

### 3

---

**LEARNING FROM VISUAL ARTS IN SOCIAL SCIENCES  
WITH DIGITAL RESOURCES AND MOBILE TECHNOLOGIES  
AT THE MONTREAL MUSEUM OF FINE ARTS**

/

**ΜΑΘΑΙΝΟΝΤΑΣ ΑΠΟ ΤΙΣ ΕΙΚΑΣΤΙΚΕΣ ΤΕΧΝΕΣ ΣΤΙΣ ΚΟΙΝΩΝΙΚΕΣ ΕΠΙΣΤΗΜΕΣ  
ΜΕ ΨΗΦΙΑΚΑ ΜΕΣΑ ΚΑΙ ΚΙΝΗΤΕΣ ΤΕΧΝΟΛΟΓΙΕΣ  
ΣΤΟ ΜΟΥΣΕΙΟ ΚΑΛΩΝ ΤΕΧΝΩΝ ΤΟΥ ΜΟΝΤΡΕΑΛ**

**Marie-Claude Larouche, Pierre-Luc Fillion, Normand Roy & Marie-Ève Paillé**  
With the collaboration of Jean-Luc Murray, Patricia Boyer, & Geneviève Godin\*

---

---

\* **Dr. Marie-Claude Larouche** is Professor at the Department of Education Sciences, Université du Québec à Trois-Rivières. [marie-claude.larouche@uqtr.ca](mailto:marie-claude.larouche@uqtr.ca)

**Pierre-Luc Fillion** is Research Assistant and Doctoral Student at the Université du Québec à Trois-Rivières. [pierre-luc.fillion@uqtr.ca](mailto:pierre-luc.fillion@uqtr.ca)

**Normand Roy** is Professor at the Department of Education Sciences, Université du Québec à Trois-Rivière., [normand.roy@uqtr.ca](mailto:normand.roy@uqtr.ca)

**Marie-Ève Paillé** is Research Assistant and Graduate Student, Université du Québec à Trois-Rivières. [marie-eve.paille@uqtr.ca](mailto:marie-eve.paille@uqtr.ca)

**Jean-Luc Murray** is former Director, Education and Community Programme, Montreal Museum of Fine Arts.

**Patricia Boyer** is Educational Programs Officer - Families and Schools, Montreal Museum of Fine Arts. [pboyer@mbamtl.org](mailto:pboyer@mbamtl.org)

**Geneviève Godin** is Artist, Educator, Montreal Museum of Fine Arts, and Visual and Media Arts Teacher. [genevievegodin@hotmail.com](mailto:genevievegodin@hotmail.com)

*MuseumEdu 4* / June 2017, pp. 61-94.

Copyright © 2017 by Museum Education and Research Laboratory, University of Thessaly.

All rights of reproduction in any form reserved.

## ΠΕΡΙΛΗΨΗ

Από την Τέχνη στις κοινωνικές επιστήμες: Πώς μπορούν οι μαθητές να χρησιμοποιούν κινητή ψηφιακή τεχνολογία για να μαθαίνουν μέσω έργων τέχνης σε ένα μουσείο; Στο άρθρο αυτό παρουσιάζουμε μία ερευνητική δράση που εκπονήθηκε με το Μουσείο Καλών Τεχνών του Montreal και με δημοτικά σχολεία του Μόντρεαλ και το οποίο αφορούσε τον σχεδιασμό μίας πρωτότυπης εφαρμογής κινητής ψηφιακής τεχνολογίας, τον έλεγχό της σε εκπαιδευτικό πλαίσιο και τη διερεύνηση των δυνατοτήτων της. Η δράση καλούσε του μαθητές να ερμηνεύσουν έργα τέχνης ως προς την αξία τους ως πηγές αναφορικά με πραγματικότητες του παρελθόντος. Το σώμα των έργων που επιλέξαμε περιλάμβανε 12 έργα τέχνης: τοπία και καθημερινές σκηνές από τη δεκαετία του 1840 έως και τη δεκαετία του 1940, έργα καλλιτεχνών του Québec και του Καναδά. Το iPad λειτούργησε ως ένα εργαλείο διερεύνησης και μελέτης των επιλεγμένων έργων και χρησιμοποιήθηκε ως ένα εργαλείο παραγωγής κατά τη διάρκεια του εργαστηρίου στο μουσείο και για το ανέβασμα των βίντεο που παρήγαγαν οι μαθητές στο Vimeo. Η δράση χρησιμοποίησε μία ενσωματωμένη φωτογραφική μηχανή, iMonie, και μία πρωτότυπη εφαρμογή που σχεδιάσαμε και αναπτύξαμε ειδικά για αυτό το πείραμα (με παιχνίδια παρατήρησης, παλιούς χάρτες και πληροφορίες για τους καλλιτέχνες), η οποία εφαρμογή αντιδρά σε ένδειξη ενός Bluetooth όταν οι επισκέπτες πλησιάζουν ένα έργο τέχνης που μπορεί να μελετηθεί με τη χρήση της εφαρμογής. Επίσης, στους μαθητές και τους εκπαιδευτικούς δόθηκε σχετικό εκπαιδευτικό υλικό πριν και μετά την επίσκεψη. Μετά τον έλεγχο του συνολικού σχεδιασμού με 3 τάξεις της 5<sup>ης</sup> και 6<sup>ης</sup> δημοτικού (ηλικία μαθητών 10 και 11), εξετάσαμε τις δυνατότητες να ενισχύουμε την σκέψη των μαθητών στον τομέα των κοινωνικών επιστημών χρησιμοποιώντας έργα τέχνης, και ειδικότερα, με την ερμηνεία εικαστικών έργων ως προς την αξία τους ως πηγών. Η ανάλυση των βίντεο που δημιούργησαν οι μαθητές αναδεικνύει την αξία της δράσης αυτής για την πρόκληση και συγκρότηση της σκέψης των μαθητών, αλλά και ορισμένες αδυναμίες ως προς τη σύνδεση των έργων τέχνης με το ιστορικό τους πλαίσιο, αδυναμίες που ενδεχομένως συνδέονται με την περιορισμένη προηγούμενη γνώση των μαθητών για τις πραγματικότητες του παρελθόντος που μελετούσαν.

Η **Dr. Marie-Claude Larouche** είναι Καθηγήτρια στο Τμήμα Επιστημών της Εκπαίδευσης στο Université du Québec à Trois-Rivière του Καναδά. [normand.roy@uqtr.ca](mailto:normand.roy@uqtr.ca)

Ο **Pierre-Luc Fillion** είναι Βοηθός Έρευνας και Υποψήφιος Διδάκτωρ στο Université du Québec à Trois-Rivière του Καναδά. [pierre-luc.fillion@uqtr.ca](mailto:pierre-luc.fillion@uqtr.ca)

Ο **Normand Roy** είναι Καθηγητής στο Τμήμα Επιστημών της Εκπαίδευσης στο Université du Québec à Trois-Rivière του Καναδά. [normand.roy@uqtr.ca](mailto:normand.roy@uqtr.ca)

Η **Marie-Ève Paillé** είναι Βοηθός Έρευνας και απόφοιτος του Τμήματος Επιστημών της Εκπαίδευσης του Université du Québec à Trois-Rivière του Καναδά. [marie-eve.paille@uqtr.ca](mailto:marie-eve.paille@uqtr.ca)

Ο **Jean-Luc Murray** είναι πρώην Διευθυντής του Προγράμματος *Εκπαίδευση και Κοινότητα* του Montreal Museum of Fine Arts του Καναδά.

Η **Patricia Boyer** είναι Υπεύθυνη των εκπαιδευτικών προγραμμάτων για οικογένειες και σχολεία στο Montreal Museum of Fine Arts του Καναδά. [pboyer@mbamtl.org](mailto:pboyer@mbamtl.org)

Η **Geneviève Godin** είναι Καλλιτέχνης και Εκπαιδευτικός στο Montreal Museum of Fine Arts του Καναδά, and Δασκάλα Εικαστικών Τεχνών και Μέσων. [genevievegodin@hotmail.com](mailto:genevievegodin@hotmail.com)

## ABSTRACT

From Art to social science: how can students use mobile digital technology to learn from artworks in a museum? In this article, we are presenting a development research project conducted with the Montreal Museum of Fine Arts and Montreal elementary schools to design a prototype mobile technology application, test it in an educational set-up and explore its potential. The experience invited students to interpret artworks for their documentary value with regard to past realities. The corpus we created consisted of 12 artworks: landscapes and genre scenes from the 1840s to the 1940s by Québec and Canadian artists. The iPad served as an instrument of inquiry and exploration for the targeted works and was used as a production tool during the workshop at the museum and to upload the resulting videos to Vimeo. The project used the built-in camera, iMovie, and a prototype application we designed and developed especially for this experiment (with observation games, vintage maps and information about the artists), which reacted to a Bluetooth signal when the visitor approached an artwork that could be explored using the app. Pre- and post-visit materials were also offered to teachers and their students. After having tested this set-up with three grades 5 and 6 classes (students' age 10 and 11 years old), we examined its potential to spark social science reasoning using artworks, specifically, by interpreting figurative artworks for their documentary value. The analysis of the videos created by the students demonstrates the resource's value for stimulating and consolidating the students' reasoning, as well as certain weaknesses in the contextualization of the artworks, possibly related to the students' limited knowledge about the past realities studied.

## **Acknowledgements**

This research received funding from the *Fonds de Recherche Québécois sur la Société et la Culture*. We would like to thank the pedagogical consultants, teachers and students who kindly participated in the project. The mobile application prototype was produced by Idéeclic, thanks to the funding received by the Montreal Museum of Fine Arts from the Quebec Digital Cultural Plan of the Ministère de la Culture et des Communications.

## Introduction

Although the integration of mobile technologies into the museum experience offered to school visitors has yet to be studied in depth, the new possibilities it offers - and their potential impact - are being seriously considered by a growing number of museums in Quebec, Canada (Société des musées québécois (SMQ) 2011). These technologies - mainly smart phones, tablets and iPod Touches - increase and enhance the ways the museums' digital multimedia resources can be used and accessed, depending on the specific features of the devices (with or without GPS, compass, Bluetooth, camera, etc.), the software developed and the networks available (wireless or cell). By offering a gateway to the institutions' digital resources, these applications can serve as multimedia exhibition guides, games or even work tools. The fact that heritage institutions are showing an interest in adding these technologies to their cultural mediation practices (Goldman 2011; Atkinson 2013) inspired us to undertake a collaborative "development research", "*recherche-développement*" (Van der Maren 1996; Harvey & Loiselle 2009), on social science learning.

The first phase of the study was conducted with the McCord Museum (Larouche, Landry & Fillion 2016). In the second phase, this time in partnership with the Montreal Museum of Fine Arts (MMFA) and with the support of a team of pedagogical advisors and teachers, we designed a prototype mobile technology application and tested it in an educational set-up, exploring its potential with three Cycle 3 elementary school classes. Our presentation is inspired by the "education R&D model" formalized by Harvey and Loiselle (2009: 110), which outlines five phases for the research process: origin of the research, reference framework, operationalization, testing methodology and results.

## Origin of the research

In keeping with its intention to go digital and explore new avenues for cultural mediation, the Montreal Museum of Fine Arts (MMFA) showed an interest in designing and developing an interdisciplinary cultural educational activity for the elementary school social science course and investigating the potential of using mobile technologies with its digital resources. For the project, the museum wanted to focus on the permanent exhibition of Québec and Canadian art in the new Bourgie Pavilion of Québec and Canadian Art (Desrochers 2011), as well as a virtual exhibition of this collection (MMFA online).

With this goal, and in close collaboration with the museum, school and university, we began an R&D study to design a prototype mobile technology application, test it in an

educational set-up and explore its potential for elementary school audiences. The term “educational set-up” refers to a set of means designed around a plan targeting certain learning objectives and general or specific competencies in one or more disciplines, based on the terms and specifications of the program of study (Février 2009: 58, in reference to Astolfi, Ginsburger-Vogel & Toussaint 1997). As Lebrun, Smidts and Bricoult (2011) point out, the set-up design often reflects concerns related to innovation and tends to focus on the pragmatic, rather than the theoretical. The full term, “mobile technology museum educational set-up,” specifies the nature of the means used: digital tools and resources in a museum setting. “Educational” refers to more than one discipline. Primarily, it involves the “social universe” (more traditionally termed “social sciences” or “social studies”) which encompasses history, geography and citizenship education. The second educational discipline is visual arts. Needless to say that these are two fields that “often are marginalized in the elementary school curriculum” (Brewer & Brown 2009: 135).

Our first order of concern related to interdisciplinarity. How could the visual arts help the students internalize concepts of society and territory such as those outlined in the official Québec social universe curriculum? Furthermore, while it is true that figurative artworks have some documentary value and can be considered iconographic documents, interpreting artwork requires far more than simply “reading” its anecdotal components. Every work of art reflects the sensibilities of the artist, who embodies a point of view that cannot be dissociated from the society that engendered it. Furthermore, the artwork is also invested with the opinion and subjective narrative stemming from the subjective view of the child or teenager who sees and confronts themselves in their own reality within that artwork. Therein lies the rich, polysemic nature of the artwork and the viewer’s reading of it. Amid this interplay of visions, how can we guide the student to grasp the complex relationship between territory and portrayal? More specifically, how can we lead the student to understand both how the territory is occupied by the people in a particular era and what art brings to this portrayal of the territory?

We were also motivated by a second order of concerns. What contribution can mobile technology make to the experiential museum learning process? More specifically, how can we use the institution’s digital resources, the functions of mobile devices (such as digital tablets) and the WiFi network to design a museum experience that invites the student to play an active role in making meaning? How can we enrich the students’ museum experience by having them view multimedia content, create a production that recounts their vision of the work and share it with their peers?

## Reference framework

To establish the reference framework to support the design of the mobile educational application and the set-up, we reviewed the literature on education and museum mediation and studies on integrating mobile technologies into the museum experience. We conducted a brief analysis of the elementary school curriculum to identify the interdisciplinary components of the social sciences and visual arts courses and found papers on the use of artworks in history or social science courses.

For museum education, many researchers recommend that active learning should centre on investigations carried out by the student (Allard & Boucher 1990) or “inquiry learning” (Hein 1998; Hooper-Greenhill 2007). Hein (1998) defines this type of learning as being part of the constructivist school, which assigns a major and relatively independent role to the student-visitor in activities that are nevertheless structured. There has also been long-standing consensus on the importance of initiating the learning process in the classroom and extending the experience after the actual visit (see Allard & Boucher 1990). In the wider field of museum mediation, recent works have documented the trend of visitors taking photos in exhibitions with their own devices, attesting to a desire to personally appropriate and extend the museum experience (Chaumier, Krebs & Roustan 2013).

Integrating mobile technology into museum visits nevertheless poses real challenges that need to be considered. While mobile technology often leads to “head-down syndrome” (Damala, Cubaud, Bationo, Houlier, & Marchal 2008), well-designed integration should encourage “looking down, looking around” (that is, looking at both the device and the surrounding environment, according to Rodney 2011). A few studies have demonstrated the different ways mobile technology can contribute to museum visits for elementary and high school students, mainly in terms of the tools supplied for the investigation at the museum to facilitate the extension of the visit back to the classroom and in terms of the motivation and engagement elicited for the museum visit. For example, in a study to design and evaluate the smart phone application Myartspace as a learning tool, Vavoula, Sharples, Rudman, Meek and Lonsdale (2009) demonstrated its potential for “collecting” objects during a visit to an art museum and providing resources to extend the experience back to the classroom. Also, for the Gidder study (“Groups in Digital Dialogues”) conducted with the Astrup Fearnley Museum of Modern Art in Oslo, Pierroux (2009) designed and tested a museum education program for high school classes that used mobile and social media as a learning tool. The study demonstrated the importance of seeking balance between novelty and the actual inclinations of the participants doing the exploration. Charitonos, Blake, Scanlon and Jones (2012a, 2012b) examined museum-school learning trajectories stemming from

the use of social media on personal telephones by 29 13- and 14-year-old high school history students on a visit to the Museum of London. They identified the contributions of various tools and artefacts, especially images taken by the students using their phones, which are used to form and build the meaning that the experience takes on in their eyes. Finally, Larouche (2016) explored the potential of a mobile educational application and the relevant educational set-up for a history museum, using a prototype iPod touch application to offer tools that would develop the students' historical thinking. She showed that while mobile technology offers an interesting gateway between an institution's virtual resources and its physical resources, in the exhibition hall as well as the classroom, it is still important to guide the students in the appropriation of the museum artefacts, whether they are real or virtual.

Thereafter, we completed the reference framework with a brief analysis of the Québec Ministry of Education, Leisure and Sports school curriculum, the *Quebec Education Program, Preschool Education, Elementary Education, QEP-MELS*, (Ministère de l'Éducation 2006), which suggests interdisciplinary connections that can be established between the social universe and the visual arts. The social universe curriculum is designed to develop the young citizen's reasoning abilities, with an emphasis on the perspectives of space and time, using a series of explanatory concepts about the social and territorial realities under study (Ministère de l'Éducation 2006: 170). In Cycles 2 and 3 -when this subject is mandatory- the students study how different societies in Québec were organized in the territory at different times in the past.<sup>1</sup> To do this, the students use a research and information processing approach that requires them to draw on community resources as well as written, visual or media documents (Ministère de l'Éducation 2006: 172, 174, 176), using techniques that include interpreting iconographic documents. The students are asked to make multiple observations that are likely to provide information. For visual arts, the QEP seeks primarily to develop two competencies in the students: art appreciation and media creation. In Cycle 3, the students are expected to explore a variety of visual artworks and the sociocultural traces that reveal their connection to different artistic periods (Ministère de l'Éducation 2006: 216).

This brief analysis turned our interest to figurative artworks that would be likely to attest to the social and territorial realities at various moments of the past. In reference to Seixas's work on historical consciousness (2004) and the model of historical thinking he established (Peck & Seixas 2008) and developed to facilitate teaching (Seixas & Morton 2012), and which has been expanded by Lévesque (2009) and adopted by many scholars in history education in Canada (Clark 2011), it appears that the use of primary sources is important for learning history, because they provide the opportunity for the students themselves to make inquiries about past realities. This learning procedure helps students to learn how to approach the past in historical terms. It allows the



students to realize that “history is a way of making sense of the past, not a report from the past” (Von Heyking 2011: 182). To do so, it is important to know how to interrogate these sources (*The Historical Thinking Project*), which elementary school students are capable of, according to studies cited, notably, by Von Heyking (2011).

To give the students the means they needed for this endeavour, we developed a tool for the interpretation of figurative works of art as iconographic documents, based on works on material culture (McCord Museum 2003), teaching history (Jadoulle, Delwart & Masson 2002) and teaching social sciences (Larouche 2014). Crawford, Hicks and Doherty (2009), who are active in museum and school settings, created a web tool that allows social science classes to interpret accessible works of art and publish their interpretations. Their scaffolding interpretive model sets out a six-stage interpretive process: “React, Embrace, Explore, Decipher, Locate, Opine”, summarized by the acronym REED-LO (Crawford, Hicks & Doherty 2009: 137). The material they developed, copyrighted by the Art Museum of Western Virginia, involves a series of questions and links specific to the study of 17 works of art related to themes in US social studies curricula. Although the tool was no longer available online at the time of our study, interestingly, we saw that it started by emotional reaction and led to analysis and interpretation.

## Operationalization

After our survey and analysis of the curricular documents, we carried out the four steps explained below to operationalize the research:

1. Define the educational and cultural intentions: This involved: a) establishing pedagogical intentions that take the museum’s aims into account, from a social science/visual arts interdisciplinary perspective for elementary school Cycle 3 (grades 5 and 6); and b) finding a novel use for mobile technology.
2. Design the prototype mobile technology application and educational set-up: This involved: a) drawing connections between the museum’s collection and the QEP curriculum and identifying a common theme; b) identifying and documenting a set of 12 works of art from the museum’s collection; c) designing and overseeing the development of a prototype application and producing the required content; d) designing and developing a learning scenario (pre-visit, visit and post-visit) and an artwork analysis and interpretation grid; e) producing the relevant materials for the classroom (teacher and students).
3. Testing methodology by conducting the trial: This meant: a) preparing for the implementation of the learning scenario with a museum educator; b) meeting with the elementary Cycle 3 teachers and the pedagogical advisors and training them on the use of the museum resources; c) having the teachers and their students

adapt and test the learning scenario through real activities in the classroom and on a field trip to the museum; and d) defining a testing methodology to study the potential of the set-up.

4. Explore the potential of the learning scenario: This was a matter of exploring the scenario's potential for learning and appropriating the collection from the point of view of social science reasoning stimulated by contact with works of art.

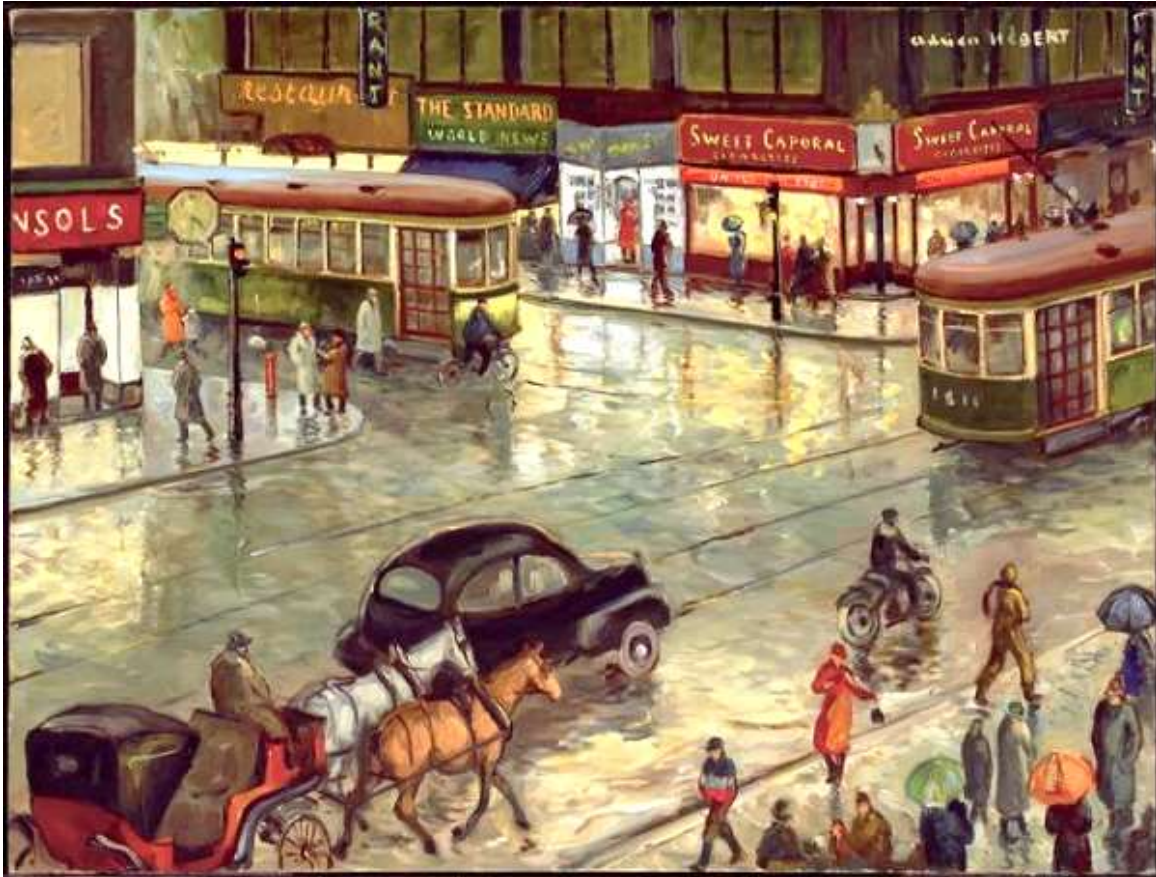
### **Step 1: Pedagogical intentions and the use of real and digital resources and mobile technologies**

To define the pedagogical intentions, in keeping with the above-mentioned educational goals for the social science and visual arts, we identified a juncture between these two educational areas, which is the interpretation of works of art for their documentary value with regard to past realities. Elementary Cycle 3 seemed to be an especially appropriate audience, particularly because these students are less frequent visitors to the MMFA than children in the other elementary school cycles. The MMFA wanted to give them an experience of discovery and digital creation and to use the project to enhance the tour of the Bourgie Pavilion, where there is not much interpretive media. Ultimately, the MMFA was hoping to add a new visit experience to its educational and cultural offer, specifically designed for Cycle 3 classes using tablets. The technology the MMFA chose, on the basis of earlier trials, was the iPad, so we defined the following interdisciplinary pedagogical intention: to guide the students in examining figurative works of art to find signs of how Québécois occupied the territory and in assessing these works of art by documenting their ideas before the visit and on site at the museum, using a prototype iPad application and creating a video report using one of the museum's devices. The tablet was used to consult and explore the artworks during the visit (with the prototype app), create the video report at a workshop at the museum and share the resulting multimedia production. Such use of mobile technology - that is, using tablets to explore and create video reports about figurative artworks in a museum in order to learn about social sciences - has not been documented or reported in the studies we have read about digital technologies, museum experience, museum education, and school visits (Din & Hecht 2007; Tallon & Walker 2008; Naismith & Smith 2009; Van Boxtel, Klein & Snoep 2011; McNames 2013; Bakken & Pierroux 2015) neither in the databases we consulted.<sup>2</sup>

### **Step 2: Design of the prototype mobile technology application and the educational set-up**

To design the prototype mobile technology application and educational set-up, we established connections between the MMFA collection and the QEP and loosely

identified a common theme - Québec society around 1900 - focusing on the transitions Québec was experiencing at that time, when it was in flux from country to city, undergoing industrialization and urbanization. We put together a corpus of 12 works of art - landscapes and genre scenes from the 1840s to the 1940s - on display in the Bourgie Pavilion permanent exhibition, by 12 Québec and Canadian artists who, having returned from Europe, sought to portray the unique nature of Québec's landscape (see an example in Picture 1).



Picture 1. Adrien Hébert, *Corner Peel and Sainte-Catherine* about 1948. (Montreal Museum of Fine Arts, 2010.645) [http://expositionvirtuelle.ca/oeuvre-artwork/2010\\_645-eng](http://expositionvirtuelle.ca/oeuvre-artwork/2010_645-eng)

The iPad served as an instrument of inquiry and exploration for the targeted works and was used as a production tool during a workshop at the museum and to upload the resulting videos to Vimeo. The project used the built-in camera, iMovie, and a prototype application we designed and developed especially for this experiment. “Artistic Journey in Québec around 1900” is a prototype app that fulfils two functions: 1) exploration tool for the Bourgie Pavilion permanent collection to locate targeted works on three floors; and 2) discovery tool for these targeted works, to observe them, play with them and learn more about them. It is combined with chips, placed behind the 12 targeted

works on three of the five floors of the permanent exhibition, which emit a Bluetooth signal to the approaching visitor when the artwork can be explored using the app. The Bluetooth message contains a question that encourages the visitor to observe the artwork. The application also has a short text that recounts the artist's own thoughts about the piece and provides a portrait and short bio of the artist, a contemporaneous map showing the location that the artwork portrays and a error-finding observation game (using an altered reproduction to compare to the original work) (see Pictures 2 and 3). In addition to portraits of the artists, the app mainly presents original and complementary content for the MMFA online exhibit presenting the Québec and Canadian art collection.



Pictures 2 & 3. The iPad prototype app *Artistic Journey in Québec around 1900*. Home page and the page “In the artist’s eye”.

The learning scenario designed for the teachers and museum educators offers a complement or cultural enrichment for the study of Québec society in its territory around 1905 and contributes to the visual arts curriculum through art appreciation and the production of a “media work in visual arts” (one-minute video) (Ministère de l’Éducation 2006: 225). In keeping with the proposals of Allard and Boucher (1990), the scenario provides a global learning approach in social sciences and visual arts for before, during and after the museum visit (see Table 1).

In the museum portion, it includes ideas for leading the tour of the Québec and Canadian art rooms (see pictures 4, 5, & 6)<sup>3</sup> and for the video creation workshop (see picture 7). Each step proposes certain actions for the students to do in the exhibit hall, first without the iPad, then with the iPad, to avoid having all their attention drawn to the technology (“head-down syndrome”). In the school portion, it suggests pre- and post-visit activities. With a guide for the teacher and a handout for the students, as well as information sheets on the 12 selected works and artists (the same texts used in the app), the scenario relies on mobile technology and a virtual exhibition of the MMFA’s Québec and Canadian art collection (MMFA online). The student handout includes an



analysis and interpretation grid for the artworks (see Table 2) to guide the students' first observation of the works of art.

Table 1. Social science and visual arts learning approach: “Artistic Journey in Québec around 1900”

TIMING	ACTIVITIES	DIGITAL RESOURCES AND TOOLS
Before the visit	Take note of the question: What traces of the way Québec society occupied the territory around 1900 can be found in a dozen artworks? Reflect on the artworks and Québec society and territory around 1900. Read over the artwork interpretation grid. Do an initial assessment and interpretation of the target artwork. Obtain information on the artist's life.	MMFA virtual exhibition
During the visit	Assess artworks Create a video report	Prototype application iPad camera iMovie Vimeo website
After the visit	View the videos Share the learnings Write a critical report of the entire process	Vimeo website



Picture 4. Distribution of tablets to students in the Bourgie Pavilion of Québec and Canadian Art of the Montréal Museum of Fine Arts.



Picture 5. Students observing “Corner Peel and Sainte-Catherine” by Adrien Hébert (about 1948) on display in the Bourgie Pavilion of the Montréal Museum of Fine Arts.



Picture 6. Photographing using the iPad at the Montreal Museum of Fine Arts.



Picture 7. Students creating a video report at a workshop at the Montreal Museum of Fine Arts.

To create our grid, we used works by Jadoulle, Delwart and Masson (2002), the McCord Museum (2003) and Larouche (2014), drawing on the iconographic document interpretation technique and the “Appreciate visual artworks” competency in the QEP. Our grid proposes, first, an affective reading of the artwork, provoking sensations, emotions, memory and hypothesis, and then an analysis and interpretation of the artwork in terms of its materiality and its portrayal of the reality it represents (see Table 2). Drawing on the Keys for History approach (McCord Museum, 2003), it examines the type of work (WHAT), the place of creation (WHERE), the date of production (WHEN), the creator of the work (WHO) and the artist’s motivation for creating it (WHY). It also analyses and interprets the general subject matter of the artwork and its pictorial language (WHAT), the location (WHERE), the time or season (WHEN) and the people depicted (WHO), as well as exploring the work’s portrayal of the reality of the time and the testimony it offers for understanding that reality (WHY).

**Table 2: Analysis and interpretation grid for figurative artworks, from emotion to cognition\***

Step 1 - EMOTIONAL REACTION		
Sensations, emotions, memories, hypotheses, etc.		
Step 2 - ANALYSIS AND INTERPRETATION		
Reading keys	Object (materiality of artwork)	Portrayal offered by artwork
What?	Title and type of artwork (landscape, genre scene, etc.)	General subject matter, pictorial language (planes, colour, movement, time and light)
Where?	Place of creation	Place portrayed
When?	Date of production	Time or season portrayed
Who?	Artist / creator	People portrayed (if any)
Why?	Artist's motivation for creating the artwork	What the artwork teaches us about the society and territory studied

\*Based on Jadouille, Delwart and Masson (2002), Larouche (2014) and McCord Museum (2003).

The learning scenario invited the students, in teams of two, to document a specific artwork assigned to them and describe the artist's life. During the visit to the museum, which included a tour of the exhibition hall and a video creation workshop, they had to make a video report on the artwork using iMovie (see Pictures 4 and 5). For the videos, they were given these instructions: *"In one minute, present the artwork and explain what can be learned from it about the way Québec society occupied the land around 1900, and compare it with another related artwork in the exhibition (same subject, same technique or same artist)"*. After the workshop, the students were instructed to post their videos on Vimeo so they could access them again after the visit.





Picture 8. Students' videos posted on Vimeo.

### Step 3: Testing methodology by conducting the trial and studying the potential

Here is an outline of the methodology used for the trial and for our study of the potential of the educational set-up. This study involved two schools, and specifically three Grade 5 and 6 teachers, as well as two pedagogical advisors from the Commission Scolaire de Montréal. The schools serve socio-economically underprivileged and multi-ethnic areas. The activities were carried out in spring 2015 and involved 54 students.

Extensive data were collected through the instruments (individual written pre/post activity student questionnaires, observation grid and a general report on impressions after the visits, student interview guide, written teacher questionnaire at the end of the trial), but this article focuses mainly on the analysis of the students' videos. A total of 26 productions were created by the participants. Of these, 23 were suitable for analysis, the other three being inaudible. The videos are an average of 44 seconds long, ranging between 26 seconds and 1:06 minute.

We wanted to analyse certain outputs of the trial, namely, the social science reasoning stimulated by contact with works of art. How did the students use these artworks to reflect on how Québécois occupied the territory? In a sense, we were investigating the meaning-making of figurative artworks, inspired by a multimedia and discourse analysis semiotic perspective, as described by Lemke (2012), and the extent to which students were taking into account the interpretation grid and information provided in the

classroom activities, presented during the museum visit, and available in the prototype app.

The videos were processed using NVivo for content analysis, based on a three-part grid:

- 1) Visual content, namely footage of the works taken in the exhibition hall and screenshots of the application (portrait of the artist, portrait and bio page, old map)
- 2) Narration-image relationship, which involves the appreciation (emotional aspect), analysis and interpretation of the artwork, from the point of view of both its materiality and the portrayal it offers, based on the analysis and interpretation grid given to the students. This narration-image relationship undergoes a second analysis for the interpretation of the artwork, to separate out simple descriptions of the work from inferences, which establish a connection between the work, society and the territory studied. Inference mobilizes different knowledge, including, possibly, the social studies concepts the students have already grasped.
- 3) Connection between the narration and the sources of information (full reading of texts in the application, reformulation of information in the app or other information mobilized in the analysis and interpretation of the work).

#### **Step 4: Results by exploring the potential of the learning scenario**

The results examine the visual content of the videos, the narration-image relationship in the video productions and the relationship between the narration and the sources of information.

##### ***Visual Content***

The analysis of the visual content of the 23 videos reveals the use of both footage taken in the exhibition hall and screenshots from the application, with the exception of one video, which used no screenshots (see Table 3). All the videos included footage taken in the exhibition hall. In terms of content from the exhibition hall, the work appeared in its entirety in 19 of the videos, and 20 videos showed specific details of the work in question. The caption of the work was presented alone (in close-up) in 11 videos and shown next to the work in a wide shot in 5 videos.

In terms of content, only a single video did not contain any. In 16 of the videos there was a portrait of the artist, and in five more the participants presented a page of the application that includes a portrait of the artist with a bio. The old map showing the location represented in the artwork was shown in 15 videos.

Table 3. Analysis of visual content of the 23 videos

Video	Length	Content from the museum gallery				Content from the application		
		Artwork alone	Museum caption	Artwork and caption	Detail from artwork	Portrait of the artist	Artist and descriptive text	Old map
K_Morris	00:32	X			X		X	X
K_Hébert	00:59	X	X		X	X		X
K_Brymner	00:28	X	X		X	X		
K_Sandham	01:03			X	X		X	X
K_Jackson	00:47	X	X		X	X		X
K_Edson	00:36	X			X		X	X
K_Légaré	00:41			X	X	X		X
J_Fortin	00:40	X	X		X	X		X
J_Morris	00:36	X				X		X
J_Cullen	00:46	X			X	X		X
J_Sandham	00:26	X	X			X		X
J_Brymner	00:54	X	X		X	X		
J_Krieghoff	00:29	X			X			
J_Edson	00:51	X			X	X		
J_Hébert	00:51		X		X	X		X
J_Legaré	00:26	X			X	X		
I_Hébert	00:51	X	X		X	X		
I_Jackson	00:36	X	X	X	X	X		
I_Boisseau	01:01	X			X		X	
I_Brymner	01:06		X	X	X	X		X
I_Edson	00:52	X			X		X	X
I_Krieghoff	00:48	X	X	X				X
I_Sandham	00:54	X			X	X		X
Total	17:13	19	11	5	20	16	5	15

### ***Narration-image relationship***

The results of the narration-image relationship in the videos are presented with regard to, first, emotional reactions, second, remarks about the work in its materiality, and finally, the portrayal offered by the work. Comments that are purely descriptive are

differentiated from those that entail an interference, that is, that establish a link with the social and territorial context being studied.

- *Few emotional reactions to the artworks*

Although the artwork analysis and interpretation process suggested for the pre-visit and visit activities encouraged the students to reflect emotionally on the artworks, only a few videos showed any sign of this in the narration. In this sense, the emotional reactions were not very deeply explored by the participants in the videos. A single video provided a general appreciation of the artwork:

“We liked all the details. We also really appreciated the shadow and light effect”  
(I. Légaré)

Several of the videos mentioned the choice of colours and the artistic aspects of the artworks, but very few did so from the perspective of personal appreciation.

- *Narration centred mainly on the artwork, from the point of view of its materiality*

The video analysis revealed that the narration centred primarily on the artwork considered in its materiality (object) rather than on what it portrayed (content). In total, of 17:13 minutes of video, over half was dedicated to the artist, the artist’s life, the artist’s work in general and the artist’s preferences (08:47), while just less than one-third focused on the content of the artwork (05:53). The remaining narration time involved a connection with a second work at the museum, without there necessarily being any comment on it in terms of its materiality or the portrayal it offered, and this is therefore not included in the table.

- *The artwork as an object and the artist’s preferences*

When the students talked about the artwork as an object - that is, when they considered it in its materiality - most of what they said was related to the artist, the artist’s life and the artist’s work as a whole. There was a certain correspondence between the narration and the questions in the interpretation grid. In terms of the WHAT and WHO, all the videos gave the title of the artwork and the name of the artist. In half of the videos, the life of the artist was also mentioned, with the year and place of birth and the year and place of death. The following example illustrates this well:

Alexander Young Jackson. He was born in 1882 in Montreal and died in 1974 in Kleinburg, Ontario. His painting is called *Grey Day, Laurentians*. (I. Jackson)

None of the productions, however, mentioned the type of artwork (landscape or genre scene), even though the interpretation grid encouraged the students to pay attention to this.

As for the WHEN and WHERE, nearly half of the teams explicitly mentioned the year and place the work was produced. In this regard, the students often used the map offered in the museum app to show the production site.

For the WHY, most of the productions talked about the artist's preferences in terms of theme. They mentioned the artist's interest in landscapes, specific locations such as the country or the city or a focus on concerns such as modernity:

The artist's name was Marc-Aurèle Fortin. He liked painting, cities, deciduous trees, reflections, light and atmospheres. (J. Fortin)

In the majority of the videos, this was information repeated or reformulated from the museum app.

- *The artwork as a portrayal: Between description and inference*

A few of the narrations broached the WHAT of the artwork, examining its properties, the pictorial language and the technique used by the artist. The following excerpts took note of the choice of colours and their effects:

Black is very important in this painting, or he would not be able to show the storm, the blackness and the contrasts. (J. Fortin)

In this painting, the colours are gloomy and cold, [...] it is as if the people are stressed. (J. Légaré)

Elsewhere, technique was mentioned:

Where the mountains are, there are lots of lines and the colours are rather gloomy. (K. Jackson)

In another video, the student analysed the aerial perspective:

The colours are cold, grey. We can also see that the artist uses aerial perspective, because the field and the city are detailed, but the hill appears to be hazier. (J. Brymner)

Sometimes the work was described from the artist's standpoint, in terms of artistic motivations:

In this piece, the artists chose warm colours, to show that it is fall. (K. Edson)

Finally, some of the narrations attributed preferences to the artist, despite the fact that no such information was provided in the prototype application:

Today we are going to present a painting by Alexander Young Jackson. He liked to paint the countryside, because he did not really like modernity. (K. Jackson)

One possible explanation could be that the information provided during the museum visit about the city-country duality may have led these students to polarize the artist's preference in these terms.

With regard to the way the videos addressed the testimony that the artworks offered about past realities, from the perspective of the WHEN, WHERE, WHO and WHY, our examination of the students' explanations revealed two levels of analysis and interpretation: description and inference about past realities. The distinction was sometimes complicated to make, as the narrations tended to weave from one to the other depending on which aspects of the artwork were being discussed. In this sense, it was often more of a continuum in which the narrative went from a description of the content of the painting to an inference about the wider social and territorial context.

In terms of description, many of the narrations mentioned visible components of the landscapes or genre scenes. The students simply named and described what they saw in the image, as in this example:

There is a house where the lumberjacks can stay. Here are the lumberjacks canoeing down the Saint-Maurice River. Here is the deciduous forest along the Saint-Maurice River. (J. Edson)

Some of these descriptions led to generalizations:

As you can see, many people go to the tobacconist's to buy their cigarettes. (I. Hébert)

In 1800 we see that hats were in fashion. (I\_Sandham)

Since there is a river in this painting, I understand that there were a lot of waterways at that time. (J. Cullen)

In this regard, the observations served as confirmations about what existed at the time, such as the agriculture, electricity, apparel, language of signs and means of transportation:

The stores are shown in English. [...] Means of transportation were being developed, such as the bicycle, the tramway, the car and the carriage. (K. Hébert)

The descriptions drew on prior knowledge to name the items in the paintings, as shown in the following excerpt about an Aboriginal encampment:

Here are their dwellings which are called tipis. Here are their means of transport called canoes. Also they cleared the trees to make furniture. (K. Légaré)

One reference was made to the concept of the bourgeoisie, but without any further elaboration on the different social classes that made up Québec society at the beginning of the twentieth century:

We can see that the clothing has changed significantly and that the bourgeoisie are better dressed than the cabman. (I. Boisseau)

In short, the descriptive words revealed an acknowledgement that things have changed since the era represented by the painting, but little connection was made with the social and territorial context of the time.

In terms of inference, although less frequent in the body of data, some of the narrations drew on contextual information. They mobilized contextual knowledge and concepts of differing degrees of complexity, such as in this example, about transportation and public signs:

In 1948, horse-drawn carriages were still very common, but cars were starting to appear. Tramways were still very much in use downtown. In 1948, cigarette advertisements were still legal and they could be posted in English. (I. Hébert)

Unlike the previous excerpt on the same painting (K\_Hébert), the students inferred several pieces of contextual information that supported their interpretation of the work and its value for understanding Québec society, including laws concerning advertising and English signs (by law, signs in Québec today must be mainly in French). Other excerpts clearly illustrated the way the participants could use interference to interpret the artworks. This next excerpt reveals the importance of religion to society:

At that time, religion was very important. Every Sunday they went to church. Then they gathered to talk and party. (K. Morris)

The next one raises the impact of the Port of Montreal on the city's economic development:

In 1800, the Port of Montreal is very important because there are lots of new jobs being created. In addition, the Port of Montreal used to unload cargoes from Europe. (I. Sandham)

This type of comment was relatively rare in the entire set of videos analyzed, however.

### ***Narration-sources of information relationship***

Three types of information were mobilized in the participants' narrations: information taken practically as-is from the application, information reformulated from the application content and other information (description or inference). All three types of information were sometimes used within a single video production.

- *Information taken as-is from the application*

In the majority of the videos, when they talked about the work in its materiality, and especially for the questions WHAT, WHERE, WHEN and WHO, the information came directly from the application or the museum label at the museum. This included the name of the artist, the year and place of birth and death, the title of the work or the year and place of its creation:

We're going to talk about Cornelius Krieghoff. He was born in 1815 in Holland and died in 1872 in the United States. [...] The title of the painting is *View of Québec City from Pointe de Lévy*. He painted it in 1863. (J. Krieghoff)

This use of general information about the work is representative of what is found in most of the videos, although the order of presentation varies:

We are going to present the painting called *Ice Harvest*. It was painted by Maurice Cullen in 1914 in Montréal. He was born in 1870 in Saint John's in Newfoundland, and he died in 1934 in Chambly, Québec. (J. Cullen)

Some videos also examined the WHY of the work, taking the text about the artist's motivations directly from the application:

Cornelius likes painting from life. (I. Krieghoff)

William is more interested in traditional aspects such as architecture. (J. Brymner)

- *Information reformulated from the application content*

In the vast majority of the videos, the information provided in the application was reformulated in the participants' own words. This information deals principally with the artist and the artist's preferences:

He likes painting landscapes, battle scenes, the region where he lives and he really likes showing winter. (I. Jackson)

He really likes painting the seaside and boats, (K. Sandham)

As well, some of the participants reformulated the information in the application to analyse the portrayal:

Made in 1868, Allan Edson shows lumberjacks getting out of their canoe. [...] The woodsmen use canoes to get to their worksite. (I. Edson)

This formulation appears to be largely inspired by the information in the application, which says, "The lumberjacks I show in my painting are getting out of the canoe to go to the worksite" (MMFA, 2015).

#### *Other information used in the analysis and interpretation of the artwork*

A significant majority of the videos presented comments that did not draw on the texts provided in the application. These were essentially descriptions of the content of the artwork or, in some instances, inferences about past realities. For example, some participants mentioned the law on the language of signage, which was not in effect at the time the painting was made. It is hard to identify the origin of this knowledge, however. It may be knowledge acquired during the visit, in class or in any other context. Unfortunately, we did not develop a tool in the methodological framework to trace the



origin of these inferences. Note, however, that while such knowledge is necessary to establish connections with Québec society at the time, it was barely mobilized in the videos we studied.

## Discussion

The educational set-up appears to offer an interesting context for social science learning. By requiring the students to play an active role in building meaning, the use of mobile technology and the institution's digital resources paves the way for their appropriation and interpretation of figurative artworks. The analysis of the visual content and narration in the videos demonstrates the value of the application in the museum experience offered, with almost all the videos using screenshots and information from the prototype app. The analysis of the narration-image relationship offers a window into the students' reasoning about the artworks and shows some of the difficulties they had using artworks to study past social and territorial realities. This echoes findings by other researchers (Van Boxtel & Van Drie 2012) who stressed the importance of the prior knowledge the students must have in order to interpret iconographic documents. Returning to our original questions and our intention to leverage visual arts to foster an understanding of concepts related to Québec society and territory, we would be tempted to state that interpreting artworks does not offer much more than reading anecdotal incidents. Our study provides a clearer understanding of the challenges involved in this type of educational action.

The fact that there were so few emotional reactions to the works in the video narrations inspired the museum personnel to seek a better way to align the social science learning objectives and those related to the field of the visual arts. This reflection led the team to review the learning scenario, in particular with regard to the instructions to give during the video production workshop, to encourage the students to express their emotional reactions, in relation to the "appreciate visual artworks" competency.

Likewise, the contextual data collected using the impression reports written after the visits revealed how stimulating the activities were for the students, their rapid adoption of the iPad as a tool to explore the exhibition and the artworks and to create a report, and their pleasure in spontaneously discovering, here and there throughout the exhibition, several other artworks that were not targeted by the project. One painting in particular piqued the students' curiosity and led to direct questioning (see Picture 9). "The King's Beavers," by Canadian Kent Monkman (2011),<sup>4</sup> is a very large work that uses the realist codes of historical painting to portray the massacre of beavers during the time of the fur trade in New France, with a religious allegory in which the beavers all convert to Catholicism. The students also expressed a desire to have more time to visit

the exhibition and create the video. Many showed strong interest for discovering more artworks, taking pictures in the gallery, and experimenting editing process with iMovie.

Moreover, it is important to reiterate that this mobile technology museum educational set-up was designed to serve as a complement to the study of Québec society around 1900. In this regard, the contextual data collected from the teachers showed that the activities were undertaken in class with no previous study of the social and territorial realities, and that less than the usual amount of time spent on the social universe was dedicated to the project. This information may help explain the fact that the students' narrations tended to be descriptive and that they made so few inferences. Furthermore, we were not informed about how the videos were used after the students returned to class, so we do not know whether viewing them permitted them to pool knowledge and learning or share a critical overview of the entire process, as was suggested in the teacher's guide. We still do not have this information and this is a clear limitation of the study of our set-up's potential. The novelty and short duration of the activities may have hindered a full espousal of the teaching and learning approach.

As Suh reminds us (2013: 135), the “effectiveness of the use of the arts depends on the ways teachers might use arts in their teaching” (Levstik 1990; VanSledright 1998). Also, to echo the concerns stated by Pirotte (2002) in particular, we should pose the question, to what extent were the students encouraged by the teachers and museum guides to take a critical stance in relation to images in their learning of the social and territorial realities of the past? As Nakou says (2006), the student's learning from contact with an artefact is reliant on the type of educational action it is embedded in, rather than the nature of the artefact itself. As such, both this question of the critical understanding of the artwork for social science learning and the related teaching practices merit investigation in greater depth, since we know little about them (Suh 2013). As Wallace-Casey points out (2016: 390), further work will be required to see “how museum exhibits can be opened up to enable alternative perspective-taking and more critical thinking about the past.”

For the moment, considering how little research and development has been conducted on the design and potential of mobile technology museum educational set-ups, especially scoping to use art to promote elementary school social science learning, it is difficult to evaluate our results in terms of the application's pedagogical potential. It is important to point out, however, that, overall, the activities proposed provoked the active participation and engagement of the students during the museum visit, which is clearly apparent by their Vimeo productions. Incidentally, using other data collected during the trial, we plan to analyze the students' understanding of the realities and concepts explored.



Picture 9. Students looking at “The King’s Beavers” by Kent Monkman (2011), on display in the Bourgie Pavilion of the Montréal Museum of Fine Arts.



Picture 10. Students looking at “An Adult’s Toy” by BGL (2003), on display in the Bourgie Pavilion of the Montréal Museum of Fine Arts.

## Conclusion

This article presented the design and potential of digital resources and mobile technologies in a museum educational set-up for the interpretation of figurative artworks to study the past. The results of this study are important for research into cultural mediation and social science teaching, and for pedagogical practices in museum and classroom settings. They show how a museum visit and digital resources and mobile technologies can be used for the schooling of a targeted group of elementary school children. The results demonstrate the scientific and pragmatic potential of this type of set-up. In terms of education, the results show the value of figurative artworks as documentary materials for studying the past, from the interdisciplinary perspective of social science and visual arts. Furthermore, recourse-like those used to complement the physical resources of the museum exhibition - seem to contribute significantly to a museum visit, as demonstrated by the many references to them in the participants' videos. The results of the narration-image-relationship analysis nevertheless reveal how few inferences the students made about the social and territorial realities of the period in question, echoing the results obtained by Van Boxtel and Van Drie (2012).

In pragmatic terms, as documented in this article, our study established an artistic corpus that is valuable to museologists and teachers for the study of Québec past social and territorial realities. In this sense, the complementarity established between the artworks and the elementary school Cycle 3 social science program provides the basis for a relevant educational action and offers practitioners' ideas for creating a fertile interdisciplinarity between two fields that could be relevant for critical thinking (Vitulli & Santoli 2013). We also determined, however, that further effort is required to activate both the students' emotional reactions to works of art and their critical skills. That aside, the tool was easy for the children to use and ideal for organizing their observations about the target works and posting their video productions to Vimeo. As a result, the MMFA has a prototype iPad application and is more familiar with the possible pedagogical uses of this tablet as a tool for exploring a gallery and discovering and investigating artworks and their creation. It also has a new visit-workshop scenario and tangible instruments with definite potential to contribute to the institution's intended digital shift. In fact, the MMFA has added the resource we designed to its educational offer for 2015-2016 (MMFA on line b). More generally, this type of activity, involving the creation of video reports on figurative artworks and their use in social science learning, can inspire other museums that wish to develop an innovative interdisciplinary educational program that is inspiring for young people and that nurtures their engagement, creative thinking and visual culture.

## References

- Allard, M. & Boucher, S. (1990). *Le musée et l'école*. Montreal, Canada: Hurtubise HMH.
- Atkinson, R. (2013, October 14), "How Are Museums Using Mobile?" Accessed January 25, 2016, from Museums Association:  
<http://www.museumsassociation.org/museum-practice/mobile-in-museums-2013/15102013-mobile-survey-2013-results>
- Bakken, S.M., & Pierroux, P. (2015). "Framing a topic: Mobile video tasks in museum learning", *Learning, Culture and Social Interaction*, 5, 54-65.
- Brewer, E.A., & Brown, S. (2009). "Perspectives on social studies and visual arts integration", *Kappa Delta Phi Record*, 45(3), 135-139.
- Charitonos, K., Blake, C., Scanlon, E., & Jones, A. (2012a). "Museum learning via social and mobile technologies: (How) Can online interactions enhance the visitor experience?", *British Journal of Educational Technology*, 43(5), 802-819.
- Charitonos, K., Blake, C., Scanlon, E., & Jones, A. (2012b). Trajectories of learning across museums and classrooms. In *The Transformative Museum*, 22-25 May 2012. Roskilde, Denmark: DREAM-Danish Research Center on Education and Advanced Media Materials. Accessed January 25, 2016, from:  
<http://oro.open.ac.uk/33400/1/>
- Chaumier, S., Krebs, A, & Roustan, M. (2013). *Visiteurs photographes au musée*. Paris: La Documentation française.
- Clark, P. (Ed.). (2011). *New Possibilities for the Past, Shaping History Education in Canada*. Vancouver: UBC Press.
- Crawford, B.S., Hicks, D. & Doherty, N. (2009). "Worth the WAIT: Engaging social studies students with Art in a digital age", *Social Education*, 73(3): 136-139.
- Damala, A., Cubaud, P., Bationo, A., Houlier, P., & Marchal, I. (2008). Bridging the gap between the digital and the physical: Design and evaluation of a mobile augmented reality guide for the museum visit. Paper presented at the *Third International Conference on Digital Interactive Media in Entertainment and Arts*, Athens (pp. 120-127). ACM.
- Desrochers, J. (Ed.) (2011). *Art québécois et canadien. La collection du musée des Beaux-Arts de Montréal*. Montreal: Musée des beaux-arts de Montréal.
- Din, H., & Hecht, P. (2007). *The Digital Museum. A think guide*. Washington, D.C: American Association of Museums.
- Février, G. (2009). *Dispositif didactique pour l'étude de pratiques culturelles à l'aide du roman migrant, 'Passages' d'Émile Ollivier*. Une recherche-développement (unpublished thesis) Université de Montréal). Accessed January 25, 2016, from:  
[https://papyrus.bib.umontreal.ca/xmlui/bitstream/handle/1866/6479/Fevrier\\_Gilberte\\_2009\\_these.pdf?sequence=1](https://papyrus.bib.umontreal.ca/xmlui/bitstream/handle/1866/6479/Fevrier_Gilberte_2009_these.pdf?sequence=1)



- Goldman, K.H. (2011). Understanding adoption of mobile within museums. In N. Proctor (Ed.), *Mobile Apps for Museums. The AAM guide for planning and strategy*. Washington, DC: The American Museum Press.
- Harvey, S. & Loiselle, J. (2009). "Proposition d'un modèle de recherche développement", *Recherches qualitatives*, 28(2), 95-117.
- Hein, G. (1998). *Learning in the Museum*. London & New York: Routledge.
- Hooper-Greenhill, Ei. (2007). *Museums and Education: Purpose, pedagogy, performance*. London & New York: Routledge.
- Jadoulle, J.L., Delwart, M., & Masson, M. (2002). *L'histoire au prisme de l'image*. Louvain-la-Neuve: Université catholique de Louvain.
- Larouche, M.C. (2016). Using museum resources and mobiles devices for developing teens' historical thinking: A formative evaluation of an innovative setting. In V. Gosselin and P. Levingstone (Eds.), *Museums and the Past, Constructing historical consciousness* (p. 122-141). Vancouver: UBC Press & The History Education Network/Histoire et éducation en réseau.
- Larouche, MC. (2014). Voir et savoir interpréter des documents iconographiques, de l'affectif au cognitif. In M.A. Éthier, D. Lefrançois, & S. Demers (Eds.), *Faire aimer et apprendre l'histoire et la géographie au primaire et au secondaire* (pp. 213-231). Québec: MultiMondes.
- Larouche, M.C., Araujo-Oliveira, A. & Fillion, P.L. (2015). "L'univers social au primaire, un domaine à la dérive?", *Enjeux, revue de l'association québécoise pour l'enseignement de l'univers social*, 11(3), 4-6.
- Larouche, M.C., Landry, N., & Fillion, P.L. (2016). "Conception et étude du potentiel d'un dispositif muséo-techno-didactique pour le raisonnement en sciences humaines d'élèves québécois de 5<sup>e</sup> année du primaire", *McGill Journal of Education*. 50(2/3), 293-320. Accessed January 25, 2016, from: <http://mje.mcgill.ca/article/view/9148>
- Lebrun, M., Smidts, D., & Bricoult, G. (2011). *Comment construire un dispositif de formation?* Bruxelles: De Boeck.
- Lemke, J.L. (2012). Multimedia and discourse analysis. In J.P. Gee & M. Handford (Eds.), *The Routledge Handbook of Discourse Analysis* (pp. 79-89). London, & New York: Routledge.
- Lévesque, S. (2008). *Thinking Historically: Educating students for the twenty-first century*. Toronto: University of Toronto Press.
- Levstik, L. (1990). "From the outside in: American children's literature from 1920-1940", *Theory and Research in Social Education*, 18(4), 327-343.
- McCord Museum (2003). *Do you know how to interpret artifacts?* Accessed January 25, 2016, from: <http://www.musee-mccord.qc.ca/scripts/projects/CC/pdf/CN-doyou.EN.pdf>

- McNames, M. (2013). *Exploring the Potential for Mobile News in Museums*. (Doctoral dissertation, Ball State University). Accessed September 25, 2016, from: [http://cardinalscholar.bsu.edu/bitstream/handle/123456789/197479/McNames\\_M\\_2013-3\\_BODY.pdf?sequence=1&isAllowed=y](http://cardinalscholar.bsu.edu/bitstream/handle/123456789/197479/McNames_M_2013-3_BODY.pdf?sequence=1&isAllowed=y)
- Ministère de l'Éducation, du Loisir et du Sport du Québec (MELS). (2006). *Québec Education Program, Preschool Education, Elementary Education*. Québec: Government of Québec. Accessed January 25, 2016, from: <http://www1.education.gouv.qc.ca/sections/programmeFormation/primaire/pdf/educprg2001bw/educprg2001bw.pdf>
- Montreal Museum of Fine Arts (MMFA) (2015). *Voyage artistique en territoire québécois, vers 1900*. Private application prototype available on MMFA (iPads only).
- Montreal Museum of Fine Arts (MMFA) (On line, a). *Virtual Exhibition: Discover Quebec and Canadian Art*. Accessed January 25, 2016, from: <http://expositionvirtuelle.ca>
- Montreal Museum of Fine Arts (MMFA) (On line, b). *School Outings and Teacher Resources: Travelling back in time to Québec in the early 1900*. Accessed January 25, 2016, from: <https://www.mbam.qc.ca/en/education/school-outings/>
- Naismith, L., & Smith, M.P. (2009). Using mobile technologies for multimedia tours in a traditional museum setting. In M. Ally (Ed.), *Mobile Learning: Transforming the delivery of education and training* (pp. 247-264). Edmonton, Alberta: AU Press.
- Nakou, I. (2006). "Museums and history education in our contemporary context", *International Journal of Historical Learning, Teaching and Research*, 6(1), 83-92.
- Peck, C., & Seixas, P. (2008). "Benchmarks of historical thinking: First steps", *Canadian Journal of Education*, 31(4), 1015-1038.
- Pierroux, P. (2009). Newbies and design research: Approaches to designing a learning environment using mobile and social technologies. In G. Vavoula, A. Kukulska-Hulme, & N. Pachler (Eds.), *Researching Mobile Learning: Frameworks, methods and research designs* (pp. 289-316). Bern: Peter Lang.
- Pirotte, J. (2002). De la séduction à la critique : Décoder les images. In J.L. Jadoulle, M. Delwart, & M. Masson (Eds.), *L'histoire au prisme de l'image, I. L'historien et l'image fixe* (pp. 13-32). Louvain-la-Neuve: Université catholique de Louvain.
- Rodney, E. (2011). Looking around vs. looking down: Incorporating mobile technology in your experience design. In N. Proctor (Ed.), *Mobile Apps for Museums: The AAM guide to planning and strategy*. Washington, DC: American Association of Museums Press.
- Seixas, P. (2004). *Theorizing Historical Consciousness*. Toronto: University of Toronto Press.

- Seixas, P. & Morton, T. (2012). *The Big Six: Historical thinking concepts*. Toronto: Nelson Education.
- Société des Musées Québécois (SMQ) (2011). *États généraux des musées du Québec 2011* (Cahier du participant). Accessed March 20, 2012, from: [http://www.musees.qc.ca/pdf/cahier\\_du\\_participant\\_sept2011.pdf](http://www.musees.qc.ca/pdf/cahier_du_participant_sept2011.pdf)
- Suh, Y. (2013). "Past looking: Using Arts as historical evidence in teaching history", *Social Studies Research & Practice*, 8(1), 135-159.
- Tallon, L., & Walker, K. (Eds.) (2008). *Digital Technologies and the Museum Experience. Handheld guides and other media*. Lanham, MD: AltaMira Press.
- Van Boxtel, C., Klein, S., & Snoep, E. (Eds.). (2011). *Heritage Education: Challenges in dealing with the past*. Amsterdam: Erfgoed Nederland. Retrieved from: <http://thenhier.ca/sites/default/files/Grever-Heritage-education-Challenges-in-dealing-with-the-past-2011.pdf>
- Van Boxtel C. & Van Drie, J. (2012). "'That's in the time of the Romans!' Knowledge and strategies students use to contextualize historical images and documents", *Cognition and Instruction*, 30(2), 113-145. Accessed January 25, 2016, from: <http://dx.doi.org/10.1080/07370008.2012.661813>
- Van der Maren, J.M. (1996). *Méthodes de recherche pour l'éducation*. Montreal: Presses de l'Université de Montréal.
- VanSledright, B., & Kelly, C. (1998). "Reading American history: The influence of multiple sources on six fifth graders", *The Elementary School Journal*, 98(3), 239-265.
- Vavoula, G., Sharples, M., Rudman, P., Meek, J., & Lonsdale, P. (2009). "My art space: Design and evaluation of support for learning with multimedia phones between classrooms and museums", *Computers & Education*, 53(2), 286-299. Accessed January 25, 2016, from: [https://lra.le.ac.uk/bitstream/2381/8125/3/\[03\]VavoulaEtAl-C-E09-preprint\[1\].pdf](https://lra.le.ac.uk/bitstream/2381/8125/3/[03]VavoulaEtAl-C-E09-preprint[1].pdf)
- Vitulli, P. & Santoli, S.P. (2013). "Visual arts and social studies: Powerful partners in promoting critical thinking skills", *Social Studies Research and Practice*, 8(1), 117-134.
- Von Heyking, A. (2011). Historical thinking in elementary education: A review of research. In P. Clark (Ed.), *New Possibilities for the Past: Shaping history education in Canada* (pp. 175-194). Vancouver: UBC Press.
- Wallace-Casey, C. (2016). "Thinking historically in community history museums: A case study in contextual learning", *Loisir et Société / Society and Leisure*, 39(3), 371-395. DOI: 10.1080/07053436.2016.1243828



## Endnotes

---

<sup>1</sup> In the province of Québec, Canada, elementary cycle 2 students are 8-9 years old; elementary cycle 3 students are 10-11 years old.

<sup>2</sup> We consulted the following databases: Academic Search Complete, Communication & Mass Media Complete, Education Source, ERIC, Humanities Source, PsycINFO, with the following words: tablets, mobile devices, producing videos, museum, figurative artworks, and social science learning.

<sup>3</sup> Figures 4, 5, 6, 7, 9 & 10 by Marie-Claude Larouche.

<sup>4</sup> “The King’s Beavers” by Kent Monkman (2011): <http://virtualexhibition.ca/image/858-eng>

