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# Visual Sources and Historical Thinking in Higher Education

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*Abstract: In this paper we argue that a meaningful perspective for framing the development of historical thinking is needed and suggest the expertise approach for this purpose. In an interview study, 12 master's and 11 bachelor's students of history were invited to name themes for two series of historical images and reflect on the images and their conclusions. Only eight students explicitly demonstrated what we define as advanced historical thinking: instead of simply describing the sources, these students used both conceptual and analytical tools, and evaluated the sources critically. We suggest that learning history at university should be a more frequent topic of research in history education and that the scaffolding of history students on different levels of expertise should be taken more into account.*

KEYWORDS: COLLIGATION, ENCAPSULATION THEORY, EXPERTISE, HIGHER EDUCATION, HISTORY EDUCATION, VISUAL SOURCES

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## Introduction

When considering the learning and teaching of history, it is important not to forget the essential role that university plays: it is at university that future historians focus on training their skills in historical analysis and interpretation and, moreover, construct their conceptions of what history is and why it is important. Later on, when some of these historians take on teacher training or begin to teach at university, their ideas about history also affect their conceptions of how it should be taught and learned. However, despite their significance, *what* is learned at university and *how* this learning gradually takes place has rarely been the target of research in history education (see Díaz, Middendorf, Pace, & Shopkow, 2008; Ludvigsson, 2012; Nye et al., 2011; Pace, 2004). In addition, although historical thinking is said to be a form of expertise that requires reasoning strategies and analytical skills that are specific to history (e.g., Limón, 2002; Voss & Wiley, 2006; van Drie & van Boxtel, 2008; Wineburg, 2001), such strategies and skills seem to be rarely explicated at the academy. This, in turn, may lead to a mismatch between the views of the students and the staff on the nature of the discipline (Díaz et al., 2008; Nye et al., 2009; cf. Wineburg, 1991). In a large-scale Australian study (Nye et al., 2009; 2011), for instance, history students' views on how to develop their historical thinking emphasized the use of secondary historical sources instead of analyzing and interpreting primary ones, implying that the contrary view of the university staff had not been fully recognized by the students.

In this paper we hope to point out how getting a grip on the historical thinking of future historians can inform their educators about the support the students require in order to develop this domain-specific set of skills. We specifically address what we find to be two major areas where research on learning history at university should be refined. For one, we argue that still not enough is known on one basic element of historical thinking, namely history students' skills in performing historical analysis, and especially their ability to operate with *visual* historical sources. Such sources that often relate to cultural topics in historical research are more and more available thanks to the continually increasing number of digital data sets, and it is our impression that history students are using such material increasingly in their theses and other work. However, we doubt whether all university departments are meeting the resultant need for the development of skills in handling visual historical data. For another, in our view, the reported empirical studies on working with historical sources leave us with an incomplete understanding of historians' analytical skills as a result of the lack of a theoretical framework on what it actually means to be or act like a professional historian. Thus, we also argue for a need to find a meaningful way to frame the development of students' historical thinking and suggest the expertise approach for this purpose.

To begin, it is understandable that prior empirical studies on performing historical analyses have typically asked historians to examine textual material (e.g., Leinhardt & McCarthy Young, 1996; Reisman, 2012; Wineburg, 1991), as this discipline has traditionally emphasized the use of textual sources (Ankersmit, 1995; Werner, 2002).

There are, however, a number of studies that deal with children's and adolescents' skills in interpreting and making inferences about the past through historical images. These studies have shown that even primary school children are able to sequence pictures in chronological order and distinct older pictures from newer ones: in addition, although children's and adolescent's knowledge tends to be fragmentary, anachronistic, and they lack exact historical concepts and contextual knowledge, when constructing interpretations, they still apply the ideas of the past they happen to have (see, Fasulo, Girardet, & Pontecorvo, 1998; Foster, Hoge, & Rosch, 1999; Harnett, 1993; Levstik & Barton, 2008; van Boxtel & van Drie, 2008; van Drie & van Boxtel, 2012). Nevertheless, in this text-dominated discipline, it is not yet clear to what extent university history students possess such analytical skills. Based on an overview of several studies (focusing mainly on the use of textual sources), Voss and Wiley (2006) generally note that some skills of performing professional-like historical analysis indeed start to develop at university. Thus, thinking of visual sources one could assume, using Werner's formulation (2002), that while gaining in historical concepts and contextual knowledge (cf. the remark on youngsters' analytical reasoning mentioned above), history students' analytical skills should gradually extend beyond Werner's first, manifest level to the extraction of associative and preferably even evaluative meanings. These would then, similarly to working with textual sources, include taking into account how, and under which restrictions, interpretations on the past can be made based on a specific source (cf. Wineburg, 2001).

In our second argument, we emphasized the need to have a framework to which to align such assumptions on the gradual development of analytical skills in history, and we propose that increased proficiency in this discipline can usefully be examined from the general perspective of expertise development. Within the psychologically oriented research tradition focusing on expert behavior, the domain of history, however, has gained relatively little attention (for the apparently most comprehensive review on expertise in history to date, see Voss and Wiley, 2006). Thus, in order to expand our understanding on the route towards expertise in historical thinking, we apply the theoretical constructs that have been developed in other, more researched, areas of expertise. As our empirical data focuses on the analysis of historical images, we frequently turn to research on expertise in medicine, where interpreting visually presented information and expertise development have both been studied relatively extensively (e.g., Krupinski, 2010; Norman, Eva, Brooks, & Hamstra, 2006).

One of the most influential theories on expertise in medicine was suggested initially by Boshuizen and Schmidt in 1992. This so-called *encapsulation theory* presents the idea of a three-stage model of medical expertise development consisting of the acquisition of (a) basic science or biomedical knowledge (i.e., causal mechanisms regarding the functioning of the human body) as well as (b) practical (clinical) experience and, finally, (c) the integration of biomedical and experiential knowledge that results in knowledge encapsulation. By applying encapsulated medical concepts, expert diagnosticians are able to integrate the available biomedical information into plausible diagnoses. In short, then, this theory aims to explain how experts are able to quickly retrieve relevant information out of their extensive

knowledge base. This, in practice, leads to increase in speed and accuracy of the diagnostic processes, making experts superior to novices and intermediates in this respect.

To be sure, the idea of comparing the analysis of medical and historical images may, at first sight, seem far-fetched, but in practice, there are indeed likenesses in how experts in both domains operate. A radiologist, for example, who discovers an abnormality in an X-ray image, corroborates this visual evidence with clinical findings and patient data. This type of “sourcing” – or understanding the origin and purpose of documents, which is familiar to all historians – is becoming increasingly important also in medicine: understanding how medical images are created, as well as their limitations, distortions, and artifacts, is a crucial part of the diagnostic process (Lesgold et al., 1988). In history, too, such tools of sourcing, corroboration and contextualization (Wineburg, 1991) should become more and more readily available with increasing domain-specific expertise.

The parallels may be taken even further. In fact, the idea of an expert doctor applying encapsulated knowledge resembles, to us, the much older idea of *colligation* as one of the main tasks of the historian (Walsh, 1967; see also Lee, 2005; 2011; Lévesque, 2009). According to Walsh (1967, 65), colligation is “the procedure of explaining an event by tracing its intrinsic relations to other events and locating it in its historical context”; it is what historians *do*, a unique feature of professional, or expert, historical thinking—the creating of historical “diagnoses”. Following this line of thought, then, in the case of analyzing visual sources, the historian’s act of colligation could be seen as the outcome of an encapsulation process in which information from two, though intertwined, still theoretically separable knowledge sources, (a) *knowledge of historical concepts* and (b) *practice-based knowledge of how interpretations of the past may be made based on visual sources*, are integrated (cf. Voss & Wiley, 2006; Wineburg, 1991).<sup>1</sup> If so, one may conclude that it is exactly the extent of this kind of encapsulation that differentiates more advanced historians from less advanced ones.

This type of a distinction is not unfamiliar in history education, either, but can be aligned with, for example, what van Drie and van Boxtel (2008) describe as substantive concepts and meta-concepts. According to these authors, substantive concepts are (often) abstract and theoretical, and denote a complex network of interlinked phenomena. Meta-concepts, on the other hand, are heuristics that guide “the description, comparison, and explanation of historical phenomena and the use of sources in an argumentation” (van Drie & van Boxtel, 2008, p. 101). Thus, gaining such meta-concepts, and the ability to effectively use them, equals here to the gaining of the practice-based knowledge base, as these concepts are best enriched through experience in working with historical sources. However, we propose that the encapsulation approach helps us to detail and investigate the relationships between these different types of knowledge, and perhaps also ease the examination of steps towards proficiency in performing historical analysis, as it has done in medicine.

To further clarify the potential roles of the conceptual and practice-based knowledge in expertise development, we yet again turn to medicine for examples.

Now, it is often said that part of the historians' analysis is the integration of the obtained information into coherent narratives "that provide a reasonable account of particular historical events and actions" (Voss & Wiley, 2006, 573; cf. Walsh, 1967). Perhaps coincidentally, Schmidt and Rikers (2007) use similar language when they argue that the final stage of medical expertise is characterized by the formation of *illness scripts*, which are also narrative structures containing "a wealth of clinically relevant information about the enabling conditions of disease, as a product of growing experience with how disease manifests itself in daily life" (p. 1135). Importantly, while biomedical knowledge enables causal reasoning, it is the *practice-based* knowledge about the enabling conditions that improves diagnostic accuracy and speed by guiding the diagnostician toward the most plausible categories of disease. In light of this we suppose that when analyzing historical images, too, encapsulated knowledge has much to do with the understanding of the "enabling" conditions of a historical source, as the historian should be aware of the conditions affecting the sources nature and quality. This awareness would then allow the historian to critically examine the source and see beyond it all the way to the researched phenomenon (cf. Werner, 2002).

In the following study, our aim was to address the two main issues described above: to study history students' analytical skills while investigating visual sources, on the one hand, and examine the encapsulation theory as a potential explanatory framework with which to align our observations, on the other. Thus, we first ask (1) to what extent history students, in their interpretations of historical images, demonstrate colligation as Walsh (1967) defined it; that is, to what extent they express attempts to identify relevant historical processes depicted by the images, and whether such expressions appear to be affected by the stage of their studies or image contents. Second, we ask (2) whether the students explicitly evaluate the visual sources they encounter and third, (3) whether the given responses in total indicate of knowledge encapsulation. Finally, we discuss the educational implications of this empirical study.

## **Methods**

### **Participants**

A total of 23 students at the University of Turku volunteered to take part in the study. Of the participants, 12 were master's (MA) students, who had studied history at the university for three to six years and also completed their bachelor's theses. The remaining 11 participants were bachelor's (BA) students (10 first-year and one second-year student). Nine of these students were majoring in history, while two were history minors. The data collection was administered in November<sup>2</sup> (the academic term beginning in September); therefore, 10 of the bachelor's students had begun their history studies at the university only a couple of months prior to the study.<sup>3</sup> The participants were recruited by the first author giving a short presentation about the study at the beginning of a lecture (in a compulsory introductory history course) and at

two master's thesis seminars. In addition, students were informed about the study by e-mails that were sent to university mailing lists. Information about the study mentioned its focus on historical images and the use of eye-tracking methodology in the measurement session. A book donation by Turku Historical Society was raffled among the participants following the data collection.

## **Stimuli**

The stimuli consisted of two series of three historical images that were displayed to the participants one by one on a computer screen. All images (drawings, paintings, and photographs from the 19<sup>th</sup> and early 20<sup>th</sup> centuries) were presented in grayscale format and with slightly modified contrasts in order to minimize differences due to variability in coloring and shades. The original images are available from the first author.

The two image series were designed to represent different levels of topic familiarity for the study participants. The images in series A, here called "Female Workers", presented several people, most of them women, at work in a manufacturing or factory-like large indoor space. Differences in the workers' equipment and clothing in the three pictures referred to changes in industrialization. This historical era is a standard topic in history studies in Finnish secondary and high school. In series B, here called "Doctors and Infants", the center of all the images contained a male doctor and a woman holding a child, the doctor performing a medical procedure (a vaccination or an examination) on the infant. This topic was assumed to be less familiar to the participants. Furthermore, only the third image presented the doctor in a white coat and in a hospital-like room, whereas the other two images, representing earlier historical periods, presented a house call (first image) and a public reception at a coffee house (second image). In both series the images were of indoor spaces, contained several people and details (e.g. objects.), and apparently represented different historical eras. Neither the names of the artists nor the dates for any of these images were given to the participants.

## **Procedure**

The individual interviews were performed by one of the researchers (the first or the second author). The research procedure in all cases followed the same protocol (see Table 1). The order of the participants was quasi-randomized by allowing them to choose the time for their measurement session from a list of available alternatives and rotating the order in which the two target series were presented.

Background information on the participants' history studies and experience related to working with visual sources and the arts was collected using two questionnaires presented before and after the session (Steps 1 and 6; see Table 1). (As these questionnaires did not bring forth any clear-cut distinctions between participants, the questionnaire data will not be analyzed in this report.) Following the first questionnaire, the participant was made familiar with the research protocol through a practice stage (Step 2). Here the participant was presented with three photographs

containing two or more people and related to European political history. The instructions and images appeared on the computer screen exactly as for the target series in Steps 3 and 4. In addition, the stimulated interview protocol was familiarized to the participant by interviewing the participant on the first image of the practice series (for the instructions and interview questions, see Appendix 1).

TABLE 1.

*The research protocol*

Step 1	Questionnaire 1: previous studies
Step 2	Practice stage: (a) viewing three images for 2 s each and naming a theme (b) viewing three images for 8 s each and elaborating on the theme (c) stimulated recall interview on the viewing of the first image
Step 3	Series A or B: (a) viewing three images for 2 s each and naming a theme (b) viewing three images for 8 s each and elaborating on the theme (c) stimulated recall interview on the viewing of all three images
Step 4	Series B or A: (a) viewing three images for 2 s each and stating a theme (b) viewing three images for 8 s each and elaborating on the theme (c) stimulated recall interview on the viewing of all three images
Step 5	Final interview, including a question on the type of information transmitted by one particular image
Step 6	Questionnaire 2: studies and activities related to visual sources and arts

The main task during the viewing of the target series (Steps 3 and 4) was to determine a theme for both sets. First, all images of one series were presented for two seconds each, and, after the three images had been viewed, a text on the computer screen instructed the participant to name the theme (see Table 1; Appendix 1). This very brief first viewing of the images was meant to reveal the participants' first interpretations of the content of the series and their immediate tendencies to express colligation under such circumstances. The duration of the two-second glance at each image was intended to resemble the scanning of a book with historical images and other similar tasks where visual historical content is present and looked at but where the historian does not pause to analyze the images other than to extract their overall content. Next, each image was presented for eight seconds, and, after they had been viewed, the participant was instructed (again in writing) to describe in speech how the images contributed to the given theme. The participant was also allowed to alter his/her theme. Eye movements during the viewing of the images were recorded with a Tobii 60XL Eye Tracker (sampling rate of 60 Hz and the 1920x1200 pixel resolution



of the 24" TFT monitor), and the whole session was video recorded (with an additional audio recording).

After the two viewing processes of each series (A or B), the participant was interviewed according to the stimulated recall interview protocol, using the eye-movement recordings as interview stimuli. The participant was shown the images one by one, but this time they were overlaid with a graphical presentation of the participant's own viewing process. The purpose of the stimulated recall interview was to ease and enrich the interviews by allowing the participants to see which areas of the image they were actually looking at. This encouraged them to comment and reflect on why certain particular areas might have aroused their interest and how they came to deduce the theme, while also offering the participant time to re-explore and re-interpret the image. As a result, although the first viewings of the images were brief, each image was also inspected for a longer time during the stimulated recall interview.

When both series had been viewed and discussed according to the protocol described above, a final interview was conducted (Step 5). In this part of the study, the participant was, as a final question, asked once more about his or her views on the information transmitted by one of the images (see Appendix 1). While responding to this question, the participant was again shown the first image of the "Doctors and Infants" series. The whole session typically lasted for 30 to 40 minutes.

## **Data Analysis**

To begin, the stimulated recall interviews were transcribed by a non-member of the research group. The participants' answers to questions targeting their interpretations of the series of images were then examined (see Appendix 1). Each participant gave two descriptions relating to the theme and answered 13 questions in connection with each image series and both series combined, thus giving a total of 30 analyzed utterances, as well as responding to the final interview question on the information that a historical image transmits.

To address the first research topic (on potential demonstrations of colligation), all responses apart from the final interview question were analyzed by two researchers (the first and second author) collaboratively. As stated in the introduction, it was assumed that a tendency to approach the image series from an expert-like perspective would include explicit attempts to reach a level of colligation, attempting to describe the underlying historical processes and to place the images in historically meaningful contexts rather than simply commenting on the images' manifest meanings (cf. Werner, 2002).

The qualitative data-based content analysis proceeded in two steps. First, all responses were analyzed in order to search for various types of expressions of colligation. To give a brief overview of the analyzed material, those students who came up with more sophisticated interpretations used everything from the date of individual images (e.g. century) to chronology (order of the images) to continuity (how images are related to each other in terms of continuous historical processes). With regard to the "Female Workers" series, participant 4, for example, dated the last

image to the 20<sup>th</sup> century based on the fact that it was a photograph but also mentioned the chronology and the continuity between the images (noting the increasing complexity of the machinery). In addition to placing the images in temporal contexts, it was also noted that the students used contextualization to give meaning to the *persons* in the images. People were given hypothetical roles in the immediate context (a mother, a father, a doctor) and even in relation to the historical development of roles (changes in the roles of parents or a doctor).

Overall, then, two main types of responses signalling participants’ attempts to express colligation were identified: a) responses referring to a so-called *time* function and containing a description of the image as part of a historical, continuing process (this function going beyond any intuitive notions of chronology between images); b) responses referring to a so-called *historical human* function and describing humans in relation to a historical process (see Results below for examples). For this second stage of the analysis, the two researchers collaboratively placed each participant in one of three categories (presented in Table 2) based on their expressions of colligation.

TABLE 2.

*Descriptions of the outcome categories of the participants’ analysis of the images*

	No topic/theme	Colligation	
		<i>Meagerly defined topic or theme</i>	<i>Richly defined topic or theme</i>
Description	No explicit expressions of colligation; neither the <i>time</i> nor the <i>historical human</i> functions represented	A historical, time-related phenomenon given; either the <i>time</i> or the <i>historical human</i> function represented	A historical, time-related phenomenon given; both the <i>time</i> and the <i>historical human</i> functions represented

In order to directly address the ways that students expressed their knowledge of operating with historical sources (this being a part of the redefined concept of colligation, as described in the introduction), the responses to the final interview question that asked the students to state “what kind of information on history this image transmits” (see Appendix 1) were examined. The purpose here was to explore the extent to which the participants critically addressed and discussed the trustworthiness of a historical source. The recognitions of potential “enabling conditions”, that may affect how the image is applied as a source, were identified from the responses (see Results below for examples) by one researcher and evaluated by the co-authors.

## Results

### Expressions of Colligation

Figures 1a and 1b present the frequencies of students' expressions of the three categories of colligation for both of the image series. In total, 18 of the 23 participants were able to explicitly state a historical phenomenon in the context of the "Female Workers" series (examples of the themes are given below), while only five students stayed on the purely descriptive and non-integrative level in their descriptions. However, in the case of the "Doctors and Infants" series, nearly half of the students (10) apparently found it difficult to identify and/or express historical phenomena depicted in the images. Only three MA students were able to express colligation by our definition to a "rich" extent, and 10 students were not able to express any historically meaningful processes at all, giving merely superficial descriptions of the images. There was also a tendency for the MA students to reach a higher level of interpretation in the case of the "Doctors and Infants" series, while the majority of the BA students analyzed this image series more on a descriptive level.

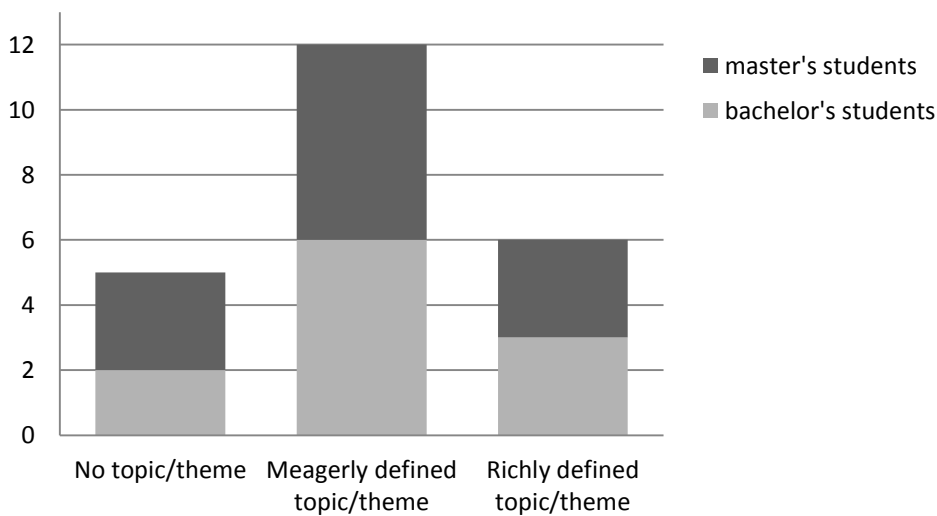


FIGURE 1A.

*History students' expressions of colligation for the "Female Workers" series.*

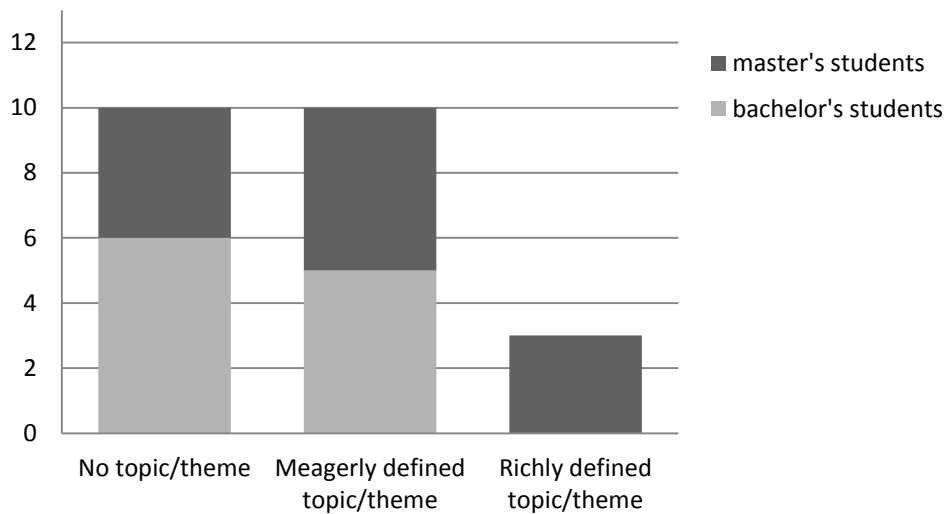


FIGURE 1B.

*History students' expressions of colligation for the "Doctors and Infants" series.*

To illustrate the quality of the responses in more detail, we first explore those types of responses that did not result in expressions of colligation of any kind. In addition to listing the apparent features of the image (e.g., persons present), the focus of these responses was often on what was *happening* in the images, without locating these occurrences in any historical context. Nevertheless, some of the descriptions did contain attempts to date the images more or less vaguely or to give an idea of their chronological relationship. As described in the Data Analysis (see above), these did not, to us, fulfill the characteristics of expert-like historical analysis but were rather demonstrations of an intuitive tendency to speak of serially presented images as a chronological whole (cf. studies on children's and adolescents' interpretations of historical images; see Introduction). Below, we give extracts of some of these responses.

*Well... There were in all of them at least children... and a mother and... usually probably also some man... Apparently a family and then some extra person there like helping with the birth. They perhaps are from different eras... or different places... Pretty similar images, the last one seemed a bit more modern. (Participant 3, BA Student, "Doctors and Infants.")*

*[...] well, there were in all of them... in all of them women working in a [...] not really a factory, the first one, but... Perhaps there are like such stages that... that coming towards the present... all the time. I'd think. (Participant 7, MA Student, "Female Workers.")*

By contrast, the interpretations that were framed in historical processes, as defined above, contained (by definition) the presence of time-related historical phenomena. For the "Female Workers" series the phenomenon mentioned was typically

*industrialization* or, on occasion, *changes in women's working environments*, whereas the phenomena mentioned after the viewing of the "Doctors and Infants" series included *the development of medicine, changes in the medical care (of children) or the professional role of a doctor, and changes in the role of children as a member of the family*. It is plausible that the varying level of agreement on potential themes between the two image series reflects a difference in topic familiarity and the difficulty experienced in each case. However, what these expressions have in common is that they are indeed reflective interpretations on historical processes or attempts to express colligation.<sup>3</sup> In short, the participants were not describing the images but historical processes *depicted* by them. Below, we give extracts from such responses.

*I gave the theme medical treatment of children and I see a small development in it from the first picture to the third one... becomes more professional this, medical treatment, becomes more scientific.* (Participant 6, MA Student, "Doctors and Infants.")

*So the first image was from the time when there were no machines there, but they wanted to... or had a need to... there was a demand for textiles that they had to somehow... make it more industrial and they had put a lot of women in one place to do stuff related to the making of fabric.* (Participant 9, BA Student, "Female Workers.")

In sum, the history students produced professional-like interpretations of the image series only to some extent. The two image series were also perceived differently: the "Female Workers" series was described by the students rather unanimously through the process of industrialization, whereas for the "Doctors and Infants" series the students were less forthcoming and more diverse in their expressions relating to underlying historical processes. However, in the case of the latter series, the more experienced students pondered more explicitly on the potential historical processes that the images might relate to.

## **Evaluating Sources**

We next turn to the explicit evaluation of the trustworthiness of a visual historical source. When questioned in the final interview about the historical information transmitted by one of the images (see Procedure above), to our surprise only eight (five BA and three MA students) of the 23 students made any statement at all about what may have affected the content and presentation of the image (i.e., their "enabling conditions"). The rest of the participants described the information in the images simply as a representation of the time it depicts, remaining, in Werner's terms (2002), at the level of describing the image's manifest meanings. These types of responses may certainly also be meaningful in a historical sense, but they lack source criticism. Some of these descriptions only listed physical objects, while others were slightly more analytical in discussing how the image tells us something about the roles of and interaction between people. In four cases, the students remarked that the event the image presents must have been considered significant, as it has been portrayed.

Among the eight students' remarks that contained elements of source criticism, the two main themes were *the choices the artist had made when creating the image* and *the typical ways of picturing things at a particular time*. The latter could be seen to contain two subtopics: *the ideals of the time when the image was created* (e.g. romanticizing) and *the ideals of the time in the content of the image* (e.g. a mother and a child). Three examples of the students' responses are given below.

*[...] if we simply think that, well, this tells us about the clothing at that time, for example, or what happened then, but it's possible that the artist has... made some of his/her own things there. [...] if he wanted to dress the people a bit nicer [...] it tells more about the time, how they wanted to represent certain things, and not necessarily how things actually were. (Participant 10, MA Student.)*

*Well, I think this image is pretty romanticized [...] That doctor is made to look really beautiful, but I can't really say, like, what real and concrete information you could get out of this... Well, in general there is a person who works in the medical profession and helps... in this case a child [...] Pretty hard to say anything, since this image seems to be so embellished. (Participant 23, BA Student.)*

*[...] and perhaps a bit on what... objects and things and animals and such they have considered important, since they are in this image... so it's unlikely that all those coffee pots, cats and roses are there just by chance. (Participant 19, MA Student.)*

On the whole, then, the students did not produce much explicit evidence on their skills of critical analysis with respect to visual material. This type of criticism and analytical approach would most likely have been displayed more had the question been more direct in addressing the source's trustworthiness. However, as the framework presented in the introduction suggests, this type of analytical behavior should be a standard feature of expert-like historical reasoning and already achievable during university studies (cf. Voss & Wiley, 2006).

### **Indicators of Encapsulation**

To approach these findings from the encapsulation perspective, we now look more closely at the above-mentioned eight students who reflected on the source's trustworthiness. These same students did, in fact, express colligation for the "Female Workers" series, and seven of them also did so for the "Doctors and Infants" series (Table 3). Apart from these eight, only three MA Students were able to do the same in the context of both image series.

TABLE 3

*Frequencies of students expressing source criticism and colligation*

	No colligation for either of the series	Meager or rich colligation for <b>one</b> of the series	Meager or rich colligation for <b>both</b> of the series
Source criticism	0	1	7
No source criticism	2	10	3 <sup>a</sup>

<sup>a</sup> Only MA students

Despite the small group sizes, it appears that those students critically evaluating the source also tended to describe both image series through colligation; thus, they were able to go beyond the manifest meanings of the sources and express a grasp of underlying historical phenomena. This observation seems to be in line with the definition of encapsulation, described in the introduction, where it was suggested that high-level interpretation of sources depends on not only conceptual but also practice-oriented knowledge of how history may be represented in them (or knowledge of the “enabling conditions”). Describing a historical phenomenon, such as industrialization in the case of the “Female Workers” series or the development of medicine in the case of the “Doctors and Infants” series, involves the “inferential process by which a person uses his or her knowledge to infer other information related to the initial knowledge” (Voss & Wiley, 2006, p. 577). Thus, based on these observations, we suggest that these students’ encapsulated concepts included and organized the underlying time-related relationships, how these manifested in society, and how they could, therefore, be represented in visual sources.

A final issue is worth noting. In medicine, it has been observed that experts revert to basic sciences in the case of an increase in case difficulty and when practice-based knowledge is insufficient for reaching an adequate diagnosis (Pelaccia, Tardif, Tribby, & Charlin, 2011), whereas in history, experts appear to apply their basic *analytical* skills when their domain knowledge is insufficient (Díaz et al., 2008; Wineburg, 1991). In the present study, the BA students, in particular, were struggling with the “Doctors and Infants” series, but, as beginners in their domain, they did not appear to have the basic analytical skills with which to compensate for their lack of domain knowledge. As a result, their analyses remained more at the descriptive level. Furthermore, none of the students expressed source criticism without also expressing colligation in the case of at least one image series (see Table 3), suggesting that, at least in these beginning and intermediate stages of the studies, conceptual knowledge may act as one factor in the tendency to explicitly express awareness of such “enabling conditions”.

## General Discussion

To return to the two main arguments of this article, we first stated the importance of understanding the development of skills of “doing history”, and, more specifically, analyzing visual sources. In sum, even our volunteer participants, who were interested enough in visual material to participate in a study relating to them, were not expressing the level of historical thinking that we might have assumed. With respect to our second argument, we stated that a redefinition of colligation and other similar conceptual tools would be useful in order to grasp the different stages of developing expertise. The previous notions, where domain knowledge and knowledge relating to historical analysis tend to be addressed somewhat separately (e.g., Voss & Wiley, 2006), do not, in our view, fully acknowledge the interaction between the two. This is particularly important in history, because it is in this interaction that expert-like behavior in this discipline seems to lie. The encapsulation approach offers one way of first conceptualizing and later on detailing the role of the two knowledge types. Furthermore, modifying and applying an existing theory on expertise has, in our view, benefits over creating a number of domain-specific theories, not least because this might, eventually, facilitate the comparison of the nature of expertise across domains.

In terms of pedagogical implications, it is worth noting that the framework applied in the present study, expertise approach, also favors one significant pedagogical principle. Returning once more to the domain of medicine, we quote Norman (2007) who argues that “unless students actively apply the concepts they are learning to understanding and explaining clinical problems, the knowledge will remain inert and will be soon forgotten” (p. 402). The same problematic is, most likely, not foreign to history educators, either. In expertise research, this type of active, intentional rehearsal that explains success in many domains is called *deliberate practice*; however, this type of deep and often effortful work does not happen without guidance. Thus, we would argue that students at university should be seen not only as potential *academics* in need of training but also, more importantly, as *learners* in need of scaffolding and support. These changes in perspective are perhaps best achieved, as Nye and her colleagues (2011) suggest, through self-reflective teaching practices at the university level; indeed, and as shown also by Stoel, van Drie and van Boxtel (2015), students could benefit from explicit teaching of expert-like heuristics and reasoning skills. Reaching these goals requires systematic research on the nature and development of expertise in this particular domain from both theoretical and didactical perspectives.

In sum, we suggest that university teaching should carefully consider the interaction between historical conceptual knowledge and analytical skills. The reciprocal nature of these two aspects of expert historical thinking suggests that skills in performing historical analysis, for example, are perhaps not best addressed through separate compulsory courses, as sometimes is the case in university curricula. Instead, the close connection between these skills and domain knowledge should be made apparent to students as early as possible. However, closely related to all this is the changing of the epistemic stances of some students; many are perhaps unwilling to alter their views on what they are accustomed to view as “history”, which may be



considered to be a book-centered discipline with fascinating, and to some extent “true”, stories of the past. Indeed, for future research, we suggest that also such epistemological issues should be systematically examined in the academy. This would offer educators to have something to respond to in their efforts in improving the teaching of their discipline.

## Endnotes

1 Apparently by coincidence, Lee (2011, p. 67) uses the word “encapsulate” when writing about colligatory concepts, i.e., concepts that “encapsulate historians’ ideas about the past that structure the historical field”.

2 To secure the anonymity of the study participants, the exact year for the interviews is not stated.

3 The history education these participants had been exposed at school may have had different orientations. Encouraging and training the students’ historical thinking has traditionally been one of the main goals of Finnish school curricula, although this goal has been interpreted and implemented in different ways. In the upper secondary level, the use of historical sources in teaching has been recommended since the 1980s, and the goals and assessment criteria in the current curricula for history education in the primary and lower secondary level are focused on the skills of acquiring knowledge and assessing the reliability of the sources. (cf. Virta, 2006.)

4 We do not apply the term “colligatory concept” here (see e.g. Lee, 2011) as the students were not, in all cases, applying specific historical concepts. They were nevertheless attempting, according to the authors’ interpretation, to speak of historical phenomena in a colligatory sense.

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## Appendix 1

Participants' tasks and interview questions, omitting questions that did not relate to information on the historical content of the image but focused instead on the processing of the participants (e.g. "does something in your eye movement processing surprise you?"). The whole interview protocol is available through the first author.

### *Tasks presented in writing on a computer screen*

- |  |   |
|--|---|
| Prior to the initial (2 s) viewing process | a1) You will see a series of three images. Each image appears for 2 seconds. Your task is to determine what the series is about.  |
| Prior to the actual (8 s) viewing process  | a2) Next you will see the same images again. Each image appears for 8 seconds. Your task is to determine how each of the images relates to the theme you gave. Give your answer after the last image. |

### *Stimulated recall interview after the initial (2 s) viewing process of a series*

- |               |   |
|---------------|---|
| On each image | b1) Did you recognize what the image depicted?      |
| On each image | b2) Do you remember what you were thinking of while |

you looked at the image for the first time, or do you remember what came to your mind at that time?

After all three images      b3) You gave --- as the theme. Can you tell at which point you chose this theme?

*Stimulated recall interview after the actual (8 s) viewing process of a series*

On each image      c1) Do you remember what you were thinking of while you looked at the image for the first time, or do you remember what came to your mind at that time?

On each image      c2) When you look at the image now, does anything else come into your mind about the image?

*Final interview*

On the 1<sup>st</sup> image of the “Doctors and Infants” series      d) What kind of information on history does this image transmit?