Students Writing History Using Traditional and Digital Archives

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This study shows that upper secondary students' historical writing may be influenced by their use of sources from traditional archives versus their use of digital sources in databases. A qualitative approach, theoretical perspectives, and historical empathy seem to be stimulated primarily by using traditional archives and print sources, while digital archives and sources, in contrast, stimulate the use of quantitative data and a more social scientific approach. The results indicate a historiographical shift in students' historical thinking, which researchers of history education need to consider in a digital era. The results of this study call for reflections in history teaching to make it possible for students to learn and experience the double nature of history as part of the humanities and social sciences.

Keywords: archives, databases, historical thinking, history teaching, primary sources

Historical writing is based upon fragments of the past that have survived into the present. Going to the sources is thus central to historical research, and therefore history lessons in schools should point students to the sources to learn the discipline, and so called historical thinking (Wineburg, 2001; Levesque, 2008). The national Swedish syllabus for history in upper secondary education states the following:

> *[The] use of historical methods should be a part of teaching. This means that students should be given the opportunity to search for, examine, interpret and assess different types of sources, and use different theories, perspectives and tools to explain and illustrate processes of historical change* (Skolverket 2012).

Thus, students are to be trained to use different kinds of sources to investigate the past in a way professional historians do. The syllabus also highlights the importance of historical empathy (Lee & Ashby, 2001; Barton & Levstik, 2004), stating that teaching should stimulate "an understanding of living conditions of different ages" and "contribute to the realisation that people in every age should be understood in relation to the conditions and values of their time" (Skolverket, 2012). Similar emphasis on historical thinking and historical empathy can be found also in syllabi in other Western countries (Wilschut, 2010; Cunningham, 2013). One way of stimulating historical thinking and historical empathy in teaching is using primary sources. Giving students the opportunity to critically scrutinize sources has been described in positive ways by advocates of historical thinking (Wineburg, 2001; Levesque, 2008). But previous research has examined students who consult a single document or only a few documents selected by the teacher or researcher (Wineburg, 2001; Martin & Wineburg, 2008; Lévesque, 2009), a practice quite different from the work of historians.

For historians, writing history is a long-term process that includes an individual process of formulating research questions, making theoretical and methodological considerations, collecting and critically interpreting sources, and finally presenting their findings. The rapid digitization of primary sources has, however, come to influence historians' process of writing history (JAH, 2008; Rosenzweig, 2011; Turkel, 2011). Traditional and digital archives are transforming. Increasingly, historical sources can be found in databases—often labeled digital archives (Theimer, 2012; in this study, database and digital archive are used interchangeably). The younger generation of historians, in particular, seems to use and prefer digital material. Using digital archives allows

historians not only to think in many ways as they have done for a long time but also to work out new ways to find and analyze sources and data (Tibbo, 2003; Stieg Dalton & Charnigo, 2004; Malkmus, 2010; Nygren, 2013; Nygren, Buckland & Foka, 2014).

Students today can access multiple archives and millions of primary sources without even leaving the classroom. The potential of using primary sources in history education has been underlined by scholars, and so have the ways digital archives can improve learning practices (Levesque 2009; Lee & Friedman 2009; Lindquist & Long, 2011). Teachers have stated that they see this potential and want to use more primary sources, printed and digital, in history teaching (Hicks, Doolittle & Lee, 2004). The possibility of using digital material in teaching has been described as a digital revolution and a democratic possibility for students' studies of the past (Bass & Rosenzweig, 1999; Lee, 2002; Clarke & Lee, 2004; Tally & Goldenberg, 2005; Lévesque, 2009; Lee, 2010). A number of useful teaching websites have been designed (see, for instance, sheg.stanford.edu and stockholmskallan.se). Using websites with historical sources may be a fruitful way to stimulate historical thinking (Martin & Wineburg, 2008; Lévesque, 2009; Manfra & Coven, 2011). But students who use these websites are not actually conducting the challenging intellectual work of historians navigating in authentic digital environments. Students' historical thinking when they use authentic sources in authentic archives, digital and traditional, has previously been studied only to a very limited extent (Nygren, Sandberg & Vikström, 2014). And using online material can pose a real challenge to students.

Research regarding the potential of using digital material and tools in education highlights a complex practice whereby more extensive use of computers has not necessarily improved teaching and learning (Fleischer, 2012; Alexandersson & Limberg, 2012; Kirkwood & Price, 2013; Balanskat *et al.*, 2013; Grönlund *et al.*, 2013). Students' familiarity with computers and social media does not necessarily make them experts in navigating the Web to accomplish complex learning tasks (Azevedo *et al.*, 2008; Pan *et al.*, 2007). Students may perceive Web-based inquiry as

complicated and stressful (Nygren & Vikström, 2013). Andrew J. Milson (2002) has noted that students tend to follow the "path of least resistance," leading to inefficient problem solving. Indeed, hyperlinked material on the Web might constitute an obstacle to student-centered learning, for students even today can get lost in hyperspace (Edwards & Hardman, 1989) and sometimes find it difficult to navigate idiosyncratic online presentations (Land, 2000; Brush & Saye, 2007). Students can, nevertheless, given the appropriate scaffolding by teachers, use digital databases designed for professional historians, employ historical thinking when doing so, and perceive the process as interesting and fun (Nygren & Vikström, 2013; Nygren, Sandberg & Vikström, 2014). It has also been noted that students' historical understanding might differ depending upon their backgrounds and previous knowledge (Seixas, 1994; Porat, 2007; Barton, 2008; Peck, 2010). Previous research—and lack of research—highlights that it is vital to better understand the variety of knowledge constructions that are possible when using historical archives, both traditional and digital (Swan & Hofer, 2008).

The questions how digital history differs from traditional history and what the future of studying the past is in terms of research and teaching form an ongoing discussion dating back to the 1980s (Rosenzweig, 2011; Sternfeld, 2012; Mills Kelly, 2013; Dougherty & Nawrotzki, 2013; Westerberg, 2014). But even though reflections on contemporary digital history practices are quite common, no previous research has compared students' writing of history when they use printed to what they produce from digital sources in a long-term process. John K. Lee (2010, 82) has emphasized that "the act of historical inquiry in digital environments … involves some important and unique elements," but still there "seems to be little systematic concern for how students access historical resources."

Purpose of the Study

In this study I explore the processes of thinking historically and students' knowledge construction in a digital era. The aim of this investigation is to analyze students' use of archives and sources, both traditional and digital, in the long-term process of writing history. I consider the

following questions: (1) How do upper secondary students outline papers and present historical knowledge when they use archives and sources of different forms? (2) How do upper secondary students address the core issues of historical study when they write history based upon different sources from different archives? (3) How do students perceive history writing when they use different types of historical sources and archives? (4) Is it possible that the materiality of archives and of sources influences students' writing of history, and if so, what implications can this have for history education?

Theoretical Considerations

Core Issues in Historical Thinking

As mentioned above, the use of primary sources in classrooms has been highlighted as a way to stimulate students' historical thinking (Wineburg, 1991; 2001; Seixas, 1996; Lévesque, 2008). Peter Seixas (1996) has claimed that all historians and history students must address in their historical thinking the core historical issues of significance, evidence, empathy, and change. The core issues in historical studies have been emphasized as vital procedural knowledge and second-order concepts that are central to making sense of the past. Stéphane Lévesque (2008, 30) claims that "[w]ithout these concepts, it would be impossible to make sense of the substance of the past." The procedural knowledge used by historians and history students when addressing the core issues of historical studies needs more attention because these issues "shape the way we go about doing history" (Lee & Ashby, 2001, 199).

Historical significance can be defined as historians' ability to orient themselves in the mass of facts in history, to identify problems, and to formulate research questions, combined with an understanding of what is relevant to study and how this should be done (Cercadillo, 2001; Peck, 2010). Guided by their research questions, scholars go to the sources, sources that should be critically examined and, after corroboration, presented as historical evidence (Wineburg, 1991, 1998, 2001). But the data from the past must be contextualized in an interpretive process, here

labeled historical empathy, defined as an understanding of the context and an ability to shift perspective (Lee & Ashby, 2001; Foster, 2001; Barton and Levstik, 2004). Historical empathy includes an ability to avoid what has been called "presentism," the tendency to judge the past according to present values and standards (Wineburg, 2001). Studying the past often gives rise to questions of continuity and change, as well as to questions of progress and decline. In the results from a historical study, the historian is supposed to use solid evidence and balanced interpretations of change—avoiding, for example, naïve nostalgia and the glorification of progress (Seixas, 1996; Lévesque, 2008). On the basis of theories of historical thinking, I consider historically navigating the past a process guided by considerations of historical significance, evidence, empathy, and change (Wineburg 1991, 1998, 2001; Seixas, 1996; Lévesque, 2008). These core issues in historical studies shape our understanding of the past (Seixas, 1996) and, consequently, the writing of history.

Materiality

Archives and technology are never neutral; the environment and material can support some thinking and behavior and suppress others (Derrida, 1995; Verbeek, 2005). As Bruno Latour (1999) has noted, knowledge production is a dynamic process whereby materiality influences representations, and in the scientific transformation of material into representations there is always a gap of uncertainty. In addition to this, Emily Robinson (2010, 503) has contended, "[t]he archive is the place where historians can literally touch the past, but in doing so are simultaneously made aware of its unreachability." Thus, for historians there is also a gap between the past and present that needs to be filled; fragments need to be put together, critically and theoretically interpreted, and contextualized. Based upon available material, the gaps need to be filled, making history an act of creative construction quite influenced by materiality. In this study, such sense-making activity based upon historical material is primarily analyzed by scrutinizing what Kress (2010) has called students' symbol-making—in this case, their writing of

history. In a multimodal world, we need to consider that materiality may influence knowledge and our understanding of the past. And digital archives can be quite different from traditional ones (Lee, 2010). The materiality of archives and sources may therefore influence the process of writing history.

Study Design, Data, and Methodology

Sweden has a long tradition of assigning students to write individual history papers based upon multiple sources in order to help them learn the skills and thought processes of a professional historian (Nygren, 2011a, 2011b). The importance of promoting students' skills to search for, critically analyze, and present information is emphasized in guidelines nationally and internationally, not least in the area of history teaching (Council of Europe, 2001; UNESCO, 2007). The present Swedish national curriculum states that it is the responsibility of each school to teach students the skills they need to "use books, library resources and modern technology as a tool in the search for knowledge, communication, creativity and learning" (Skolverket, 2013). Writing individual papers seems to be a rather common practice, at least in schools in Sweden and in the Nordic countries (Vinterek, 2010). This study is designed as an inquiry examining school practice in history teaching whereby students write individual papers as part of their ordinary school work in which digital tools are carefully introduced (Bass & Rosenzweig, 1999; Swan & Hofer, 2008).

Participants and assignments

The students who participated in this study, ages 18 and 19, were all upper secondary students in advanced elective courses in history. The teaching studied took place during their second and third (i.e., last) year of gymnasium (Swedish upper secondary school). In compliance with ethical recommendations, all students in the study were informed of the study's purpose and agreed to participate anonymously (Social Research Association, 2003; Swedish Research Council, 2011). In this article, their names have been changed to guarantee their anonymity.

Most of the students were interested in history, and their average grades were quite high (eight of the eleven students were given MVG [~A] in the courses studied). Their interest in history is indicated by the fact that they chose to take the advanced elective courses examined here. What these students were able to construe in their papers therefore highlights what is possible, not what just any student would do given a similar assignment. In two separate lesson units, the students were assigned to individually decide what to research, to formulate research questions, and to present their findings in a paper.

In the first assignment the students were assigned to use six weeks of course time, in an advanced elective course, to conduct their research (approximately 20 hours) to explore traditional archives and to study primary and secondary sources related to a freely chosen historical topic. Their findings were to be presented in a paper and in a seminar. After summer holidays, also in an advanced elective course, the same students were assigned to conduct a similar assignment—namely, to formulate their own research questions, use the digital archives holding digitized primary sources, and present their findings in texts and seminars. It was limited to a freely chosen topic within the theme the history of medicine, and the students were assigned to use at least one of four public databases relevant to historical research. Time was also in this case limited to approximately 20 hours of course time. The lesson unit was designed to fit into practice as an ordinary task, with the addition of digital archives (databases). The syllabi emphasize that advanced history courses should promote students' ability to individually formulate historical problems and critically examine and use different types of sources (Skolverket, 2000a, 2000b, 2012). Previous research examining school practices shows that Swedish students, especially in upper secondary schools, study sources and individually interpret and present historical accounts (Långström, 2001; Hansson, 2010; Nygren, 2011a, 2011b, 2012)

The archives that the students were introduced to in the first assignment comprised municipal and national records. The students visited and were guided in the archives. In addition, before they were given the first assignment, they were made familiar with the school

library, the school archive, and the municipal library. In the second assignment, they were shown where the digital databases could be found. The databases are comprehensive, well known, and often used by historians. Students could choose to use for instance censuses (Tabellverket), parish records (Indiko), provincial doctor inspections (Medicinhistoriska databasen) and scanned historical literature (Runeberg). All digital databases except Runeberg were initially developed for scholarly research.

Written and oral instructions to the students in both assignments made clear that they were to write their research papers using headings consistent with academic writing—namely, introduction, methodological considerations, results, and concluding discussion—a configuration quite similar to models of social scientific inquiry (Massialas & Cox, 1966; Beyer, 1971; Banks, 1999).

In both cases, an experienced teacher was available as a passive supervisor primarily asking the students questions about their process and answering questions of historical relevance for their work. No extra technological help was given the students in their use of digital databases. In line with the principles of constructivism, the assignment, teaching, and analysis were based upon a perspective that prioritizes students' learning in authentic and complex environments (Doolittle & Hicks, 2003; Lindquist & Long, 2011). In contrast to many assignments based upon theories of constructivism, in this case students were assigned to conduct their work individually. This approach was based upon the consideration that historians and students often write history individually.

Quantitative and qualitative analysis of papers

The focus of this study is students' knowledge construction when writing history and the identification of similarities and differences in their papers when the students used printed versus digitized historical data. With inspiration from complexity theory, the data in this study were analyzed in smaller and bigger entities, using different methods to gain a better grip on the dynamic system of knowledge construction (Ni &

Branch, 2008). As a first step in the explorative analysis of students' sign-making, the texts were analyzed in a quantitative way. The papers were quantitatively compared in terms of their use of tables and figures and their use of primary, secondary, and digital sources. The quantitative analysis also focused on the disposition and presentation of historical knowledge when students were assigned to use printed sources versus digital databases. To highlight similarities and differences in the distribution, the papers were analyzed using word count. Words have been counted in the paper as a whole—except for the front page, index, summary, and list of references—and in each paper the number of words in each section (the introduction, formulation of research questions, methodology, results, and concluding discussion) is counted separately. In the comparison, the quantitative distributions have been statistically compared in total and individually using repeated measures analysis of variance (Anova). To use quantitative methods on texts has well-known limitations, and, for instance, the number of words does not necessarily show the relation between the parts (Apple, 2008). In this study the quantitative analysis was followed by a more qualitative analysis to overcome these limitations, acknowledging that both numbers and words are needed to better understand the world (Miles & Huberman, 1994). The quantitative analysis, which highlights similarities and differences on a more aggregated textual level, was the port of entry into a more in-depth analysis of how students use and present historical sources.

The qualitative analysis of the papers was based on the core issues of significance, evidence, empathy, and change (Seixas, 1996). The question of significance is a major intellectual and practical venture in historical writing (Cercadillo, 2001). In this study the question of significance was analyzed in two ways so as to better understand the students' approach to the sources. First, I analyzed whether they take primarily a qualitative or a quantitative approach to the sources. Do they select a few sources to scrutinize, or do they prefer to use large sets of data to better understand the past? This is a classic debate in historiography discussed not least by Robert William Fogel and G. R. Elton in their famous book *Which Road to the Past?* (1983). Fogel and Elton labeled the qualitative

approach "traditional history" and the quantitative they called "scientific history" claiming that both approaches are valuable but have different potentials and problems. Another question within the issue of historical significance is that of having and stating a theoretical position. Since all history is construed under the influence of the historian's theoretical position (Jenkins, 1991; Tosh & Lang, 2010), it was also important to study whether the students use or problematize their theoretical positions.

The core issue of historical evidence was analyzed by scrutinizing whether students critically consider problems in their primary sources and to what extent they use historical data to support the historical claims made in their papers (Wineburg, 1991, 1998; Shemilt, 2001). When students contextualize their findings and present perspectives from the past, considering that the people lived in a different physical and ideological world, this was highlighted as historical empathy (cf. Davis, Yeager & Foster, 2001; Barton & Levstik, 2004; Brooks, 2011). If students' texts made temporal comparisons or reflected upon developments over time, this was noted as the consideration of change. All considerations of continuity and change, progress and decline were noted as change, as an overall concept for this kind of temporal reflection (Seixas, 1996; Lévesque, 2008).

On this basis, the students' texts were coded and categorized guided by five questions: In his or her paper, does the student (1) take a qualitative or a quantitative approach? (2) state a theoretical position? (3) methodologically consider and use primary sources as historical evidence? (4) contextualize the findings and use historical empathy? (5) consider and interpret questions of change? In the process of coding and categorizing the papers, each student's two papers have been read in juxtaposition, making it easier to find similarities and differences stemming from the alterations in the assignments, as opposed to differences between students' historical preconceptions or interests.

Scrutinizing knowledge construction in school gives us a better understanding of what students actually can construe when they are assigned to use printed and digital sources, as well as of the ways students

experience this as a part of their ordinary teaching. In the analysis of the texts, both quantitative and qualitative, it must be considered that the students might learn from their first experience of using sources and writing a paper. Limitations in students' freedom regarding themes and archives were also considered in the analysis, given that the second assignment may have influenced students to orient themselves toward historical writing influenced by ideas within the field of the history of medicine. It must also be considered that they might learn ways of thinking from other teaching that took place parallel to this study. Examining the complexity of education always holds a risk of contamination from factors outside the study, but following the group closely and scrutinizing each individual's knowledge construction provide important information about historical writing in complex environments. Because students have different preconceptions and skills, their knowledge constructions are primarily compared individually: each student's paper has been analyzed with respect to his or her other text.

Triangulation by observations, interviews, and questionnaires

Observations, interviews, and anonymous questionnaires were also used to triangulate the analysis of the students' papers. Observations focusing on the activity and communication in the process of selecting, analyzing, writing, and presenting were conducted during 14 hours. Data from the observations were noted in field notes, and presentations in seminars were videotaped (3 × 90 min.). The interviews were conducted in groups of four students after the second assignment had been finished (3 × 30 min.). Group interviews made it possible for the students to discuss different perspectives and complement each other (Cohen, Manion & Morrison, 2007). Their answers were noted and videotaped. The central question in the semi-structured interviews (Kvale, 1997; Merriam, 1998) was how they experienced using digital archives in comparison to traditional archives. Individual perspectives were also collected using questionnaires completed after the second assignment had been finished. Twelve students who participated in the teaching and both assignments filled out the questionnaire. One student who answered the

questionnaire handed in only one paper. Stemming from the fact that the questionnaires are anonymous (to allow for more critical comments), this student's questionnaire could not be excluded from the statistics. This student's perception of teaching is, however, relevant, even though her papers could not be analyzed. The questions, focusing on how they experienced the individual work and using primary sources, analogue and digital, contain forced choices on a graded scale of four options, followed by open questions. Data from observations, interviews, and questionnaires are used to complement the analysis of the papers. Complementing the students' sign-making as represented in their papers with interviews, observations, and questionnaires was a way to better understand the relation between students' sense-making and their symbol-making (Kress, 2003; 2010; Selander, 2007; Selander & Åkerfeldt, 2008). Acknowledging that the use of media is a social construct influenced by the user's perceptions and cultural codes made it important to relate the writing of history to students' experiences using various archives and sources.

Results

Going to the Sources?

In the first task, the students were assigned to use both primary sources when writing history. In paper 1 seven of eleven students did use some kind of primary source. The types of primary sources varied a great deal. Students used oral sources, old school textbooks, digitized television programs, and archival documents from a seventeenth-century witch-hunt. However, only three students used traditional archives. Four students did not follow the instructions and relied exclusively on secondary sources for paper 1.

In the second task, they were assigned to use at least one digital database containing primary sources. In paper 2, all the students used primary sources, and eight of the eleven used more than one archive. Most students (eight of the eleven) used the database containing censuses (Tabellverket), six students used the medical-historical database

(Medicinhistoriska databasen), four students used the scanned documents in Project Runeberg, two students used the database comprising parish records (Indiko), and one student used national governmental statistics from Statistics Sweden (SCB).

The use of secondary sources was, in general, greater in paper 1. Eight students used more secondary sources in the first paper, two students used the same number, and one student used more secondary sources in paper 2. A popular secondary source was the scholarly national encyclopedia (Nationalencyklopedin; NE). In paper 1, five students used NE as a reference, and in paper 2 six students did so; in both assignments, students who used NE consulted it in digital format, not the printed version available in the school library. Interestingly, no student referred to Wikipedia, most probably because the teachers had questioned its trustworthiness.

The use of secondary literature decreased substantially when the students were assigned to use digital historical databases. In paper 1, all but one student used books, printed articles, and even a doctoral thesis as secondary sources. In contrast, in paper 2 only three students used print references. The total use of print references in paper 2 decreased to less than one-third that in paper 1 (31 percent). Students did use digital references in paper 1, but their use of these sources more than doubled in paper 2. It is clear that more extensive use of digital archives and digital references was accompanied by a more limited use of libraries and print references.

Fewer Words and More Statistics

In a comparison, the number of words in the papers decreased when the students used digital databases. The total word counts in paper 2 correspond to 83 per cent of the words used in the first traditional assignment. An individual comparison of the students' papers highlights that eight of the eleven students used more words when writing papers based on printed sources (see Appendix 1).

There is a clear correlation between the students' use of words and their use of statistics. The eight students whose word counts decreased

used more statistics in paper 2. At the same time, the word counts increased for the three students who did not use statistics in paper 2. In seven of the papers, more extensive use of statistics was manifest in tables and figures. Two students used photographs as illustrations in their first paper; in paper 2, they used instead statistical tables and figures.

Disposition of Texts

In both assignments the students were told, orally and in writing, that they were to write a paper following a standard format that included an introduction (containing a formulation of purpose and methodological considerations), a presentation of results, and a concluding discussion. All students managed to follow these instructions. Counting the words in the papers reveals some similarities and differences between paper 1 and paper 2 (Table 1).

	P1 Intro	P2 Intro	P1 Purp.	P2 Purp.	P1 Meth.	P2 Meth.	P1 Res.	P2 Res.	P1 Concl.	P2 Concl.
Ben	9%	8%	4%	13%	8%	13%	41%	56%	37%	11%
Gia	6%	2%	6%	3%	7%	15%	62%	55%	19%	25%
Hanna	0%	4%	1%	4%	16%	15%	66%	30%	17%	48%
Jenny	3%	3%	2%	2%	4%	11%	73%	44%	18%	39%
Lars	10%	5%	5%	6%	8%	21%	45%	47%	32%	20%
Lisa	3%	3%	2%	3%	11%	19%	62%	46%	22%	29%
Nelly	5%	3%	3%	2%	9%	10%	64%	56%	18%	29%
Sara	2%	5%	2%	2%	12%	12%	66%	63%	18%	18%
Sofia	3%	6%	3%	3%	5%	18%	76%	53%	14%	20%
Willy	6%	6%	2%	7%	5%	25%	78%	35%	9%	26%
Åsa	12%	6%	8%	6%	12%	7%	49%	55%	19%	26%
Mean	5%	5%	3%	5%	9%	15%	62%	49%	20%	27%
sd	4%	2%	2%	3%	4%	5%	12%	10%	8%	10%
p(t-test)	0.504		0.293		0.022		0.039		0.194	

Table 1. Distribution of words in per cent in students' papers.

Note: P1=Paper 1, P2=Paper 2, Intro=introduction, Method=Methodological considerations, Concl=Concluding discussion

The papers' introductions hold a total of 5 per cent of the words in both paper 1 and paper 2. The students, in general, used more words in paper 1, and they also used, in total, more words in their introductions to paper 1. The individual length of introduction varied a great deal among the students. One student (Hanna) did not have an introduction; instead, she started paper 1 with the purpose of her study, whereas another student (Lars) used 282 words in his introduction to paper 1. By percentages of the entire paper, five students used more words in their introductions to paper 1 than in those to paper 2, three students used the same percentage of words, and three students used a greater percentage of paper 2 for their introduction (see Table 1).

The number of words used to formulate the purpose of the study and to ask probing research questions increased generally but not significantly in paper 2, with an average of 117 words in paper 1 and 128 words in paper 2. Variations in the students' use of words are fewer in comparison with their use of words in the introduction. Even if the formulation of the research was generally more extensive in paper 2, three students' word counts decreased in paper 2, three students used a similar per cent in both papers, and five students used more words in their formulations in paper 2 (see Table 1).

The methodological considerations show a clear difference between uses of words in the papers. Eight of the eleven students used more words, in percentages and numbers, in paper 2. One student (Sara) used the same percentage, and only two students used fewer words for the methodological considerations (see Table 1). The use of words in percentages increases from 9 to 15, an increase that is significant ($t(10) = -2.714$, $p < .05$). This indicates that in the second assignment, using digital databases, the students discussed their sources and the purpose of their research to a greater extent than they did when they were using primarily print sources and traditional archives.

The results section is the most extensive part of all the students' papers. In total, this was the section in which all but one student in paper 2 (Hanna) used the most words. This part also shows the greatest decrease between paper 1 and paper 2, from 62 per cent to 49 per cent of the entire paper. The number of words used in this section dropped, on average, from 2,190 to 1,377. Only three students used more words to describe their results in paper 2, two of them being the same students (Lars and Åsa) who did not use statistical tables or figures in paper 2. This significant change in the result sections ($t(10) = 2.467$, $p < .05$) indicates that the students used more space for other parts of the paper when they used digital primary sources and databases, along with more statistics.

As a percentage of the total word count, the concluding discussions are more extensive in paper 2. Eight of the eleven students increased the percentage of words they used for evaluating and analyzing their findings and presenting their results. Two students (Ben and Lars) used a smaller percentage for this in paper 2, and one student (Sara) used approximately the same percentage of words (see Table 1). Notable is that the difference between the use of words in the results and concluding discussion sections decreased significantly ($t(10) = 2.271$, $p < .05$). In general, the students used fewer words describing and contextualizing their results and more words analyzing their results in paper 2.

In sum, the distribution shows changes toward a greater use of words in sections of their papers in which students discuss (1) their research problem(s), (2) methodological issues about the study and sources, and (3) possible conclusions stemming from the results. The interpretative process of knowledge construction in history is given more space in paper 2. However, the presentations of the results, in general, grew smaller, showing a shift toward more statistics and fewer secondary sources. This indicates a more elaborate focus on the context in paper 1.

Core Issues

My qualitative analysis of the papers shows that the students addressed the core issues of significance, evidence, empathy, and change in at least

one of their papers. The issues the students focused on in their papers are presented in Table 2.

	Paper 1, traditional archives & sources						Paper 2, digital archives & sources					
	Qualitative	Quantitative	Theoretical position	Evidence	Empathy	Change	Qualitative	Quantitative	Theoretical position	Evidence	Empathy	Change
Ben	•		•		•			•		•		•
Gia	•				•	•		•		•		•
Hanna	•		•		•	•		•		•		•
Jenny	•			•		•		•		•		•
Lars	•		•		•			•		•		•
Lisa	•		•	•	•			•		•		•
Nelly	•		•	•	•		•			•	•	
Sara	•		•	•	•	•	•		•	•		
Sofia	•		•	•	•	•		•		•		•
Willy	•				•	•		•		•		•
Åsa	•				•			•		•		•

Table 2. Core issues of historical studies addressed in students' papers

Qualitative and Quantitative

In paper 1 no student conducted a study that could be categorized as quantitative. In paper 2, using databases, nine of the eleven students took an approach toward the quantity of the historical phenomena they studied (see Table 1). In paper 1 they looked closely at a limited number of sources, whereas in paper 2 the same students used statistics from the past and created their own statistics—of, for instance, mortality and industrialization—from primary data available in the databases.

In paper 1, historical textbooks, female chefs, and policemen have been studied qualitatively and made relevant in relation to present-day society (Hanna, Jenny, Gia, Sara). Charles the Great, a legendary songwriter, migration, and the local hockey team are all studied as important phenomena in a contemporary context (Lisa, Åsa, Sofia, Lars). The profound influence of a local witch-hunt, as well as the durability of ancient architecture, was also of interest (Ben, Willy). In both papers students often focused on social history—for instance, the social life of farmers in the eighteenth and nineteenth centuries (Nelly P1), the treatment of the mentally ill (Sara P2), and the mentality of migration (Sofia P1).

Theoretical Positions

Six of the eleven students presented a theoretical position in their first paper but not in their second (see Table 1). Theoretical positions such as critical feminist perspectives, materialistic approaches, and a focus on the history of mentalities are presented in paper 1; this cannot be found in paper 2, in which most students instead discussed primarily how they collected data (search terms) and calculated their data, making it reliable as evidence. Only one student (Sara) presented theoretical orientations in both papers. Not stating a theoretical position and focusing on statistics and evidence is, of course, also a theoretical position. What is notable is that students who are aware and capable of making theoretical and ideological consideration did so much less when using digital data. Analyzing their texts, I find that objectivity and empiricism become the ideology in the students' papers when they have used statistics from databases. This theoretical position is, however, not presented or discussed by the students, who instead focused their methodological and theoretical considerations in paper 2 on sourcing and corroborating their historical evidence.

Evidence, Empathy, and Change

In both papers, all the students presented their material in some manner, but the quality of sourcing differs between the papers. In paper 1 six of

the students were very limited in their critical presentation of their sources. Other students engaged in more thorough scrutiny of texts regarding the credibility of the sources, considering aspects such as tendency, dependability, and closeness, much in line with the heritage of Leopold von Ranke and the Swedish critical tradition of Lauritz and Curt Weibull (1965). Considerations of tendency are especially evident in paper 1 but not in paper 2, probably because most students looked at quantitative data in paper 2 and conducted a more qualitative textual analysis in paper 1. Sourcing and corroboration when considering problems of missing data and problems of comparing data from different archives and documents are much more common in paper 2; for instance, in paper 2 eight of the eleven students problematized the way they solved the problem of missing data. They corroborated existing data and used calculations over greater periods or changed their focus to make their study better fit the data.

My qualitative reading of the students' papers highlights that paper 1 holds a greater variety of sources (e.g., oral sources, multimedia, old textbooks), making sourcing there more diverse than that in paper 2. Paper 2 focuses primarily on statistics and turns sourcing into a matter of evidence and facts. Most students who demonstrated a more qualitative, interpretive perspective on historical sources in paper 1 presented a more quantitative, empirical methodology in paper 2.

Thus, the shift toward more historical evidence based upon statistics that my quantitative analysis indicates is confirmed in the textual analysis. A stronger focus on historical evidence is evident in eight of the eleven students in paper 2. However, the extensive use of quantitative data also seems to reflect an orientation away from historical empathy. Eight of the students focused primarily on issues of empathy in paper 1. They presented historical accounts considering ways the context differed from today's, stating, for instance, "what is considered good today was not necessarily considered good back then" (Lisa P1). A sense of otherness and shared normalcy (Barton & Levstik, 2004) is evident in studies of the warrior-king Charles the Great, legendary hockey players, and farmers (Lisa, Lars, and Nelly, respectively). But when using the

digital archives to produce paper 2, students instead focused more on evidence and change. For instance, Sofia presented empathetic and nuanced perspectives on migration in the seventeenth century after analyzing newspapers and diaries in paper 1, but in paper 2 when she used statistics, individual perspectives and empathy fall into the background behind data about tuberculosis and calculations of mortality changes in percentages.

Studying progress and decline appears more often in paper 2 than in paper 1 (see Table 2). Statistical change in percentages based upon quantitative data is considered in ten of the eleven papers; the possibility of comparing data over time is central in these papers. For instance, changes in child mortality and different types of diseases interested students. Strong statistical evidence for change is presented, but the numbers are often poorly contextualized. In paper 1 six students addressed the historical issue of change, such as changes in culture and textbooks. Students addressing issues of change in paper 1 did this primarily based upon formulations in the sources. Notions of change are, in general, based upon a smaller set of evidence in paper 1 but are better contextualized there than they are in paper 2; again, the tendency is to move away from historical empathy toward more statistical evidence.

Students' Perceptions

The students said that they had previous experiences from individual work and writing papers, both in history and in other school subjects. Using archives and primary sources, both print and digital, were, however, a new experience to them. The observations of the students' activity and communication when writing history highlight that processing and writing history is an inner and individual process. Most students were quite occupied with reading and writing. It must be noted that the students did a great deal of reading and writing at home, and this process was not observed. Judging from the discussions in seminars and interviews and from responses to the questionnaires, using archives was a positive experience for most of the students, but it was also challenging. Comparing it to using traditional archives, most students

stated that it was *very good* (six students) or *good* (three students) to use digital archives. Three students stated that it was not as good as using traditional archives. And although in general they appreciated the opportunity to use archives and primary sources to write history in these assignments, the students also stated that they enjoyed other teaching even more, such as lectures, readings, and seminars.

The easy access to digital archives was underlined in the questionnaire responses. For instance, one student stated that "it was great to have direct access to sources without having to go to the archives or look for books." Another student emphasized that "information was easy to find and relevant. It was easy to find a topic to study." Primary sources were considered "better and more accurate than the secondary sources we usually use." One student who appreciated working with historical evidence rather than with interpretations of the past found that it "was great to get the facts in numbers."

The positive reactions in the interviews mirrored in many ways the written responses; for instance, students indicated that it was "a luxury" to have the sources online (Lars). That statistical data could be constructed and compared was perceived as positive. Using a great number of primary data made it easy to see that some data were missing and to identify the limitations of what can be studied. Going to the sources and finding interesting results were perceived as motivations to use databases in future studies. Even though most students talked about statistics when discussing the databases, students also underlined the fascinating and gory details available in, for example, autopsy reports, stating that one could lose oneself in "dizzying readings" of doctors poking holes in corpses.

Although the databases were easy to access, six students stated in the questionnaire that they found them more or less complicated. One student reported that it was "fun at the end of the day, but a little difficult at first when I didn't know how to use databases or handle the information." In all the interviews, students stated that using statistics, tables, and figures when writing history was a new and somewhat complicated experience. Finding gaps in the primary sources was a good

thing when it comes to being critical about the sources, but it was also perceived as frustrating (Gia). Even if it was easy to find the data, students found that it was not always easy to make comparisons since comparable data was not necessarily available (Lisa).

Further, students stated that digital archives and the great amount of data can be confusing. It was hard to place the data in the digital space. One student felt a bit lost in the virtual world and struggled to "keep track of all the sites I visited" (Sofia). Paradoxically, some students had a hard time finding the boundaries of data, while others found themselves limited by the databases. In the questionnaire one student stated that he or she felt "very limited by the scanned sources in comparison to visiting an actual archive," but other students found it overwhelming to have access to large data sets; Sofia found it problematic that the digital archives stimulate one to gather "too much data".

Concluding Discussion

The results of this study following the long-term processes of students' historical writing highlight a number of notable findings and raise questions for the future. One notable difference between using traditional archives and digital ones is that more students actually "visited" the digital archives. Evidently, when they were supposed to go to the traditional archives, not all the students went to the sources, and they used far fewer primary sources. That more students used primary sources in greater numbers from the digital archives when writing paper 2 can be at least partly explained by online accessibility. The path of least resistance previously noted by Milson (2002) might have influenced students against visiting the traditional archives when writing paper 1; the phenomenon might also explain the lack of secondary literature in paper 2. When sources are easy to find digitally, resistance against going to the library seems to increase. Students' responses underline the "luxury" of having sources available online. But this positive perspective on digital archives was not shared by all students. The ambiguous nature of digital archives is highlighted by the fact that one student may perceive digital archives as more limited than traditional archives,

whereas another student instead may find herself lost in large data sets. Online archives might be perceived as more complicated than written documents and library books owing to their lack of coherent narrative (cf. Lévesque, 2009). Unclear boundaries and massive amounts of data are perceived as a limitation by some students and as a potential by other. This underlines that students have different preconceptions and perspectives about visiting the archives, both traditional and digital. However, when they use archives, both traditional and digital, students tend to focus more on the social history of ordinary men and women rather than on power politics. Considering the diversity of topics and perspectives in the students' papers, it is evident that using traditional and digital archives offers many possibilities for making history lessons a rich experience for students.

The outline of the papers and the presentation of historical knowledge changed, quantitatively and qualitatively, when students used different types of material and archives. Using archives with easy access to large data sets and statistics seems to have influenced the way students wrote history. Digital databases appear to have stimulated a quantitative approach and a focus on historical evidence. A more qualitative, hermeneutic analysis of a few documents and formulations was replaced by corroboration of larger quantities of primary data. When using traditional archives, the students tended to focus more on limited material and on interpreting it from a more clearly stated theoretical approach. Perhaps hard, quantitative data do not easily lend themselves to historical contextualization and theoretical perspectives. There is a notable difference in the way theoretical considerations are backgrounded when digital data are used as evidence. Students who are evidently capable of theoretical consideration when using traditional archives or secondary sources do not consider their own theoretical positions when they focus on quantitative digital data. The more humanistic tradition of historical studies is replaced by a more social scientific approach in which the past is studied by using and comparing statistics. Sourcing and corroboration are more evident when students use digital data, and this comes at the expense of greater theoretical

consideration of critical perspectives on history. The way students write history seems to indicate a shift from historical empathy (Barton & Levstik, 2004) toward a greater focus on historical evidence (Wineburg, 2001). The analysis of the students' papers clearly shows that the core issues in focus can shift when students shift archives and material. There are also methodological differences in the ways students may address the core issues of historical study. Quantity and evidence rather than close reading and historical empathy seem to compose a data-driven effect in students' historical knowledge construction when they use digital archives. This is evident in several ways, not least of which is the way the students analyzed change. Scrutinizing formulations in order to study change in paper 1 was replaced by compiling quantitative historical data and statistics in order to study change in paper 2. Is it perhaps an automatic reaction to first try to organize big data? Then, in a second phase, can students be more critical? Or is it, in contrast, easier to critically scrutinize only a few documents and formulations?

The shift toward a quantitative social science history can primarily be explained by the materiality of the archives and sources. The learning period between the two papers did not have a more quantitative or less theoretical approach, at least not judging from the syllabus, highly theoretical teaching material, and observations. Rather, the opposite is true: a more theoretical and hermeneutical syllabus and teaching material characterized the second elective advanced history course (Skolverket 2000a, 2000b), in which students wrote paper 2. Perhaps this shift can be explained in part by the theme of the study that the students conducted. For instance, demographical history using parish records and censuses has a tradition of quantitative history (Anderson, 2007). But an analysis of recently published historical research based upon the same databases the students in this study used indicates that historians today use the databases to write history from many different theoretical and critical perspectives—often highlighting marginalized groups by combining quantitative data and qualitative analysis (Nygren, Buckland & Foka, 2014).

The digital archives in this study contain both narratives and numbers, but evidently students ended up focusing primarily on quantity. Even students intrigued by gory details in the sources still turned to statistics when writing their papers. In future research it would be most interesting to more closely study the details of how different digital archives may influence the users' knowledge construction. The interface, presentation, and organization of material in the digital archives in this study could be directing the students' understanding of the past; thus, other digital archives could perhaps stimulate different types of navigating toward a more qualitative approach and greater historical empathy.

Perhaps historians in general have a better theoretical and critical awareness than students do, but current debate in the digital humanities highlights that this may not be the case. Andrew Prescott (2013) has criticized research in digital history and the digital humanities for having a view of knowledge that is too positivistic, where access to data steers research. Being directed by accessible data entails the risk of neglecting critical perspectives and alternative paths to the past. Instead, research should be directed by qualified research questions (Fish, 2012). And as Johanna Drucker (2011) has pointed out, large data sets, tables, and diagrams may very well create an illusion of objectivity. Students' lack of theoretical considerations and critical perspectives could, at least partly, be explained by these problems related to the digital humanities. This highlights the importance of humanistic thinking in a digital era. Students need to be able to critically evaluate digital information and to avoid being seduced by big data and digital presentations. From a historiographical perspective, it is interesting to consider whether digital history will push toward an empirical turn and the methods of social science history. Is it possible that digital history (as part of the digital humanities) will make history less humanistic?

Bearing in mind the double nature of history as a part of both the humanities and the social sciences (cf. Stanley, 2005), it is possible that different environments and materiality may stimulate different types of disciplinary thinking (Gardner & Boix Mansilla, 1994). Reflective

teachers (Schön, 1987) can design active history-teaching activities that stimulate humanistic and social scientific disciplinary thinking. Primary sources can stimulate hermeneutic inquiry and historical empathy, and large databases can now be used by students to study history in new ways. New technologies evidently make it possible for students to consider disciplinary questions of sourcing and corroboration when collecting and comparing historical data. This study indicates that students can follow different roads to the past. Following both the more "traditional" road of G. R. Elton and the cliometric, "scientific" road of Robert William Fogel (Fogel & Elton, 1983) will most probably provide students with a wider historical understanding.

Traditional and digital archives can be used in history education, but the potential and the challenges of this new approach need to be further studied to ensure that students will encounter history's richness. Developing students' ability to critically examine different perspectives and sources is central in history teaching (Bain, 2006). The finding that students present their theoretical positions when using traditional archives but not when using large digital data sets highlights that teachers need to consider training students' historical thinking in some new ways. Historical sources differ in traditional media and new media; the need to teach students to use both makes history even more important as a school subject that promotes critical thinking. History teaching can thus stimulate a habit of mind that students can use to critically evaluate the credibility of digital media, data, and statistics (Baildon & Damico, 2009). To make this possible, more research must consider the complicated reality of knowledge construction and historiography in print-based and digital practices.

As Jacques Derrida (1995, 12) has emphasized, an archive is a construction both "[r]evolutionary and traditional … It keeps, it puts in reserve, it saves, but in an unnatural fashion." Going to the archives is actually not a visit to the past but rather an attempt to use fragments from the past to make sense of the past. This sense-making activity is central to the work of historians, and the materiality of the archives and the sources can stimulate students' creative symbol-making, their writing

of history. Preparing students to live in an information age also calls for schools to stimulate historical thinking that can help students navigate in a digital world—navigation based upon quantitative and qualitative analysis, evidence, and empathy. Thus, preparing students for the future might very well start in the historical archives, both traditional and digital.

Acknowledgments

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Appendix 1

	Paper 1	Paper 2
Ben	2557	2117
Gia	3431	2565
Hanna	5462	3077
Jenny	6832	6392
Lars	2692	2730
Lisa	3429	3073
Nelly	1475	2791
Sara	3996	3031
Sofia	4181	2135
Willy	1953	1510
Åsa	1338	1768
Mean	3395	2835
sd	1681	1296
p(t-test)	0.103	

Table 3. Use of words in students' papers