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Stimulating situational interest and student questioning through three types of historical introductory texts

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Abstract This study investigates questions students ask related to an introductory text about a new topic in the history classroom. The effects of a narrative, problematizing, and expository introductory text on the situational interest of students and the number and type of student-generated questions, are compared. Participants are 174 students in higher secondary education (16 years old). Student-generated questions are categorized in higher -and lower-order questions, in descriptive, explanative, comparative and evaluative questions, and in emotive and non-emotive questions. The type of introductory text had a significant effect on the level of situational interest and type of questions but not on the number of generated questions. Narrative and problematizing texts provoked more situational interest and more emotive questions than the expository text. We found a significant positive correlation between prior topic knowledge, interest in History, situational interest, and number of questions.

Résumé Cette étude porte sur les questions posées par des lycéens sur un texte d'introduction à un nouveau sujet en classe d'histoire. Elle compare les effets d'un texte d'introduction explicatif, d'un texte de problématisation et d'un texte narratif sur l'intérêt situationnel de ces élèves, ainsi que le nombre et le type des questions posées par les élèves dans chaque cas. 174 élèves âgés de 16 ans de l'enseignement secondaire supérieur y ont participé. Les questions posées sont classées en différentes catégories : questions par ordre prioritaire et secondaire ; questions descriptives, explicatives, comparatives et évaluatives ; questions affectives et non affectives. Le type du texte d'introduction a eu un effet significatif sur le niveau de l'intérêt situationnel et le type des questions, sans influer cependant sur le nombre des questions posées. Les textes narratifs et de problématisation ont suscité davantage d'intérêt situationnel et un nombre de questions affectives plus important que le texte explicatif. Les résultats ont également montré une corrélation positive significative entre la connaissance préalable du sujet, l'intérêt pour l'histoire, l'intérêt situationnel et le nombre des questions.

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Introduction

History derives from the questions we ask about the past. Questions are an important means to construct historical knowledge. The questions historians ask reflect their historical interest and knowledge about particular topics and are shaped by the meta-concepts of the discipline; for instance, causation, change, continuity, and significance (Counsell 2000).

Despite the growing body of research on the learning and teaching of history, there are not many empirical studies that have student questioning as a main focus. Some scholars discussed the importance of developing students' ability to ask historical questions. Van Drie and Van Boxtel (2008) consider the asking of historical questions as an important component of historical reasoning in history classrooms, next to contextualization, the use of historical sources, argumentation, and the use of meta- and substantial concepts. Questioning functions as a kind of 'engine' for the construction of historical interpretations. Schreiber et al. (2006) describe willingness and ability to ask historical questions as competencies underlying historical reasoning. Some scholars give a pedagogical argument for stimulating students to ask questions. Barton and Levstik (2004) propose that when students inquire about the past, the starting point should be the questions that students themselves ask. They believe that questions derived from textbooks are less meaningful for student inquiry because these questions do not originate from what students themselves want to know about the past.

These views are also put forward in other domains. Graesser et al. (1996) claim that questions, such as why, how and what if, guide explanatory reasoning in science learning. Engle and Conant (2002) consider problematizing as one of the four principles of fostering productive disciplinary reasoning in the classroom. They state that teachers should encourage students to problematize what they study, to define problems that elicit their curiosity, and to ask questions. Furthermore, the idea that working with student questions can make learning activities in the classroom more meaningful and enhance student motivation is also put forward in studies of, for example, Chin et al. (2002) and Scardamalia and Bereiter (1992).

Despite the potential value of student questioning, we must acknowledge that students may not spontaneously ask questions themselves. We are not familiar with data specific for the subject of history, but it seems to be reasonable to assume that in line with findings from studies about student questioning in classrooms (e.g., Dillon 1988; Good et al. 1987; Niegemann and Stadler 2001) students in history classrooms do not ask many questions. The questions are most of the time provided by the teacher, textbook, and task instruction. Practitioner-oriented literature on teaching history provides several methods to stimulate student questioning, especially at the start of a new topic. For example, telling an exciting story or anecdote or presenting a controversial problem at the start of a new topic is believed to stimulate interest and to trigger questions (e.g., Schneider 2001; Wilschut et al. 2004). There are two important assumptions in this approach of stimulating student questioning. First, it is believed that some introductions to a new history topic or curriculum unit are more powerful in stimulating student questioning than others. Second, it is assumed that when students are interested or captivated, they start asking questions.

Research literature on situational interest and student questioning provides only limited support for these assumptions. Several studies have focused on the effects of different types of texts on the situational interest of students (Brantmeier 2006; Hidi and Anderson 1992; Schraw et al. 2001; Schraw 1997), but less is known about the effects of different types of texts on the questions students ask and on the effects of texts meant to introduce a new topic. Only few empirical studies showed that a higher (situational) interest results in more questions. In a Cuccio-Schirripa and Steiner (2000) study, it was found that students asked more questions about high-interest topics than about low-interest topics in the domain of science. Berlyne and Frommer (1966) used different stimuli in stories and pictures to arouse curiosity and conceptual conflict. They found that items that triggered novelty, surprise, and incongruity generated more questions.

In the present study, we investigate student questions that originate from interest triggered by different types of introductory texts. In history textbooks for secondary education, it is common practice to introduce and to motivate students for a new topic through the use of an interesting introductory text. The first goal of this study is to gain insight into the nature of questions students generate after reading an introductory text on a history topic. Since situational interest is considered an important trigger for questioning, the second goal is to investigate the effects of different types of introductory texts on the situational interest, and the number and type of questions students generate after reading the text.

The study aims at generating insights that can inform the design of motivating introductions for history lessons and of domain-specific instruction and support for developing students' ability to formulate historical questions. Furthermore, the study contributes to theories about situational interest and student questioning by focusing on the effects of different types of introductory texts on both situational interest and student questioning.

First, we explore the kind of questions students might ask about the past and how these may be affected by different sources of interest. Then we will present the research questions, method, hypotheses and results of an empirical study in which we asked students to generate questions after reading an introductory text on a history topic.

Student questions about the past

Typical historical questions are descriptive, comparative, explanative (causal) and evaluative (Van Drie and Van Boxtel 2008). In history, questions are an important means to:

– Building historical context (When? Where? What was characteristic for this time and place?)
– Describing processes of change and continuity (What changed? What stayed the same? Did the change come about gradually or suddenly?)
– Explaining historical phenomena (What were the causes of …? What was the impact on the short term and on the long term?)
– Comparing historical phenomena (What were the differences and similarities? Was it a unique event or a more common one?)
– Evaluating (How significant was the event? What was the most important cause of..? What would have happened if..? Was it a wise decision? To what extent could people have made another choice?).

Students in secondary schools naturally generate different questions than experts in the domain (Wineburg 1991). Whether students are able to ask the types of historical questions discussed above will depend on their historical knowledge and historical reasoning ability. Prior knowledge affects the representation that students construct from

new information, and different representations are likely to produce different types of questions. Studies have shown that prior knowledge facilitates the asking of questions (Otero and Graesser 2001; Person et al. 1994; Taboada and Guthrie 2006; Van der Meij 1990). Questions are often asked when a knowledge deficit is experienced or when new information clashes with prior knowledge (Otero and Graesser 2001). From studies on students' reasoning about the past, we know that students often lack knowledge of the specific historical context, which is formed by the characteristics of the time and place of historical events (Hartmann and Hasselhorn 2008; Barton 2008; Shemilt 1983; Wineburg 2001). Students experience difficulty in thinking about the past in its own terms and with taking a historical perspective; students tend to judge past actors and actions by present standards. Students may therefore ask 'naïve' questions or questions that reflect moral judgment based upon a present-oriented perspective.

Triggering questions through an interesting introductory text

Next to students' prior knowledge and experience within the domain of history, questioning may also be affected by students' interest. Since students' individual or personal interest in History will not be well-developed in secondary education, triggering situational interest may promote the asking of questions (Hidi and Renninger 2006). In the present study, situational interest is operationalized as text-based interest. Text-based interest is an "emotional state aroused by specific text features" (Schiefele and Krapp 1996). There are several possible sources of interest when students read an introductory text. Text-based sources of situational interest are, for example, textual coherence, engagement and emotional involvement (Brantmeier 2006; Schraw et al. 1995). Particularly, texts containing an unexpected element, incongruence, or an appeal to one's imagination can stimulate situational interest (Brantmeier 2006; Hidi and Anderson 1992; Schraw et al. 2001; Schraw 1997). Furthermore, narrative texts are considered more interesting than expository texts (e.g., Bergin 1999). According to Barton and Levstik (2004), the themes of race, gender, class, and religion in historical contexts are appealing to students. Fundamental contrasts like good and bad, brave and cowardly, rich and poor, and fear and safety are often connected with those themes. This view corresponds with the opinion of Kintsch (1980), who proposes that major life themes, such as death, sex, and conflicts between people promote emotional engagement. Interest can be seen as an emotion characterized by curiosity and appraisal of novelty (Silvia 2005). Abrandt Dahlgren and Öberg (2001) compared the effects of starting a course about environmental science with different scenarios on student questioning and found that scenarios that were provocative or evoked emotional involvement were powerful triggers. When students read a historical introductory text that triggers engagement and emotions, this engagement and emotion may also be reflected in the level of text-based interest and the type of questions they ask.

Research questions

The questions we address are:

1. What type of questions do students generate after reading an introductory text on a historical topic?
2. What is the effect of the type of introductory text on situational interest, sources of interest and the type and number of questions generated?

Method

Participants

A total of 174 Dutch students in higher general secondary education (106 girls and 68 boys, average age=16.1 years) participated in this study. An experiment was conducted with students working in one of three groups in which they either read a narrative text (N=58, 23 boys and 35 girls), a problematizing text (N=61, 23 boys and 39 girls), or an expository text (N=55, 23 boys and 32 girls) about the Industrial Revolution. Within each classroom, students were randomly assigned to one of these groups.

Students at this school level prepare for a central examination that permits them to enter Higher Vocational Education. Students came from four different (urban and rural) schools and eight classes. These students chose a subject combination that included history. Students usually have 2 or 3 history lessons a week. Typical curriculum topics cover the prehistory era to modern times.

Prior knowledge test

Since prior knowledge is expected to affect generation of questions, we measured prior knowledge on Industrial Revolution, as a covariate, with a paper-and-pencil test. Since the topic is included in the Dutch history curriculum in the first years of secondary education, the participating students had followed lessons about this topic 2 to 16 months before the test took place. In the final years of secondary education, the Industrial Revolution is discussed at a deeper level. Students were prompted to activate their prior knowledge by recalling what they knew about the topic. This test included one main question: 'what do you know about the Industrial Revolution?' Eight open questions were offered to guide students in answering this question. Students were instructed to write down and define concepts they associated with the Industrial Revolution, to situate it in time and to describe its causes and effects. Items of this test are described in Table 1.

Answers were scored according to a template of correct and acceptable answers supplied by the first two authors, who both have a master degree in history. The inter-rater reliability for each of the eight items between two raters on 40 randomly chosen tests from different classes varied from 0.61 to 1 (Cohen's kappa). The lowest kappa was reached for the two questions that asked for causes and effects of the Industrial Revolution. We decided not to exclude these questions from the test because these questions were mostly answered correctly by students with a high level of prior knowledge. Causes and effects regarding historical events are also considered as important components of historical knowledge. Furthermore, values between 0.40 and 0.75 can be considered fair to good agreement beyond chance (e.g., Fleiss et al. 2003, p.604). The kappas for the other six items were all above 0.74. Reliability of the test was computed (eight items, α=0.69). Given the fact that prior knowledge on this topic was low (M=10.2 on a maximum score of 22), this is considered acceptable. Kappas for each item are described in Table 1.

Interest in History questionnaire

Since we expected that individual interest in the school subject of history would affect text-based situational interest and possibly also the generation of questions, we included individual interest as a covariate. We measured this type of interest with a school-subject interest questionnaire developed by the Dutch National Institute for Educational Measurement (Cito 1987). This questionnaire for the school subject of Mathematics was

Table 1 Prior knowledge test items, maximum score, kappas, means, and standard deviations

Questions	Maximum score	Cohen's kappa	M	SD
1. What do you think about at the word 'Industrial Revolution'?	2	0.725	1.41	0.721
2. Name as many concepts that have to do with the 'Industrial Revolution' as possible. Explain each concept.	6	0.774	3.13	2.356
3. When did the Industrial Revolution take place?	1	0.947	0.57	0.497
4. In what country did the Industrial Revolution start?	1	0.805	0.43	0.496
5. What was daily life like during the Industrial Revolution?	2	0.739	1.06	0.851
6. Name as many causes of the Industrial Revolution as possible.	4	0.691	0.96	1.004
7. Name as many effects of the Industrial Revolution as possible.	4	0.614	1.69	1.191
8. Name sources that help you gain more information about the Industrial Revolution.	2	1.00	1.03	0.480
	22		10.28	5.044

N=174

slightly adjusted for the school subject of history and consisted of 32 items that represent four different subscales (each eight items) with both negative and positive statements about the school subject of history. Subscales were pleasure (e.g., 'I think History is a pleasant school subject.'), fear and difficulty (e.g. 'Somehow, I do not master this History.'), effort and interest (e.g., 'Sometimes, I spend my spare time doing something with History.'), and usefulness and relevance (e.g., 'I believe History has little use.').

The original questionnaire (Attitude Scale towards Mathematics) was validated in a study by Martinot et al. (1988) regarding psychometric quality, reliability, and internal structure and validity. The questionnaire is also validated in other domains (see Kuhlemeier et al. 1990). Students answered on a five-point Likert scale with 1='don't agree at all' and 5 = 'agree completely'. Whole scale reliability is α 0.94. In this study, we use the total scores of the questionnaire (M=3.27, SD=0.641). A higher score on the interest questionnaire means higher individual interest in History as a school subject.

Situational interest questionnaire

In order to measure situational interest after reading the text, we used the Perceived Interest Questionnaire (PIQ) from Brantmeier (2006) who slightly adjusted the questionnaire of Schraw et al. (1995). Ten items were translated in Dutch and we added one item 'I would like to know more about the topic of the text'. This item was added because the function of the introductory texts was to motivate students in a topic that was relatively new for them. Students indicated the degree to which they agreed with each statement about the text on a five-point Likert scale. Examples of the other items are 'I thought the text was very interesting'; 'I would read this text again if I had the chance' and 'This text really grabbed my attention.' (11 items, α=0.89).

Sources of interest questionnaire

In addition to the items in the PIQ, we used a questionnaire to identify sources of interest because we expected that particularly the narrative and problematizing texts would provoke engagement and emotions. The Sources of Interest Questionnaire (SIQ) from Schraw et al. (1995) consists of 20 items measuring those text characteristics that are responsible for interest. On a

five-point Likert scale, students indicated the degree to which they agreed or disagreed with each statement concerning the text. Sources of interest are defined as cohesion (four items; $\alpha=0.73$), (e.g., the information in the text was clearly organized); perceived prior knowledge (three items, $\alpha=.81$), (e.g., the text dealt with a topic I know a lot about); engagement (six items; $\alpha=0.73$), (e.g., the text was thought provoking); ease of recollection (three items, $\alpha=0.53$), (e.g., the story was easy to remember); and emotiveness (four items, $\alpha=0.72$), (e.g., the text upset me). Scale reliability appeared to be acceptable for all scales except for the scale 'ease of recollection.' Therefore, this scale is excluded from further analysis.

Introductory texts

We selected the 'Industrial Revolution' from the curriculum because it is a topic that is part of the curriculum in the first years of general secondary education and is discussed again at a deeper level in the 2 years preparing for a central examination in history. The history curriculum is structured according to ten eras and 49 characteristic aspects (Van Drie et al. 2009; Wilschut et al. 2004). The Industrial Revolution is a topic that is connected to the aspects 'the process of industrialization and the development of an industrial society' and 'the social question that caused a discussion about the task of the government in a welfare state'. The three texts we constructed differ in the way these characteristic aspects are introduced to 16-year-old students; but in each of these texts, the content provides equal possibilities to discuss the aforementioned characteristic aspects. Students were not instructed to ask questions about the text itself, but about the topic Industrial Revolution that is introduced by the text.

We constructed three types of introductory texts in cooperation with history teachers and teacher trainers: a concrete personal narration, a text that is problematizing or presenting ambiguity by including a comparison between past and present, and an expository introductory text. We defined the narrative text and the expository text conform the definitions by Brewer (1980). A narrative text describes events that take place through time and "are related through a causal or thematic chain" (p.223). An expository text describes the organization and processes of an event. Our problematizing text combines these characteristics in order to pose an interesting problem. Table 2 describes similarities and differences between text characteristics.

The texts were of approximately the same length ($M=418$ words) and mentioned the same topics relating to the Industrial Revolution (invention of the steam engine, workers in factories, poor working and living conditions, and the development of industry). We aimed at the texts differing on characteristics that affect situational interest. All texts are typical for texts that are used to introduce new topics in Dutch history textbooks. All three texts serve the same purpose of introducing the topic of the Industrial Revolution.

The narrative text has the characteristics of a story that is concrete and personal and is told with vivid details. For example, direct reported speech and personal perspective are used in this text (Wilschut et al. 2004). The story in this text was inspired by information concerning Friedrich Engels, who was an eyewitness to the working conditions in a cotton factory in Manchester in 1842. The text contains vivid descriptions of the city and describes the punishment of a woman working in a factory. In this way, emphasis was put on issues of rich and poor, and justice and injustice.

The second text puts forward a controversial point of view that is supported by arguments, stimulating a sense of ambiguity. These elements are often used to start a history lesson, since controversy and ambiguity arouse student interest and provoke questions (Schneider 2001). In introductory texts, problematizing is often done by contrasting past and present. This text offers a comparison with contemporary China. China's fast economic growth results in strikingly similar (poor) working and living conditions as in nineteenth

Table 2 Similarities and differences between introductory text characteristics

	Narrative	Problematizing	Expository
Title	It's all about money	Old News?	The Industrial Revolution
Historical content	Industrial development	Industrial development	Industrial development
	Industrial city	Industrial city	Industrial city
	Working conditions	Working conditions	Working conditions
	Date: 1842	Dates: about 1850, 2005	Dates: 1800 to 1900, since 1500; 18th century
Interesting elements	Vivid details/descriptions	Vivid details/descriptions	Indirect speech
	Direct speech	Comparison with present-day China.	Short overview
	Unexpected happening	Act of injustice	Description of aspects of change
	Act of injustice	Contradicting opinion between historians	Description of causes and effects
	Challenging opinion		
Example of sentence	Friedrich's thoughts wander back to home, (…) Here in Manchester, factories are bigger and the machines are modern. That is the reason why his father, a successful textile baron, has sent him here.	Is the situation in 19th century England really something from the past? This is about a jeans factory in China, 2005! The rise of industry in China causes a drift from countryside into towns, just like what happened in Europe in the past.	During the Industrial Revolution machines were used for the first time. In textile factories mainly women and children worked, these unschooled workers were inexpensive.
Number of words	419	414	420

century England. One text fragment deals with a Chinese girl working at a twenty-first century factory; another fragment tells about nineteenth century factories in Manchester. Although the text includes narrative elements, the concrete and vivid examples are used to problematize the positive and negative consequences of the Industrial Revolution.

The third text explains the topic in a way that is common in history textbooks. It is an expository text that provides information about the Industrial Revolution by presenting a series of historical facts and interpretations. The text serves as a summary, structuring main points concerning the Industrial Revolution in England in the nineteenth century. Poor working and living conditions and the development of industries are described in a rather detached way, without using vivid and problematizing details. Every text starts with the same short instruction that explains to the students that the purpose of the text is introducing the topic of the Industrial Revolution.

Data collection procedure

In a history lesson (50 min), we measured prior knowledge and students' interest in History. Two weeks after administrating the prior knowledge test and interest in History questionnaire, students within each class were randomly assigned to one of three groups. Students were instructed to ask questions about what they wanted to know about the topic

and were instructed to write down questions that came up during or after reading the text. The students received the following written directions:

'Below you will find a text which is meant as an introduction to the topic of 'Industrial Revolution'; read this text carefully. After reading you are requested to give your opinion of the text and to draw up questions about the topic 'The Industrial Revolution'. Use the last page to write down your questions.'

After students read the text, situational interest and sources of situational interest were measured with the PIQ and the SIQ. Then (in the same lesson), we instructed students to write down their questions:

'You have read a text about the Industrial Revolution. Write down as many questions regarding this topic as possible. You can write down every question that came up during reading the text, even if you are uncertain about your question.'

This was done without further instruction on questioning because we were interested in the type of questions students would ask regarding a topic that was relatively new to them and based upon their own prior knowledge and (individual and situational) interest. During the experiment, the first author gave brief instructions and remained in the classroom while the students filled out their worksheets with questionnaires, texts, and instructions to write down their questions. The experiment took place in regular classrooms. Students worked individually and were given the time they needed to read the text, fill out the questionnaires and formulate their questions. Students spent approximately 30 min on this task.

Hypotheses

Our first research question, 'what type of questions do students generate after reading an introductory text on a historical topic?' will be answered by an analysis of student questions.

With regard to our second research question, 'what is the effect of the type of introductory text on situational interest, sources of interest and the type and number of questions generated?', we formulated the following hypotheses.

1. The groups that read the problematizing and narrative text have a higher situational interest than the group that reads the expository text.
2. Engagement and emotiveness are more important sources of interest for the groups that read the problematizing and narrative texts than for the group that reads the expository text.
3. The groups that read the problematizing and narrative text generate more questions than the group that reads the expository text.
4. The groups that read the narrative and problematizing text generate more emotive questions than the group that reads the expository text.

Furthermore, we hypothesized that students with more prior knowledge, more interest in History and a higher situational interest ask more questions.

Analyses

The questions students generated were analyzed with different categories using the coding software program Multiple Episode Protocol Analysis (Erkens 2003). Categorization and coding of questions, presented in Table 3, was done inductively and connected to categories derived from literature (Chin and Chia 2004; Ciardiello and Cicchelli 1994; King 1994; Otero and Graesser 2001; Person et al. 1994; Scardamalia and Bereiter 1992).

Many studies on student questioning use Bloom's taxonomy and discern higher and lower-order questions (for example, Hofstein et al. 2005; Person et al. 1994; Renaud and Murray 2007). Our first categorization distinguishes between higher and lower-order questions. Higher-order questions are questions that invoke long answers and deep reasoning. Lower-order questions invoke short answers, for example verification or quantification (Person et al. 1994). The second categorization approaches student questions in a domain-specific way. Typical historical questions are descriptive, comparative, explanative (causal), and evaluative questions (Van Drie and Van Boxtel 2008).

The third categorization distinguishes between emotive and non-emotive questions because we expected that emotion and engagement would be important sources of interest in the groups with the narrative and problematizing texts (Kintsch 1980; Schraw et al 1995). Emotive questions are defined as questions that express indignation, anger, and astonishment. Procedural, unclear, or no questions were placed in a category 'other questions'.

Table 3 reports the inter-rater reliability of the categorization between two raters on a randomly chosen set of 94 questions from different groups in terms of Cohen's kappa. A kappa higher than 0.60 was considered acceptable (e.g., Fleiss et al. 2003, p.604).

To assess the four hypotheses regarding the effects of type of introductory text on situational interest, sources of interest and type and number of questions, multivariate analyses of covariance were performed. For the first three hypotheses, the independent variable was type of introductory text; the dependent variables were situational interest (hypotheses 1), and sources of interest; cohesion, perceived prior knowledge, engagement, and emotiveness (hypotheses 2 and 3). Prior knowledge and interest in History were entered as covariates. For the hypotheses regarding the effects on number of questions, the independent variable was type of introductory text; the dependent variables were number of questions (hypotheses 4) and higher-order and lower-order questions; descriptive, explanatory, comparative, and evaluative questions; emotive and non-emotive questions. Prior knowledge and interest in History were entered as covariates. A contrast analysis (differences) was performed to reveal the differences between the introductory texts. An exact skewness-kurtosis test revealed that the skewness for three types of questions (comparative, evaluative, and emotive) was large (>2.5), and the kurtosis of four types of

Table 3 Question categories, subcategories, examples and Cohen's kappa

Question Category	Subcategory	Example	Cohen's kappa
Question level	Lower-order	How young were the children in the factories?	0.65
	Higher-order	How did the gap between rich and poor disappear?	
Type of historical question	Descriptive	How much did factory workers earn?	0.70
	Explanative	What were the causes of the Industrial Revolution?	
	Comparative	What were the differences between China 2005 and Manchester?	
	Evaluative	Has the world improved because of the Industrial Revolution?	
Level of Emotiveness	Emotive	Why did they do what they did? Who would have been that crazy?	0.60
	Non-emotive	What were the causes of the Industrial Revolution?	

questions (descriptive, comparative, evaluative, and emotive) was also large (>3). For this reason, a non-parametric analysis (Kruskal-Wallis) was performed to check for the effects found in the multivariate analysis of covariance (MANCOVA). No differences in effects were found.

For the hypothesis regarding the relationship between prior knowledge, interest in history, situational interest, and the number of questions asked, we conducted a correlational analysis and a linear regression analysis to examine predictive relationships.

Results

What type of questions do students generate?

The students wrote down a total of 729 questions (M=4.2, SD=2.3). Nine students did not formulate a question. Students generated a wide variety of questions about causes and effects, people, places, and dates concerning the Industrial Revolution. Many questions were related to the topic of the introductory texts and asked about working conditions, child labor, factories, daily life, wealth and poverty, and about the economic situation during the Industrial Revolution. Table 4 shows the results of our analysis of questions.

This analysis shows that students generated about as many higher-order as lower-order questions; 346 (47.5%) higher-order and 358 (49.1%) lower-order questions were generated. Individual students, who generated more than one question, frequently asked a combination of lower and higher-order questions. A lower-order question often preceded a higher-order question (e.g., 'When did the Industrial Revolution take place?' followed by 'What were the causes of the Industrial Revolution?').

Most questions were descriptive (469, 64.3%) such as: 'How many breaks did workers have?' and 'What was daily life like during the Industrial Revolution?' Descriptive questions like this last one were coded as higher-order questions. Many students generated explanative questions (191, 26.2%) that began with 'why' or asked for causes and effects. Not many comparative (16, 2.2%) and evaluative questions (28, 3.8%) were generated by students.

Questions that reflect emotions were generated, although these questions made up only a relatively small portion of the total number of questions (96, 13.2%).The number of emotive questions that students asked ranged from a minimum of 0 to a maximum of 5. These emotive questions sometimes contained unschooled assumptions or did not take the

Table 4 Frequencies of total number of questions for three question categories

Question Category	Subcategory	n	Percentage
Question level	Higher-order	346	47.5
	Lower-order	358	49.1
Type of historical question	Descriptive	469	64.3
	Explanative	191	26.2
	Comparative	16	2.2
	Evaluative	28	3.8
Level of emotiveness	Emotive	96	13.2
	Non-emotive	608	83.4
Other/no questions		25	3.4
Total		729	100

historical context into account. Examples of these questions are; 'Why didn't the managers care about their workers?' and 'If it paid so badly, why didn't they protest together?' There were also non-emotive questions of this kind: 'Who was the leader of the Industrial Revolution?' and 'Why was it bad to get fired? You didn't earn that much anyway'.

The effects of type of introductory text on situational interest and sources of interest

Pre-test data was examined to identify initial differences in prior knowledge and interest in History. ANOVAs indicated that the three groups did not differ significantly from each other with regard to the mean scores on the prior-knowledge test ($F(2,171)=0.383$; $p=0.68$) and interest in History ($F(2,171)=1.56$; $p=0.21$).

A MANCOVA, with prior knowledge and interest in History as covariates and situational interest and sources of interest as dependent variables, showed a significant multivariate effect of type of introductory text (Wilk's λ $(10,330)=0.78$; $p≤0.001$) and a significant effect of prior knowledge (Wilk's λ $(5,165)=0.81$; $p≤0.001$). No significant effect of interest in History was found. Univariate between-subject tests showed a significant effect of the type of introductory text on the variables situational interest [$F(4,173)=7.6$; $p≤0.001$] and perceived prior knowledge [$F(4,173)=10.0$; $p≤0.001$], engagement [$F(4,173)=5.1$; $p=0.001$] and emotiveness [$F(4,173)=7.7$; $p≤0.001$], but not on cohesion [$F(4,173)=0.40$; $p=0.812$] (sources of interest).

Regarding our first hypotheses, contrast analysis showed that the students who read the problematizing and the narrative text scored higher on situational interest than the students who read the expository text (MD=−0.423; $p≤0.001$), which was in line with our expectations. Furthermore, also in line with our expectations, students who read the narrative and problematizing texts scored higher on the sources of interest emotiveness and engagement than students who read the expository text (MD=−0.615; $p≤0.001$ and MD=−0.321; $p=0.002$). Students who read the expository text scored higher on perceived prior knowledge as a source of interest than students who read the narrative and problematizing texts (MD=0.387; $p=0.006$). A contrast test between the problematizing and the narrative texts revealed that the students who read the problematizing text scored significantly higher on the source of interest engagement than the students who read the narrative text (MD=0.265; $p=0.026$). Means and standard deviations for situational interest and sources of interest regarding three introductory texts are reported in Table 5.

Table 5 Descriptives for situational interest and sources of interest for three introductory texts

	Narrative N=58 M (SD)	Problematizing N=61 M (SD)	Expository N=55 M (SD)
Situational interest	2.79 (0.69)	2.85 (0.59)	2.39 (0.78)**
Sources of interest			
Cohesion	3.76 (0.70)	3.71 (0.64)	3.84 (0.75)
Perceived prior knowledge	3.30 (0.86)	3.37 (0.98)	3.73 (0.93)**
Engagement	2.97 (0.60)	3.26 (0.66)*	2.79 (0.66)**
Emotiveness	2.70 (0.78)	2.78 (0.76)	2.12 (0.74)**

*$p<0.05$, effect on engagement was found between narrative and problematizing text

**$p<0.01$, effects found in comparing the expository text with both narrative and problematizing texts

Table 6 Means and standard deviations for type and number of questions for three introductory texts

Question category	Subcategory	Narrative $N=58$ M (SD)	Problematizing $N=61$ M (SD)	Expository $N=55$ M (SD)	Total $N=174$ M (SD)
Question level	Higher-order	1.90 (1.80)	2.11 (1.72)	1.95 (1.69)	1.99 (1.73)
	Lower-order	2.28 (1.63)	1.84 (1.86)	2.07 (2.09)	2.06 (1.86)
Type of historical question	Descriptive	2.86 (2.13)	2.48 (2.01)	2.76 (2.42)	2.70 (2.18)
	Explanative	0.98 (1.34)	1.25 (1.37)	1.05 (1.47)	1.10 (1.39)
	Comparative	0.17 (0.38)	0.08 (0.38)	0.02 (0.13)*	0.09 (0.33)
	Evaluative	0.16 (0.41)	0.15 (0.40)	0.18 (0.39)	0.16 (0.40)
Emotiveness	Emotive	0.65 (1.24)	0.80 (1.15)	0.16 (0.42)**	0.55 (1.05)
	Non-emotive	3.52 (2.2)	3.15 (2.2)	3.85 (2.6)	3.49 (2.3)
No questions		0.19 (0.39)	0.07 (0.25)	0.18 (0.84)	0.14 (0.54)
All questions		4.36 (2.37)	3.95 (2.20)	4.02 (2.58)	4.11 (2.37)

*$p<0.05$, **$p<0.01$, effects found in comparing the expository with both narrative and problematizing text

The effects of type of introductory text on number and type of questions

A MANCOVA, with prior knowledge and interest in History as covariates and number and type of questions as dependent variables, showed a significant multivariate effect of type of introductory text (Wilk's λ (16,324)=0.76; $p \leq 0.001$) and a significant effect of prior knowledge (Wilk's λ (8,162)=0.85; $p=0.001$). No significant effect of interest in History was found. Univariate between-subject tests showed significant effects of type of introductory text on the variables number of questions [$F(4,173)=5.1$; $p=0.001$], higher-order questions [$F(4,173)=2.9$; $p=0.022$], descriptive questions [$F(4,173)=5.2$; $p=0.001$], comparative questions [$F(4,173)=3.2$; $p=0.014$], emotive questions [$F(4,173)= 4.1$; $p=0.004$] and non-emotive questions [$F(4,173)=4.5$; $p=0.002$].

Our hypotheses regarding the effect of type of introductory text on the number of questions was not confirmed. Contrast analysis revealed no differences between the expository text and both the narrative and problematizing texts, and between the narrative and problematizing introductory text with regard to the number of questions. With regard to the type of questions, the contrast analysis revealed that the students who read the narrative and problematizing text generated more comparative questions than the students who read the expository text (MD=−0.109; $p=0.038$). In line with our expectations, we found that the narrative and problematizing texts provoked more emotive questions than the expository text

Table 7 Correlations between prior knowledge, interest in History, situational interest, and number of questions

	Prior knowledge	Interest in History	Situational interest	Number of questions
Prior knowledge	-	0.39**	0.25*	0.28**
Interest in History		-	0.22*	0.23*
Situational interest			-	0.23*
Number of questions				-

$N=174$

*$p<0.05$; **$p<0.01$

Table 8 Linear regression analysis: standardized coefficients (N=174)

	β	SE	t	p	95% CI for β	
					Lower bound	Upper bound
Prior knowledge (per SD)	0.240	0.075	3.203	0.002	0.092	0.388
Situational interest (per SD)	0.169	0.075	2.242	0.026	0.020	0.318
Interest in History (per SD)	0.002	0.073	0.029	0.977	−0.142	0.146

Adjusted R^2 =0.91, $F(6.74)$=34.48, $p<0.001$

Dependent variable: number of questions

(MD=−0.568; p=0.001). The contrast analysis revealed no significant differences between the narrative and problematizing texts for the type of questions. Means and standard deviations for the number and types of questions for each introductory text are reported in Table 6.

The relationship between prior knowledge, interest in History, situational interest, and the number of student questions

We conducted a correlation analysis in order to examine the relationship between prior knowledge, interest in History, situational interest, and number of student questions. Table 7 shows the results of this analysis. We conducted the analysis for all three groups together. These groups did not differ in the number of questions asked.

We found a significant positive relationship between prior knowledge, interest in History, situational interest and the number of questions generated by the students. Students with higher prior knowledge, higher interest in History, and higher situational interest asked more questions.

A linear regression analysis was conducted to examine the predictive relationship between prior knowledge, situational interest, interest in History, and number of questions. Standardized coefficients are reported in Table 8. This analysis shows that prior knowledge in the first place and situational interest in the second place may predict the number of questions students generate.

Discussion

In this study, we examined the type of questions students ask after reading an introductory history text. We also investigated the effects of type of introductory text on situational interest, sources of interest, and number and type of questions generated by students.

The first research question resulted in a description of what type of questions students ask after reading an introductory text on a historical topic. We used three different question categories; (a) level: higher and lower-order questions; (b) type of historical question: descriptive, explanative, comparative, and evaluative questions; and (c) level of emotiveness: emotive and non-emotive questions. The analysis showed that students were able to generate higher-order questions, which were mainly explanative and descriptive. Students generated a comparable amount of higher and lower-order questions. In other words, they generated quite a number of lower-order questions. Furthermore, we found that the emotive questions students asked reflected incorrect assumptions or did not take into account the specific time and context of the historical event.

Although both lower-order questions and emotive questions that reflect unschooled historical thinking may not be questions directly suitable for inquiry, we think, nevertheless, that, if students are supported in transforming these questions into historical inquiry questions, these questions can be a proper starting point for inquiry and reflection on the, often present-oriented, reasoning that underlies most of these questions (e.g., Rop 2002). Lower-order questions, for example, can be functional as a first step towards more elaborate questions. Abrandt Dahlgren and Öberg (2001) found that undergraduate students following a course in environmental science designed on principles derived from problem-based learning, generated many encyclopedic questions (almost one-third of all questions). These questions are "formulated in a way that suggests that the students expect to find an unambiguous and not too complex answer" (Abrandt Dahlgren and Öberg 2001, p. 270). Although such questions may not result in elaborate answers, Abrandt Dahlgren and Öberg concluded that encyclopedic questions do not have to obstruct deeper processing of the topic because students who generate encyclopedic questions also reason with more meaning-oriented questions (questions "oriented towards finding the phenomenological meaning of certain terms or concepts", Abrandt Dahlgren and Öberg 2001, p. 270). Furthermore, the question itself does not reveal much about the underlying reasoning process. Yang (2006) argues that much research on questioning incorrectly assumes that "the cognitive process type needed by each question is fixed in itself." (pp. 198). A lower-order (descriptive) question can be the starting point or the result of higher-order (historical) reasoning, while asking a higher-order question does not always have to be the result of higher-order thinking. In line with this, one can consider almost every student question to be a potential starting point for learning, as argued by Beck (1998). More research is needed into methods that can be used to support the learning process of students who ask questions about the past that are naïve, too restricted for elaborated inquiry (lower-order questions) or badly formulated, while, at the same time, sustaining their interest and sense of 'ownership' (Hakkarainen and Sintonen 2002; Scardamalia and Bereiter 1992). Secondly, more research is needed into the process of questioning during the reading of historical introductory texts. Students may have had more (motives for) questions that are based on present-day thinking or naïve thinking during reading. These questions may not have been formulated since students were instructed to ask questions after they have read the whole text.

The second research question concerned the effect of the type of introductory text on situational interest, sources of situational interest, and the number and type of student questions. The narrative and problematizing texts resulted in significantly higher situational interest compared to the expository text. This supports the idea that a narration or a problem can be a suitable introduction to provoke interest at the beginning of a new topic in the history classroom, as suggested, for example, by Wilschut et al. (2004) and Schneider (2001). We are careful in generalizing these findings to all types of problematizing introductory texts, since we only used a problematizing text in which problematizing was embedded in a comparison between a historical and a current situation.

In line with our expectations and previous findings of studies on the effects of text characteristics (e.g., Schraw 1995), emotiveness and engagement appeared to be a more important source of interest in the groups where students read the narrative and problematizing text than when students read the expository text.

Thus, the relatively higher interest that students reported after reading the narrative and problematizing text may be explained by the fact that such texts evoke more emotiveness and engagement. This supports the idea in history education that students' attention is captured by important life themes and problems such as justice and injustice and wealth and poverty, which are still a part of contemporary society (e.g., Barton and Levstik 2004).

Although situational interest was higher for the narrative and the problematizing text than for the expository text, the outcome did not differ regarding the number of questions students asked. This is in contrast with our expectation that higher situational interest would result in more questions. Since we did not find significant differences between the three groups in the number of questions asked, we carried out a correlation and regression analysis between situational interest and the number of questions asked for all three groups taken together. We found a significant positive relation between situational interest and number of questions. Next to prior knowledge, situational interest can be considered an important predictor for the number of questions students asked.

Perhaps other factors are important in determining the number of questions asked. First, after writing down three or four questions, students might just stop generating questions because they consider what they have done to be a reasonable amount in their task conception. Second, prior knowledge (as a covariate) had a significant effect on the number of questions asked. Further research is needed to get a deeper understanding of how prior knowledge affects the asking of historical questions. Students with more prior knowledge may ask more questions, because they compare new information with what they already know (Otero and Graesser 2001). However, a higher number of questions may also be related to students' prior knowledge and understanding of the meta-concepts of History (Limón 2002; VanSledright and Limón 2006), such as cause, effect, change, and continuity. For example, students knowing that historical changes have multiple causes and can differ in tempo and scale, may give rise to more questions. We need more clarity on the knowledge underlying the ability to ask historical questions.

Although the type of introductory text did not have an effect on the number of questions asked, it did have an effect on the types of questions asked. The students who read the narrative and problematizing text generated more comparative questions compared to students who read the expository text. All texts mentioned differences between countries, but perhaps in the narrative and problematizing text these differences were more salient because these were described as concrete experiences of a person, thus resulting in more comparative questions. We have to notice here, however, that students asked only very few comparative questions. Furthermore, more emotive questions were generated by students who read the narrative and problematizing text, which is in line with our expectations and the finding that these texts evoked more emotiveness.

Regarding this last finding, we have to remark that although emotiveness was an important source of situational interest, relatively few emotive questions were generated by students and the standard deviations were relatively high. It may be that students thought of more such questions but did not write them down. It is noticeable that students are inclined to ask questions that are asked in textbooks or by the teacher. Further research could investigate whether emotive reactions during reading of the text are transformed into questions. Van der Meij (1994) states that transforming a state of perplexity into a question is an important ability. Students may pose other questions for social reasons that are not based on experienced perplexity (Graesser and McMahen 1993; Graesser and Olde 2003).

Emotive questions that are asked out of perplexity may reflect unschooled historical thinking, but may at the same time be authentic for the students and may be the questions they are most interested in. This is in line with the idea that every question a student asks is interesting, without being researchable from the start (Beck 1998). Emotive questions can be used in history lessons to transform present day and unschooled historical thinking into historical thinking. This transformation is considered to be an important goal of conceptual change in the domain of history (Limón 2002). Emotive questions can be useful for helping students reflect on the importance of historical contextualisation. Del Favero et al. (2007) argued that further research is needed on domain-specific guidance given to students asking questions.

A possible limitation of this study is that students were not asked to generate questions in a context of inquiry learning. Students only read a text and generated questions after reading. If students had been instructed to formulate questions in order to conduct an inquiry based upon these questions, they may have come up with a different number and type of questions. That task was not set because a drawback of such an approach might have been that students may have felt restricted in asking certain types of questions because they perceived them not to be intelligent or suitable questions for inquiry. We wanted them to ask questions that reflected what they were genuinely interested in (e.g., Scardamalia and Bereiter 1992). Furthermore, we studied task-induced questions (Graesser, and Olde 2003) and not self-induced questions. Students were directly instructed to ask questions. The questions that students might themselves have asked spontaneously during the reading of the text may have differed from those generated after our instructions.

Another possible limitation is that we did not gain any insight into the cognitive and affective processes students were engaged in and the perplexity they experienced while reading the text, whereas this could help us in explaining the questions students do and do not ask.

To conclude, this study focused on triggering situational interest with different types of introductory texts and generating questions. Our study showed that the type of introductory text has a significant effect on situational interest and sources of situational interest which is in line with findings of previous studies with texts that did not have this specific introductory function. Correlational and regression analysis supports the assumption that a higher situational interest goes together with more questions. Furthermore, our study showed that students are able to ask higher-order historical questions and that they ask relatively few comparative questions (whereas the texts contained several triggers to ask comparative questions) and questions that reflects emotion (whereas emotiveness was an important source of interest). Although we did not find differences in the number of questions asked, when constructing or choosing an introductory text for stimulating situational interest, narrative, or problematizing texts (that include attention to major life themes and compare a present and historical situation) may be more useful than expository texts. Another reason for choosing these types of texts is that they trigger more emotive questions that reflect present-oriented thinking of students and that can be used by teachers as a starting point to reflect on the importance of taking a historical perspective.

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Current themes of research:

Learning and teaching of history. student questioning. interest.

Most relevant publications in the field of Psychology of Education:

Van Drie, J., Logtenberg, A., Van der Meijden, B., & Van Riessen, M. (2009). 'When was that date?' Building and assessing a frame of reference in the Netherlands. *Teaching History, 137*, 14–21.

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Current themes of research:

Learning and teaching of history. collaborative learning. concept learning. heritage education.

Most relevant publications in the field of psychology of education:

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Current theme of research:

Cognitive and metacognitive strategies. process measurement. reasoning in domain learning.

Most relevant publications in the field of Psychology of Education:

Veenman, M.V.J., Van Hout-Wolters, B.H.A.M., & Afflerbach, P. (2006). Metacognition and learning: Conceptual and methodological considerations. *Metacognition and Learning, 1*, 3-15.

Broekkamp, H., & Van Hout-Wolters, B. H. A. M. (2007). Students' adaptation of study strategies when preparing for classroom tests. *Educational Psychology Review*, *19*(4), 401-428.