assessee's agreement with feedback. *European Journal of Psychology of Education*.
- Boelens, R., De Wever, B., & Voet, M. (submitted). Four key challenges to the design of blended learning: A systematic literature review. *Educational Research Review*.
- Boelens, R., De Wever, B., & Voet, M. (submitted). The design of blended learning in response to student diversity in higher education: Instructors' conceptions of differentiated and blended instruction. *Computers & Education*.
- De Wever, B., Härmäläinen, R., Voet, M., & Gielen, M. (2015). A wiki-task for first-year university students: The effect of scripting students' collaboration. *The internet and Higher Education*, 25, 37-44.

Conference contributions

- Boelens, R., De Wever, B., & Voet, M. (2016, May). *Lesgeven aan volwassen cursisten met diverse onderwijsachtergronden in blended leeromgevingen: Opvattingen van lesgevers*. Paper presented at the Onderwijs Research Dagen (ORD), Rotterdam, The Netherlands.
- De Wever, B., Härmäläinen, R., Voet, M., Boelens, R., & Grammens, M. (2016, August). *Scripting a collaborative writing inquiry task within a wiki environment in higher education*. Paper presented at the joint meeting of the European Association for Research on Learning and Instruction (EARLI) Special Interest Groups (SIG) 20 and 26, Gent, Belgium.
- Boelens, R., De Wever, B., & Voet, M. (2016, July). *Adult educators' beliefs about learners with different educational backgrounds and their related approaches to differentiated instruction in blended learning environments*. Paper presented at the Junior Researchers (JURE) of the European Association for Research on Learning and Instruction (EARLI) conference, Helsinki, Finland.
- De Wever, B., Härmäläinen, R., Voet, M., & Gielen, M. (2014, September). *Stimulating online collaboration in a wiki environment*. Paper presented at the European Conference on Educational Research (ECER), Porto, Portugal.
- De Wever, B., Härmäläinen, R., Voet, M., & Gielen, M. (2014). *Collaborative learning in a wiki-environment: Stimulating collaboration*. Paper presented at the meeting of the European Association for Research on Learning and Instruction (EARLI) Special Interest Group (SIG) 20, Malmo, Sweden.

Data storage fact sheets

% Data Storage Fact Sheet 1

% Name/identifier study: Chapter 2

% Author: Michiel Voet

% Date: March 26, 2017

1. Contact details

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1a. Main researcher

- name: Michiel Voet
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2. Information about the datasets to which this sheet applies

=====

* Reference of the publication in which the datasets are reported:

Voet, M., & De Wever, B. (2016). History teachers' conceptions of inquiry-based learning, beliefs about the nature of history, and their relation to the classroom context. *Teaching and Teacher Education*, 55, 57-67.

* Which datasets in that publication does this sheet apply to?:

The complete dataset of the study reported in chapter 2 of the dissertation

3. Information about the files that have been stored

=====

3a. Raw data

* Have the raw data been stored by the main researcher? YES / NO

If NO, please justify:

* On which platform are the raw data stored?

- researcher PC
- research group file server
- other (specify): Main researcher's personal OneDrive

* Who has direct access to the raw data (i.e., without intervention of another person)?

- main researcher
- responsible ZAP
- all members of the research group
- all members of UGent
- other (specify): ...

3b. Other files

* Which other files have been stored?

- file(s) describing the transition from raw data to reported results. Specify: coding scheme used for analyzing the interviews (Word).
- file(s) containing processed data. Specify: interview transcriptions (Word).
- file(s) containing analyses. Specify: coded transcripts (NVivo), data matrices of the most important results (Word), double-coding of the data (Excel), and plots of cases based on variables under study (Excel).
- files(s) containing information about informed consent
- a file specifying legal and ethical provisions
- file(s) that describe the content of the stored files and how this content should be interpreted. Specify: ...
- other files. Specify: interview guide (Word), personal details of the participants (Excel).

* On which platform are these other files stored?

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* Who has direct access to these other files (i.e., without intervention of another person)?

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- responsible ZAP
- all members of the research group
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% Data Storage Fact Sheet 2

% Name/identifier study: Chapter 3

% Author: Michiel Voet

% Date: March 26, 2017

1. Contact details

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Voet, M., & De Wever, B. (in press). History teachers' knowledge of inquiry methods: An analysis of cognitive processes used during a historical inquiry. *Journal of Teacher Education*.

* Which datasets in that publication does this sheet apply to?:

The complete dataset of the study reported in chapter 3 of the dissertation

3. Information about the files that have been stored

=====

3a. Raw data

* Have the raw data been stored by the main researcher? YES / NO

If NO, please justify:

* On which platform are the raw data stored?

- researcher PC
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- other (specify): Main researcher's personal OneDrive

* Who has direct access to the raw data (i.e., without intervention of another person)?

- main researcher
- responsible ZAP
- all members of the research group
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3b. Other files

* Which other files have been stored?

- file(s) describing the transition from raw data to reported results. Specify: coding scheme used for analysing the think-aloud protocols (Word).
- file(s) containing processed data. Specify: transcripts of the think-aloud protocols (Word).
- file(s) containing analyses. Specify: coded transcripts (NVivo), counts of codes (Excel), double-coding (Excel), radar diagrams of the codes (Excel).
- files(s) containing information about informed consent
- a file specifying legal and ethical provisions
- file(s) that describe the content of the stored files and how this content should be interpreted. Specify: ...
- other files. Specify: inquiry task used for the study (Word), personal details of the participants (Excel).

* On which platform are these other files stored?

- individual PC
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- other: ...

* Who has direct access to these other files (i.e., without intervention of another person)?

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% Data Storage Fact Sheet 3

% Name/identifier study: Chapter 4

% Author: Michiel Voet

% Date: March 26, 2017

1. Contact details

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2. Information about the datasets to which this sheet applies

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* Reference of the publication in which the datasets are reported:

Voet, M., & De Wever, B. (accepted for publication pending minor revisions). Teachers' adoption of inquiry-based learning activities: The importance of beliefs about the subject, self, and social context. *Journal of Teacher Education*.

* Which datasets in that publication does this sheet apply to?:

The complete dataset of the study reported in chapter 4 of the dissertation

3. Information about the files that have been stored

=====

3a. Raw data

* Have the raw data been stored by the main researcher? YES / NO

If NO, please justify:

* On which platform are the raw data stored?

- researcher PC
- research group file server
- other (specify): Main researcher's personal OneDrive

* Who has direct access to the raw data (i.e., without intervention of another person)?

- main researcher
- responsible ZAP
- all members of the research group
- all members of UGent
- other (specify): ...

3b. Other files

* Which other files have been stored?

- file(s) describing the transition from raw data to reported results. Specify:
- file(s) containing processed data. Specify: dataset of survey answer (SPSS), randomly split dataset for EFA and CFA (SPSS).
- file(s) containing analyses. Specify: syntax used for CFA (R), syntax used for SEM (R).
- files(s) containing information about informed consent: informed consent (PDF) copies of the informed consent signed by the participants (fysical).
- a file specifying legal and ethical provisions
- file(s) that describe the content of the stored files and how this content should be interpreted. Specify: ...
- other files. Specify: survey (Pdf).

* On which platform are these other files stored?

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% Data Storage Fact Sheet 4

% Name/identifier study: Chapter 5

% Author: Michiel Voet

% Date: March 26, 2017

1. Contact details

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1a. Main researcher

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If a response is not received when using the above contact details, please send an email to data.pp@ugent.be or contact Data Management, Faculty of Psychology and Educational Sciences, Henri Dunantlaan 2, 9000 Ghent, Belgium.

2. Information about the datasets to which this sheet applies

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* Reference of the publication in which the datasets are reported:

Voet, M., & De Wever, B. (in press). Towards a differentiated and domain-specific view of educational technology: An exploratory study of history teachers' technology use. *British Journal of Educational Technology*.

* Which datasets in that publication does this sheet apply to?:

The complete dataset of the study reported in chapter 5 of the dissertation

3. Information about the files that have been stored

=====

3a. Raw data

* Have the raw data been stored by the main researcher? YES / NO

If NO, please justify:

* On which platform are the raw data stored?

- researcher PC
- research group file server
- other (specify): Main researcher's personal OneDrive

* Who has direct access to the raw data (i.e., without intervention of another person)?

- main researcher
- responsible ZAP
- all members of the research group
- all members of UGent
- other (specify): ...

3b. Other files

* Which other files have been stored?

- file(s) describing the transition from raw data to reported results. Specify: coding scheme used for analyzing the interviews (Word).
- file(s) containing processed data. Specify: interview transcriptions (Word).
- file(s) containing analyses. Specify: coded transcripts (NVivo), data matrix of the most important results (Word), overview of codes for each case (Excel).
- files(s) containing information about informed consent
- a file specifying legal and ethical provisions
- file(s) that describe the content of the stored files and how this content should be interpreted. Specify: ...
- other files. Specify: interview guide (Word), personal details of the participants (Excel).

* On which platform are these other files stored?

- individual PC
- research group file server
- other: ...

* Who has direct access to these other files (i.e., without intervention of another person)?

- main researcher
- responsible ZAP
- all members of the research group
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% Data Storage Fact Sheet 5

% Name/identifier study: Chapter 6

% Author: Michiel Voet

% Date: March 26, 2017

1. Contact details

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- e-mail: michiel.voet@ugent.be

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If a response is not received when using the above contact details, please send an email to data.pp@ugent.be or contact Data Management, Faculty of Psychology and Educational Sciences, Henri Dunantlaan 2, 9000 Ghent, Belgium.

2. Information about the datasets to which this sheet applies

=====

* Reference of the publication in which the datasets are reported:

Voet, M., & De Wever, B. (submitted). How does immersion in inquiry-based learning affect student teachers' beliefs? The effects of a technology-enhanced inquiry environment in history teacher training. *Instructional Science*.

* Which datasets in that publication does this sheet apply to?:

The complete dataset of the study reported in chapter 6 of the dissertation

3. Information about the files that have been stored

=====

3a. Raw data

* Have the raw data been stored by the main researcher? YES / NO

If NO, please justify:

* On which platform are the raw data stored?

- researcher PC
- research group file server
- other (specify): Main researcher's personal OneDrive

* Who has direct access to the raw data (i.e., without intervention of another person)?

- main researcher
- responsible ZAP
- all members of the research group
- all members of UGent
- other (specify): ...

3b. Other files

* Which other files have been stored?

- file(s) describing the transition from raw data to reported results. Specify:
- file(s) containing processed data. Specify: pre-posttest responses (SPSS), randomly split dataset used for EFA and CFA (SPSS).
- file(s) containing analyses. Specify: syntax and results of multilevel analysis (MLWIN), coded open questions from post-test (NVivo), double-coding of the data (Excel).
- files(s) containing information about informed consent: informed consent (Pdf) copies of the informed consent signed by the participants (fysical).
- a file specifying legal and ethical provisions
- file(s) that describe the content of the stored files and how this content should be interpreted. Specify: ...
- other files. Specify: Participants' information booklet (Pdf), information booklets with participants' notes (fysical).

* On which platform are these other files stored?

- individual PC
- research group file server
- other: ...

* Who has direct access to these other files (i.e., without intervention of another person)?

- main researcher
- responsible ZAP
- all members of the research group
- all members of UGent
- other (specify): ...

4. Reproduction

=====

* Have the results been reproduced independently?: YES / NO

* If yes, by whom (add if multiple):

- name:
- address:
- affiliation:
- e-mail:

% Data Storage Fact Sheet 6

% Name/identifier study: Chapter 7

% Author: Michiel Voet

% Date: March 26, 2017

1. Contact details

=====

1a. Main researcher

- name: Michiel Voet
- address: Henri Dunantlaan 2, 9000 Ghent, Belgium.
- e-mail: michiel.voet@ugent.be

1b. Responsible Staff Member (ZAP)

- name: Bram De Wever
- address: Henri Dunantlaan 2, 9000 Ghent, Belgium
- e-mail: bram.deweever@ugent.be

If a response is not received when using the above contact details, please send an email to data.pp@ugent.be or contact Data Management, Faculty of Psychology and Educational Sciences, Henri Dunantlaan 2, 9000 Ghent, Belgium.

2. Information about the datasets to which this sheet applies

=====

* Reference of the publication in which the datasets are reported:

Voet, M., & De Wever, B. (2017). Preparing pre-service history teachers for organizing inquiry-based learning: The effects of an introductory training program. *Teaching and Teacher Education*, 63, 206-217.

* Which datasets in that publication does this sheet apply to?:

The complete dataset of the study reported in chapter 7 of the dissertation

3. Information about the files that have been stored

=====

3a. Raw data

* Have the raw data been stored by the main researcher? YES / NO

If NO, please justify:

* On which platform are the raw data stored?

- researcher PC
- research group file server
- other (specify): Main researcher's personal OneDrive

* Who has direct access to the raw data (i.e., without intervention of another person)?

- main researcher
- responsible ZAP
- all members of the research group
- all members of UGent
- other (specify): ...

3b. Other files

* Which other files have been stored?

- file(s) describing the transition from raw data to reported results. Specify:
- file(s) containing processed data. Specify: pre-posttest responses (SPSS), evaluation of the workshop (SPSS).
- file(s) containing analyses. Specify: SPSS syntax used for analysing the pre-posttest results (Txt), lesson plans and reflection papers with researcher notes (fysical), data matrix of the most important results for each case.
- files(s) containing information about informed consent: informed consent (Pdf) copies of the informed consent signed by the participants (fysical).
- a file specifying legal and ethical provisions
- file(s) that describe the content of the stored files and how this content should be interpreted. Specify: ...

- other files. Specify: assignments for reflection papers (Word), workshop presentation (Powerpoint).

* On which platform are these other files stored?

- individual PC
- research group file server
- other: ...

* Who has direct access to these other files (i.e., without intervention of another person)?

- main researcher
- responsible ZAP
- all members of the research group
- all members of UGent
- other (specify): ...

4. Reproduction

=====

* Have the results been reproduced independently?: YES / NO

* If yes, by whom (add if multiple):

- name:
- address:
- affiliation:
- e-mail: