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# Primary school pupils learning through haptics at historical sites

David Ludvigsson <sup>a</sup>, Martin Stolare <sup>b</sup> and Cecilia Trenter <sup>c</sup>

<sup>a</sup>Department of Culture and Society, Linköping University, Linköping, Sweden; <sup>b</sup>Department of Political, Historical, Religious and Cultural Studies, Karlstad University, Karlstad, Sweden; <sup>c</sup>Department of Society, Culture and Identity, Malmö University, Malmö, Sweden

## ABSTRACT

Haptics in the sense of active touch, as well as internally felt bodily sensations, add an important dimension to learning sessions at historical sites. Drawing on observations of primary school pupils visiting historical sites in Sweden, and interviews with pupils, teachers, and site educators following the visits, this study investigates in which ways haptics affect how young pupils learn history. Three aspects of haptics are identified as important to learning in history education: touch, internally felt bodily sensations, and visual and auditory senses, the latter interacting with haptics. The study argues that visits to historical sites help pupils develop their historical understanding through knowledge by acquaintance. It also emphasises that for historical learning to take place, the experience must be put in relation to a historical frame of reference.

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## Haptics and history education

History is mostly taught using auditory and visual modalities. However, humans perceive and experience the world through a combination of sensory modalities that also include the tactile and haptic. Occasionally, when history teachers take their pupils on field trips to historical sites and museums (Wilson and Hollis 2007; Dawson and de Pennington 2000), sensory experiences involving touch can be a crucial dimension of the learning session and add specific qualities to pupils' learning. In this article, using materials collected in conjunction with historical field trips (cf. Trenter, Ludvigsson, and Stolare 2021; Stolare, Ludvigsson, and Trenter 2021), we aim to discuss how haptics add to pupils' experience and learning of history.

While haptics has not previously been used in history education theory, the concept provides an operationalisation for analysing cognitive and affective aspects of school children's visits to historical sites. Since Révész (1950) introduced the term, haptics usually has referred to active touching, Révész himself emphasising that moving touch is the essence of haptics. In addition, as pointed out by Paterson (2009), the term haptic can also be applied more extensively to include internally felt bodily sensations. In this way, different sensory dimensions such as touching, hearing, seeing, and smelling are combined and related to expressed affective reactions.

A point of departure for the 'haptic approach' is the notion that humans are connected to the surrounding physical environment. The bodily sensations and responses that naturally occur as part of experiences, and especially so when actively using the body, add to our learning. In this sense, one can speak of haptic knowledge, which involves relationships between the visual, the

**CONTACT** David Ludvigsson  david.ludvigsson@liu.se

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non-visual and the somatic senses (Paterson 2009). It is possible to put the concept of haptic knowledge in the broader context of different forms of knowledge and means of obtaining knowledge. In history education research, where the idea of first- and second-order concepts has been so central (Lee 2005), the emphasis has come to be on propositional and procedural knowledge. Haptic knowledge, by contrast, can be related to ‘knowledge by acquaintance’ and the role that sensory experiences can play in a knowledge process (Winch 2013).

Utilising different forms of knowledge might be a powerful way to support learning in history. Tiballi (2015, 59) has argued that students’ abilities to process information gathered through working with artefacts are superior to their capacity to process auditory or visual information, the reason being that haptics are related to several sense organs and constitute a ‘system of several interrelated mechanisms’ that support sensory memory. A number of studies have demonstrated the complex links between the sensory and cognitive systems. For example, sensory inputs lead to activity in areas of the brain that are associated with those senses. Thus, when asked questions about colours, subjects responded through activity in the brain area that processes colour sensations (Martin et al. 2000). Therefore, as a sensory experience is clearly linked with cognition, we should conclude that haptic engagement in learning environments can have important cognitive effects.

Based on the discussion of haptics, it seems interesting to pay attention to the physical bodily experience of artefacts and cultural-historical environments in conjunction with visits to historical sites. In addition to haptics in learning processes, scholars have paid attention to bodily and emotional experiences in the making of space and sites. Geographer Doreen Massey’s (2005) operationalisation of practices and processes in relation to space highlights that spaces are constructed in relation to people. Aligned with this dynamic approach to space and sites, critical heritage studies have underlined ‘the flesh and embodied agency’ when experiencing sites (De Nardi 2020, 13). We consider the haptic experience as being a part of this ‘space-making’. What role can these experiences of touch and spatial encounters play in historical learning? Secondly, it is also relevant to recognise the relationship between external experiences and internally felt sensations. Here, haptics links to affective dimensions in the process of learning. Finally, by tradition pupils encounter history in the form of narratives, distributed verbally and visually. What role do these narratives play in the visits, and how do they interact with haptics? These are three problem areas that will be addressed empirically in this paper.

## Research on field trips to historical sites and museums

Haptics is a potentially important aspect of history field trips. As compared to a regular classroom, where pupils listen and look, historical sites and museums offer opportunities to listen, look, touch, smell and sometimes even taste. Thus, many senses may be used when gathering and processing information at sites. Which senses are most important for learning is an empirical question and will differ depending on the qualities of the site and the design of the learning session.

Field trips can take many forms and have attracted interest from researchers partly because they offer possibilities for experiential learning. Synthesis, holism and integration are characteristics of subject knowledge favourably imparted in the field (Loneragan and Andreson 1988). When it comes to history field trips, students have suggested that experiencing a physical locality made history seem more real (Ludvigsson 2012). Regarding school visits to historical museums, Spalding (2012) has emphasised that such visits stimulate emotional engagement, which contributes to a deep understanding of sensitive histories and helps develop students’ historical consciousness. Savenije and de Bruijn (2017) have similarly emphasised the complex interplays between cognitive and affective dimensions of learning history within the context of a museum visit. Other researchers have highlighted the physicality of sites and museums. Curtis (2015) in her study of children’s visits to ancient stone circles in Scotland points out that in her collected materials children lean, climb, sit and lie on the stones, and touch is a ‘recurrent action’. Lurio (2016), referring to young children visiting historic house museums, suggests that sensory experiences can teach history to children with an

autism spectrum disorder. Martinko and Luke (2018) observed children in the age range of 8–13 years who visited a history museum together with an adult. They found that in hands-on history spaces, the children engaged in multiple instances of historical thinking. Most children used material primary evidence in some kind of investigative process, and they also applied a historical perspective, for example, considering what historical actors may have felt. Meeting with objects can raise a range of questions, the answers of which can tell us diverse things about past society (Durbin et al. 1990).

## Aim of the study

While several of the studies mentioned above have noted the significance of hands-on learning and meeting history with many senses, haptics has not been the prioritised perspective of these studies. In the present study, we will investigate the visits of young school children to historical sites with a focus on haptics. The overarching research question is: *In which ways does haptics effect historical learning of young pupils during visits to historical sites and museums?*

This purpose has been broken down into three parts, which focus on different aspects of haptics in relation to historical learning.

- (1) Touch: What impact do physical and spatial experiences have on pupils' historical learning?
- (2) Internally felt bodily sensations: How does a physical bodily experience interact with affective sensations?
- (3) Visual and auditory senses: What role do verbal and visual narratives play in the visits to historical sites, and how do they interact with haptics?

## Method

### Overview of research approach

In the course of the study, we have observed primary school children visiting a variety of historical sites. After the visits, pupils, teachers, and site educators were interviewed. In addition, drawings and written narratives produced by the pupils were collected. For this article, three historical field trips are discussed that allowed the pupils to be physically active, thus making haptics add to the pupils' experience and learning of history.

### The sites

Three historic sites feature in the following; all are located in the region of Östergötland in southeastern Sweden, two of them in the vicinity of the university town of Linköping and the third in a remote forest. The first is the outdoor museum of Gamla Linköping ('Old Linköping'), a heritage village that consists of about a hundred wooden buildings that were moved from central Linköping to a location on the outskirts of town in the 1950s. Some of the buildings have been turned into museums reflecting various aspects of the old municipality; an old school was turned into a school museum (Elfström 1996; Johannesson 1996). In the context of this study, the school museum is pragmatically defined as a historic site.

The second is the combined historical sites of the Kilen cottage and the Bjäsäter old flour mill, located in the mixed agricultural and forestry landscape, and preserved by the local heritage society of Vreta Kloster (Eskilsson 2008).

The third site is the Witches' Forest. It is located in a forestry area near the town of Finspång, and was the site of a chain of events in 1617 when a small group of women hid there, were recovered, tried, and finally executed as witches.

In the curriculum for primary school in Sweden, it is stated that the children should learn from ‘meeting with places’ i.e. sites. In lower primary school, history is not a distinct subject but is part of the integrated subject of social studies. Some topics mentioned in the social studies curriculum have a historical dimension, one being how it was to go to school a hundred years ago, which here connects with visiting the school museum in Old Linköping. Another topic is the history of the pupils’ home community: ‘What places, buildings and the daily life in the pupils’ neighbourhood can tell about the living conditions of children, women and men during different periods,’ which connects with the visit to the cottage and the flour mill. In upper primary school, where history is a distinct school subject, one topic mentioned in the school curriculum is the witch trials of the early modern period. Thus, all the three sites thematically relate to topics mentioned in the history or social science curriculum.

In all three cases studied here, school children were present at a historical site together with their teacher(s) and with one or more representatives of the site. While the programmes differ from one another, the analysis of the cases was guided by the same questions: what impact do physical and spatial experiences have on pupils’ historical learning, how does a physical bodily experience interact with affective sensations, and what role do verbal and visual narratives play in the visits to historical sites, and how do they interact with haptics?

### **Learning sessions**

The visit of the class to Gamla Linköping (Old Linköping) was part of an eight-week thematic study in which the pupils learned what it was like to go to school a hundred years ago. Thus, when the pupils visited the school museum they had already read books and seen a film, so they had learned a few things about what to expect. Furthermore, prior to the visit, the on-site educator had provided the teacher and her class with suggestions on how to prepare for the visit which was to be in the form of ‘time travel’ (cf. Gordon 2016), which is a concept practiced as part of the education programmes at this site. The information pack included suggestions on how to dress, how to greet adults, and what could be included in a historical lunch pack. It also included a prayer the class should learn before coming. As a result, when the children arrived at Gamla Linköping they had dressed in old-fashioned clothing: many wore dark clothes, the girls had headscarves, braids, and a skirt or dress, while the boys wore a shirt and cap. The instructions from the on-site educator had reached the teacher, but there had been no actual direct contact before the visit, as another teacher at the school had booked the visits for three classes and thus acted as an intermediary. While the teacher had visited the site before and knew what to expect, the initiative to make this Gamla Linköping visit should be seen not simply as the initiative of an individual teacher, but as the result of a local school culture where a group of colleagues takes joint decisions on issues such as field trips.

The time travel was organised symbolically. First, the children and adults were provided with wooden name tags on which were written names other than their own. They stood in a circle, held hands, closed their eyes and counted down from ten. The on-site educator rang a bell, and when the children opened their eyes, they were welcomed to school one hundred years back in time. The personality of the friendly on-site educator had now been transformed into a rather strict mistress who led them to the school building and then through a lesson in which they practised writing on a slate, wrote script in ink, discussed an educational poster, and read a prayer in unison. Finally, the class went to another room where they counted together from one to ten and then were symbolically moved back to the present day. After returning to school, the pupils drew and wrote individual texts on the visit to the school museum, then continued their work on going to school in the past.

In the second case, a school class visited the Kilen cottage and the old flour mill at Bjäsäter. On this autumn day, the local heritage society opened the mill and the cottage, which meant that members of the society spent days slowly warming up the old baking oven in the cottage so they could make bread without causing the oven to crack, and preparing the flume and the machinery of the old mill

so it could be used for grinding. In all, some fifteen to twenty people were involved in arranging the activities at the two connected sites. A few weeks in advance, the society contacted schools in the area and invited them to come and visit. Thus, the initiative for the field trip came from the local heritage society, but, because this is an annual event, teachers in the area knew it was going to take place. To the class observed, the field trip was part of their school work on the 'farmer's year', which dealt with how food is produced; the teacher said she had planned to work with the farmer's year during the early autumn, so a visit to Bjäsäter was well suited. During the weeks prior to this field trip, the class had grown crops, reaped their harvest, and threshed seeds with their own hands in the classroom, thus developing 'knowledge how'. While the historical dimension was certainly one part of their field trip, food production was another.

The class gathered in the morning at the Kilen cottage, where a member of the heritage society, pretending to be a historical inhabitant of the house, gave a talk on how life had been at this site. The children were then allowed to walk around, to enter the house where bread was being baked in the oven and were given pieces to eat. Then the class hiked two kilometres to the old flour mill. Here they first inspected traditional methods of threshing seeds; then they entered the noisy mill and looked at the millstones working. Finally, they could buy freshly ground flour. There were also some other activities to look at in buildings near the mill, such as a blacksmith at work. After the three-hour field trip, the class returned to school, where they looked at photographs that the teachers had taken and wrote accounts of the visit related to the scene assigned to them.

In the third case, three classes travelled by chartered bus to a location deep in the forest, from where they took an hour-long walk in the company of a guide to a cave where suspected witches had hidden, to the lake into which the women had been thrown, to see if they would sink or float, and to a cliff from which the women were pushed to their death. The guide was employed by the local authorities, who also took responsibility for preserving the forest. In the days prior to the visit, the teacher told the pupils about witch hunts, and the pupils listened to an audio programme on the topic. As the spring term ended shortly after the field trip, the pupils were to further investigate the topic after the summer.

All three sessions were developed and led by site representatives. Teachers accompanied pupils on all sessions. Because the visits thematically fit with ordinary teaching, teachers rarely interrupted guides (and only occasionally helped focus the attention of pupils); they let the site educators follow their own programmes.

## **Participants**

Educators for the three sites were contacted, and they suggested dates when school classes would come to visit; a comfort selection followed. The study focusses on three primary school classes with eight-, nine- and eleven-year-old pupils. 41 pupils were interviewed. The majority of pupils had a Swedish background. Only individual pupils had an immigrant background, which reflects the areas where the schools are located. The two lower primary classes consisted of approx. 40 children, and of these, 26 were interviewed. In the case of the upper primary pupils, three classes consisting of approx. 65 pupils participated in the field trip, where the teachers divided them into two intergroups. Pupils from all three classes were interviewed in separate groups; 15 pupils were selected, where the selection principle was to choose the first few from an alphabetical list of the pupils.

## **Data collection and analysis**

Data were collected from 2017 to 2019 by means of a content analysis of the sites and learning sessions, interviews and observations of pupils, site educators, and teachers during the learning sessions.

One of the authors (Ludvigsson) collected all materials, photographing the sites, collecting written materials provided by the sites, taking notes during the learning sessions (one of which

was also audio-recorded), photographing drawings and essays produced by pupils, and audio-recording interviews with pupils, teachers, and site educators. There is no indication that the experience of pupils during learning sessions was influenced by the presence of an observer, although such influence remains possible. Semi-structured interviews were conducted with pupils in groups of four or five, each interview lasting roughly 15 min. Adults were interviewed individually for approx. 30 min. Interviews were designed to shed light on children's thinking about historical sites, posing open-ended questions such as 'What did you do yesterday [at the historical site]?' in order to have the children characterise the field trip in their own words.

A qualitative scheme of analysis was developed to examine the extent to which haptics affected the pupils' experiences and learning at the sites. Field notes, interviews and pupil-produced materials were subjected to systematic content analysis, categorising the materials according to the themes of touch, internally felt bodily sensations, and visual and auditory senses. Particular attention was paid to instances where pupils showed high intensity in their communication, indicating strong engagement. While data from the three case studies were analysed separately, similarities in the findings led us to combine them for this chapter. Thus, data were grouped when they referred to the same topic.

Substantial effort was put into informing participants about the study and securing the informed consent of children to participate. Still, the failure of some parents to consent meant that some children could not be included in the study (Balen et al. 2006). For ethical reasons, pseudonyms are used when referring to individuals.

## Findings

### *Touch and the learning of history*

During the learning session in the school museum, pupils were tasked to write in historic ways, both on a slate and on paper with ink. As the pupils were unaccustomed to shaping letters with old writing tools, this was a challenge. One pupil said afterwards that writing with ink was hard, and she was even afraid that she would be punished if she did not shape the letters well. However what surprised the pupils the most was not the writing, but that they got to hold and use a hare's paw as an eraser. The site educator did not explicitly comment on the paw, but each pupil was expected to use one, which they did with great interest: some hesitated and others were clearly excited. The fact that it was real made a big impression on the pupils. Even before the time travel started pupils looked in through the window of the school museum, partly to see whether they could glimpse a hare's paw. This was because children from another class at their school had recently visited the school museum and brought information back to school about that special historical artefact.

Back at school, when the class made a mind map on the whiteboard recounting the experiences of the field trip, erasing with the hare's paw was included. Eight of the eleven pupils participating in the study included the hare's paw in their assigned written accounts about the field trip. Interviews confirmed a fascination with the hare's paw:

- Anna: Rubbing with the hare's paw was a little creepy. One in our class [...] she said she would go home if we had to rub with the hare's paw, because she was so scared [...]
- Samuel: I thought it was difficult to rub with it, I didn't know how to hold it.
- Lars: It was a little different compared to an ordinary eraser.
- Peter: It was a little scary when we saw the skeleton.
- Cecilia: And then we heard from everyone [in the other classes] that we would rub with the hare's paw and I felt really frightened. But then when I looked through the window it did not look like I thought it would and then, when I held it, it was quite soft and nice. I thought it would be more horrid with much bigger claws.



The acts of looking through the window for the paw, the hesitation of some pupils to hold it, the excited comments of others when doing just that, and the fascination with which they talked about it afterwards all indicate that the paw was loaded emotively. It is an example of those artefacts at historical sites that enable sensory experiences of history. It was not least the act of holding it in one's hand ('it was quite soft') that made the pupils react. To this group of pupils, touching it meant touching a piece of a dead animal, and this created haptic feelings in them. However, it is difficult to say exactly what they learned from the hare's paw. One pupil pointed out there was no ordinary eraser, implying the hare's paw was used simply because it was a working alternative. Apart from that, all the fears expressed by the pupils suggest that the hare's paw was perceived as a strange item and that they did not fully grasp the meaning it could have transmitted about the society within which it was used. The pupils did not explicitly make a connection between the hare's paw and poverty, or to people's living close to animals.

The children visiting a cottage and a flour mill were active during the field trip, both in a physical sense, exploring the historic settings they visited and posing questions to the adults who were working there. All of them held up their hands, volunteering to turn a wheel on a threshing machine. When a couple of old men worked threshing seeds on a tarp in an old-fashioned way, the children joined their teacher in a song to help the men complete the work, and afterwards several children crept on the tarp gathering seeds and thus physically engaging in the threshing process – touching the seeds with their fingers, just as some of them had helped turn the wheel on the threshing machine. In moments of spare time, several of the children took the opportunity to climb on a large wooden stub or explore the inside of a log cabin.

Both observations and the children's comments in interviews suggest the sensory experiences of touching the site were a major part of what made an impression during the visit to the cottage and mill. Inside the flour mill, they physically engaged with freshly-made flour, some of them taking it up in their hands. One boy threw flour on the others inside the mill, a playful act (when the teacher was not nearby) that several of the children referred to in interviews. This and other acts of touching and feeling that the pupils referred to indicate that to them, making flour and baking bread were very real and material processes.

### ***Internally felt bodily sensations and the learning of history***

At the Witches' Forest, no historic buildings or artefacts remain from the time of the witches. Thus, during the guided walk, pupils did not touch any specific artefacts. However, the indistinct trail through the forest went across rocks and roots, some of the pupils crawled into a cramped cave, and they balanced on top of a slippery cliff while listening to the guide. Several of them commented lavishly about the cave where the witches hid themselves, thinking it was much too cramped and saying they could not understand how the women had been able to live there. Further, while enjoying or fearing walking on the cliff ('we shouldn't go closer to the precipice') from which the witches had been pushed to their death, some of them noted it was not as high as they had thought before coming there. Some pupils exclaimed similar disappointment about the little lake (where the people checked whether the witches floated), which they did not find very impressive. They had talked about the historic events in the Witches' Forest before going there, but the visit to the site failed to support their pre-conceptions as they had imagined the landscape much differently than it turned out to be. Several of the pupils found it hard to accept the realistic version of events that should have resulted from their seeing the real locations.

However, visiting the forest also made pupils reflect on living conditions for the seventeenth-century women who hid there, and the pupils' haptic experiences led to other knowledge. Both during the walk and in interviews afterwards, pupils made frequent references to the spiders, gnats and ants that they encountered. The pupils swore frequently during the walk and said that they could not stay in the cave because there were too many gnats and that they were afraid of snakes. The experience of confronting gnats engaged multiple sensory modes, with several pupils



complaining about ‘mosquito bites’. An interesting comment from one boy was that he did not see how the women could have survived living in this remote location, adding that ‘nowadays there are no cows moving freely in the forest’. All these comments, and especially the last one, suggest that the physical meeting with the forest made pupils think more intensely about the practical living conditions of the women hiding there in the early seventeenth century. While noticing blueberries growing, they thought that the berries would not be enough for the women to survive on.

The pupils visiting the Kilen cottage and the flour mill performed a large number of physical activities, which they also recounted in interviews afterwards. Referring to the flour mill, several children pointed out they found it fun or scary to walk out on a little balcony on the side of the mill just above the turbine. One girl suggested that had the old wooden floor broken she ‘would have fallen down’ onto the turbine below, possibly destroying it, and ended up in the water. This fantasy reflects what might be referred to as inwardly felt bodily sensations, the strong feeling of presence in a noisy mill and the experience of walking out on a fragile wooden balcony just above the turbine. One boy referred to the danger of sticking one’s finger into a machine where ‘it could be hurt’, which is another fantasy connected with the real danger of the site. Another boy mentioned he had stood very close to a noisy machine that suddenly started, which gave him bit of a shock. Some other children had walked to the forge, but thought it smelled badly there and exclaimed that ‘the air was not possible to breathe’. In all these experiences, multiple sensory modes combined to create impressions.

The pupils showed particular interest in the primitive living conditions presented by the Kilen cottage where there was no electricity. While a couple of children thought the cottage was cosy and said in interviews they would like to come back, even thinking it would be nice to live there, others argued it was much too dark and cold and smelled of smoke. One boy (implicitly comparing with his life-world) remarked that it would not be possible to charge a smartphone there because there was no electricity. Another boy suggested the reason they had a fire going in the house was there was no heater. Yet another boy imagined that it would have been difficult to live there if a roof beam started to mould, as it would be difficult to repair. The children also noted that the doorway was very low and commented that newspapers were used for wallpaper, suggesting there was nothing else that could be used. Next to the cottage itself, there is an even smaller log cabin which was said by the site educator to have housed eight people. Several children wondered how this would have been possible, laughingly suggesting that they must have slept head to toe or on top of each. The children found an explanation in their living conditions, saying it was probably because the people ‘could not afford anything better’. During the visit, one of the children had to go to the privy near the cottage. Some reported afterwards that the door to the privy could be locked from the outside, and it was very dark inside. All these examples indicate that the children actively explored the small buildings and learned about the poor living conditions of people in the past. Seeing played an important part during these explorations, yet they also physically ran around, examined the privy door, and comments indicate they noticed both the cold inside the cottage and the heat from the baking oven.

From the school museum visit, several pupils referred in writing and interviews to restricted body movements during the time travel, pointing out that they had to stand up when speaking in class, walk with a straight back, and sit straight on the school benches, keeping their hands on their laps. The children particularly brought up two experiences. One was sitting on a bench together with the other children, rather than on a chair, as they were used to. The other was that the mistress told them to sit up straight. These physical experiences were not included in the mind-map made by the class and their teacher, yet they came up when the pupils wrote individually or orally commented on the visit. Sitting in a specific way may have been experienced as comfortable or uncomfortable; in the interview comments the pupils said it was ‘strict’. The point here is that it created bodily sensations in several pupils important enough to have them mention this as a memorable aspect of time travel. The physical experience of going to the school museum had taught them something they did not recognise from their own school.

Another type of concrete artefact that made an impression on the pupils during the field trip to Gamla Linköping (Old Linköping) was the clothes they wore themselves; exactly how to categorise the wearing of clothes is not clear. Several children thought it was fun to dress in those dark clothes. One girl stated it was a little weird to look like 'an Easter witch', which was in reference to the old tradition on Maundy Thursday where Swedish children dress with a skirt and headscarf. Another girl protested that 'we have clothes that are ordinary for us; these clothes were ordinary to them'. This is an interesting comment, as it signals an acceptance of historical differences. Furthermore, several of the children provided social explanations for the dark clothes, suggesting that, because children in the past worked a lot, bright-coloured clothes would have become dirty, and that laundry was difficult as it had to be done in the stream. Partly helped by the on-site educator/mistress they also linked the issue of clothes to poverty. During the visit, the mistress welcomed a boy named Nils back to school. Noting that he wore a new shirt, she told the class that, because he lacked shoes, he had not been to school during the winter months. Connecting to this, after finishing the time travel the on-site educator showed her visitors a large black-and-white photograph of children, some of whom were barefoot. In one of the group interviews, referring to the dark clothes of children in the past, one boy said that in those times some people did not have much money and some starved. In those days there were no hospitals, and children could get sick and die. They also explicitly referred to the Nils character who stayed home from school during the winter because 'he had no shoes'. Reflecting on Nils' new shirt, one girl suggested his old one may have been worn down when he played King of the Hill.

The pupils' reflections on clothes partly came from seeing them, but some comments suggest the act of wearing is a physical act causing bodily sensations. Wearing unusual clothes apparently stimulated the children's thinking about life in the past. Not only did they reflect on why the clothes looked like they did, but they also compared the clothes to their own. They also made associations with their own life-world experiences, such as the Easter witch and the game King of the Hill. It appears the mistress's use of the poor boy Nils offered an example they found especially meaningful.

### *Learning history on-site by visual and auditory modes*

As indicated above, some of the learning that took place at the historic sites was clearly connected with adults telling and pointing out concrete details to the pupils. For example, inside the Kilen cottage, the accompanying teacher pointed out to the pupils that old newspapers covered the ceiling.

In their comments, the children referred not only to what they had seen but also to what the guiding adults had told them. For example, a man by the Kilen cottage acting as the historical inhabitant, Kalle, seemed to have made a strong impression on the children. They found it amusing that Kalle had tried to avoid physical work in his life, which is something the actor told them. The children called Kalle 'mischievous'. They also cited the actor's final, Brechtian remark that 'I lay buried over there'. Furthermore, there were other references to oral information provided by the actor portraying Kalle, for example, that the cottage was seven logs tall, one of the children explaining that it was taxation laws that led to this limitation in the number of logs used to build cabins. This example indicates that the children learned from spoken words. One girl specifically referred to the actor who played Kalle as telling them things she did not know before.

The schoolmistress appears in the drawings and written accounts produced by pupils. In interviews, they expressed thoughts about her. She did not seem to have made a strong impression on-site, yet they revealed that, before meeting her, they were afraid that she would be angry and punish them. This expectation was based on what they had read about going to school in the past. School children in the past could get a flogging from the teacher. It is also possible that there were rumours among other pupils at school. One of the children admitted she had been 'scared to death' that she would be sent to sit in the corner and therefore was nervous about writing in ink during the time travel. In one of the group interviews, the children discussed

whether a child in another class had lied about being sent to the naughty corner when visiting the school museum. Their own view was that the mistress they met was friendly although a little strict. All the anxiety expressed indicates they had a strong idea about the differences between going to school today as compared to in the past, and they did not feel totally secure about what could happen during their visit to the school museum.

Another example of learning by visual and auditory modes was that through the time travel in the school, the pupils were provided with new names on wooden name tags. They readily accepted their new names and asked their comrades what their new names were. Back at school, when writing and drawing about the field trip, many of the pupils pointed out that they had got new names, and in the interviews, some of them also reflected on the various new names. They had noticed that some of their names were not used in 1910 (the year that they visited), whereas other names in the group were used then just as today. This reflection suggests they had achieved an awareness of continuity and change with regard to names.

## Discussion

Field trips stretch the boundaries of history teaching and offer additional possibilities and challenges. Observations made in this study indicate that young pupils use heritage through highly physical activities. Drawing from their written and oral reflections, experiences of touching and feeling artefacts from the past seem to have strongly affected the pupils. Perhaps this was especially so because the children participating were of a young age, only eight, nine or eleven years old, when the capacities for abstract thinking are not yet well developed. There were several occasions when the young pupils were playing, for example, throwing flour on each other. These acts made it possible for them to develop not only emotional but also a cognitive relationship to the sites.

From the data gathered in connection with the three field trips studied here, haptics in the narrow sense of touching played a role in learning. However, due to the form of the field trips, only some of the pupils actively worked with their hands. The prime example gathered here is that of the pupils writing in ink and erasing with the hare's paw, thus establishing a process of re-creation, a haptic connection with a school world of the past that transformed the experience of the pupil from passive to active. Yet, while acknowledging the emotional and cognitive relationships created, the extent to which it had an impact on historical learning remains unclear. But the haptic experiences seem to generate insights that pave the way for new understandings of living conditions, in some cases unlike present time (the hare's paw) and other cases with proximity to the present (the blueberry as insufficient food.) The hare's paw made a very strong impression but several pupils simply thought it was strange and had difficulty accepting it. One implication follows directly from this. Teachers and site educators must work very hard to put historical examples into meaningful contexts. In this particular case, the class was well-prepared for the visit and they had follow-up activities in school that will have helped the learning process. Still, individual artefacts such as the hare's paw may appear more odd and confusing than they need to be. There is a challenge that an emphasis on the historically different can take the upper hand and thus cloud the opportunities for historical learning. Therefore, it is imperative that experience is put in relation to a historical frame of reference. Consequently, while haptic engagement will surely add to learning, impressive learning such as suggested by Tiballi (2015) cannot be readily confirmed but must be further investigated with other cases.

More convincingly, haptics in the broader sense suggested by Paterson (2009) constitutes an important aspect of learning at all three historical sites. Bodily experiences abound in the empirical material. Wearing dark clothes and inspecting the poor living quarters of people in the past added to the pupils' understanding of the social conditions of life in the past. Haptic knowledge will have resulted from both pleasant and less pleasant experiences. The noise inside the mill and the fears some children expressed about standing on the wooden balcony above the turbine are examples of uncomfortable bodily sensations they experienced, while their eating newly baked bread or

touching a soft hare's paw was more joyful sensations. Fighting gnats, crawling into a cramped cave and noting the absence of food in the remote Witches' Forest added to the pupils' understanding of how difficult it would have been to live there in the past. By walking the sites and seeing, smelling and touching historical artefacts and buildings, even turning a wheel of a threshing machine, pupils developed their historical understanding through knowledge by acquaintance (Winch 2013). In the same way as the example of the paw, there is a risk that sensory experiences are allowed to dominate. Indications of this were shown during the visit to Bjäsäter old flour mill. The overwhelming noise from the mill and the feeling of uncertainty when stepping out on the balcony had a profound impact on the pupils. They tended to revolve around these specific experiences rather than connect to relevant historical contexts. Thus, the pupils did not free themselves from an egocentric position, from their affective response. Following Barton and Levstik (2004) is an awareness of one's position, what they refer to as a desirable perspective recognition and an expression of historical knowledge. These examples tell us that perspective recognition needs to be exercised before, during and after the visits.

To be clear, much of the learning that took place at these historical sites drew on what the pupils saw and heard. Some of the propositional knowledge about the past that pupils had acquired prior to the visits was strengthened via oral communication with adults on-site. One indication of this is the pupils' referring to certain topics that on-site adults had talked about. Yet much of what on-site educators or teachers talked about connected with material traces and there are indications that multiple sensory modes were used in learning. At the sites, learning with one sense cannot easily be separated from learning with other senses. It would be wrong to say the pupils were only looking at traces; rather, even if they did not touch the traces they experienced them via several senses.

One issue that needs to be further explored is in what ways do haptics affect the historical consciousness of young pupils? There is ample evidence that the pupils in this study made connections between their own life-world and the historical world that they met during their visits to historic sites. Reflecting on issues such as clothing, names, living conditions and physical regulations in school they continually linked to their own practical life. Thus, the visits to historical sites seem to have added to their sense-making of the present. The pupils thought it would be impossible to live where you could not charge a smartphone; where it was too cold; where there were gnats and ants and perhaps snakes; etc. These kinds of concrete aspects were meaningful to them, rather than some more abstract ideas about present-day life. The engaging stories told to them about the schoolboy Nils and the former cottage inhabitant Kalle also made strong impressions on them. A reason for this may be that these stories were also very concrete, which made it easy for them to understand the content.

Finally, some methodological issues should be addressed. It is challenging to capture pupils' interaction during field trips. When a group of pupils move around a site together, things will happen and words will be spoken that a researcher fails to register; thus it is impossible to fully grasp such learning sessions. Further, this is a limited, exploratory case study. Yet, thanks to its principal focus on haptics it is a step toward improved insight into multi-modal learning at historical sites. Further, it should help broaden our understanding of what learning at historical sites may entail. A final remark should be made about sites and the role of on-site educators. Historical sites are located in a metaphoric borderland zone between formal and informal education. Because on-site educators, often very knowledgeable about specific aspects of the past, do not have to follow (or are not fully aware of) the school curriculum, it remains a challenge to every teacher to put the presented historical knowledge into context. In other words, the quality of education at historical sites must be seen as a shared responsibility of schools and heritage organisations.

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## ORCID

David Ludvigsson  <http://orcid.org/0000-0001-9239-4139>

Martin Stolare  <http://orcid.org/0000-0002-9606-1961>

Cecilia Trenter  <http://orcid.org/0000-0003-1522-1626>

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