HACKING THE CHILDREN'S MUSEUM: ILLUMINATING MIDDLE YEARS SOCIAL STUDIES CURRICULUM IN PERMANENT EXHIBITIONS

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Abstract

The present ongoing study, seeks to extend the educational resources that exist in the Manitoba Children's Museum's fixed exhibits by introducing social studies and arts into the educational methodology of STEM (Science, Technology, Engineering and Mathematics), where visitors learn such fields of teaching and ability to interact and play with the works of art. To be able to introduce a STEAM methodology, we will be inviting 15 5th graders from a school in Northeast-Winnipeg (Manitoba - Canada) to visit the Engine House exhibit – a true size train of the 1950's – for them to interact with the work and take notes on the relationship between the train and the place where the museum is located and the social studies curriculum of its corresponding curriculum. This is justified by the fact that the MCM is housed in a historic facility that once housed the Canadian Pacific Railway's Machine Repair Hall, which is also a significant content of the fifth-year syllabus. To introduce the Arts, we will use Museum Hacking, an active art methodology where visitors create artistic interventions such as photographs, montages and collages to present new narratives or shed light on aspects that had not been highlighted. In the case of participating students, this will be done through actions that use social studies and history that are already in their curricular system, as well as other theoretical-practical tools such as social semiotics and narrative theories. With the Engine House hack, we intend, first of all, to expand the educational possibilities of the fixed exhibitions at the MCM by introducing an important and necessary tool that is also justified by the historical importance of the place itself: the Social Sciences and the Arts. After this first initiative, we also intend to expand the actions of artistic intervention in other fixed works, to reveal new stories and expand other STEM for STEAM's, taking us to our final objective, which is to develop a new curriculum program with the MCM where other schools and other school years can also discover new narratives and new stories, using artistic-semiotic contexts. Finally, the expected result is that the artistic productions of the participating students can be organized in a future exhibition and that, also reveal important social aspects that give visibility to the excluded and provoke new ways of experiencing fixed exhibitions in other children's museums around the world.

Keywords: Social studies curriculum, middle year curriculum, arts-based education, children's museum, museum hacking.

1. Introduction

The Manitoba Children's Museum (MCM) is located in a historical building in Winnipeg. In the 1880's, this building housed the locomotive mechanical repair stations from the Canadian Pacific Railway (CPR). One of the most visited exhibits in the MCM is the Engine House; a real train engine from the 1950's, where visitors can play inside the locomotive, while learning science and mathematics and enhancing cognitive skills. STEM by design, the Engine House fails to leave behind social studies curriculum, which is an essential part of children's critical and cognitive development, because it helps children to make informed decisions for the public good.

The MCM's overall goal, which aligns with the University of Manitoba's goal, is to explore the Engine House to its full potential by including middle years social studies curriculum as part of this exhibit's design. To do so, the arts must be included in STEM design. By expanding the Engine House's STEM to STEAM (science, technology, engineering, arts and mathematics) curriculum, the MCM will be able to provide a broader curriculum support to schools. By having the arts as an equivalent course instead of supplemental to STEM courses, will foster critical thinking skills in students. This, help students to be better prepared for careers that demand problem--solving skills. Including arts with STEM

subjects in the Engine House in a meaningful manner, provides the audience with a well--rounded education with the skill sets needed to solve complex problems.

This qualitative research uses museum hack, an innovative research methodology that suggests a creative and productive disturbance by breaking into the accepted norms of particular museum narratives, and modifying them. In this study, 15 middle years students from a public school from Winnipeg, Manitoba will be invited inside the MCM to hack the Engine House. To do so, these students will create art interventions, illuminating social, historical, and geographical contexts in which Canadian society is built upon, including First People's iconography, and social markers, such as the (CPR) train tracks, which divides Winnipeg in two distinct social classes.

Our research partnership will answer the following research question: What are the potentialities of a Museum Hack as an innovative qualitative research methodology to contribute to STEAM middle years education? Framed within STEAM Education and Social Semiotics our objectives are: a) Describe and articulate the ways in which the (CPR) is a social marker that divides the city of Winnipeg in two distinct social classes; b) Unpack students' understandings of the past to tailor future social studies educational program in the MCM; c) Artistically explore with middle years students, social phenomena that make up the Canadian society, such as colonialism, immigration, marginalization, gender, and diversity; d) Create a new student--centered, inquiry and arts--based social studies educational program to the MCM that will benefit generations to follow.

The MCM will open their doors to the 15 middle years students and researchers to move freely within the building on specific days agreed upon all parties. The provision of free transit in the exhibitions allows an observational analysis to be conducted in a more competent way. In addition, the MCM, has been working with the PI in designing this project from scratch, making sure we have a shared vision. It is important to highlight that the partnership with the MCM extends far beyond the supply of the Engine House exhibition and the opening of the space for carrying out the studies.

Since our research is still under development and is expected to end only in the first quarter of 2023, the expected outcomes are: a) to highlight how CPR was an important social divider in Winnipeg and also to highlight this process in the arts produced by the participants ; b) With the students' understanding of the city's past and also of the place where MCM supports, carry out artistic provocations that lead to reflection on the themes of social exclusion and socioeconomic abuse; c) Expose the students' provocative artworks in the museum and discuss their content together with MCM curators and visitors; d) develop a new student interaction curriculum together with MCM to propose future "Museum Hacking" projects at other permanent exhibitions, also expanding their STEM curriculum to STEAM; e) Display the participants' artworks in community centers and other schools, with the aim of engaging and provoking other groups to critically think about the place where they live and its relationship with social studies.

2. Design of the project

Hacking the Children's Museum seeks to fill an unprecedented space in its field of study using elements of educational studies, curriculum studies, applied social studies and cultural analysis through semiotics in its design. Initially, the research takes place in partnership with MCM and takes place at the fixed exhibition Engine House. 15 Grade 5 students from a North End Winnipeg school will visit this exhibition at two different times, the first time they will interact with the work normally and the second they will carry out an artistic intervention based on the Museum Hacking methodology. Finally, data will be collected in the form of a questionnaire and also in photographs of the works of art produced during the research.

Initially, the project has as its design the realization of an expansion of the pedagogical-ludic system of STEM for STEAM at the Children's Museum of Manitoba, our partner in the research. The building of this non-governmental institution is housed in a historic facility that formerly housed the Canadian Pacific Railway (CPR) train repair shop, which historically was responsible for the expansion of modern civilization in Canada during the 18th century (Andreae, 1997.). Andreae points out that one of the main features of the civilizational expansion in the construction of railroads in Canada was due to the "exploitation of the labour force of immigrants from Eastern Europe and the East, while the clashes over territories of the first nations gradually increased" (1997, p. 80). With this, it is important to point out that the historical context of the building where the MCM is located already demonstrates the possibility of including social studies in its facilities, which are full of fixed exhibitions that highlight the importance of playful learning.

The museum uses a STEM methodology, which according to Catterall gives greater emphasis to "mathematical skills and logical reasoning that help to solve problems focused on time organization, space perception and probability calculation" (Catterall, 2017, p. 03). However, based on the

historical-cultural relevance of the place where the MCM is established, we propose the inclusion of elements from social sciences such as history and cultural studies to expand the methodology for STEAM, where the artistic aspect would be on account of the active methodology of the Hacking the Museum, which will be presented below.

In the initiative of including a group that represented the same socially "disadvantaged and marginalized" groups (Towens, 2018, p. 35) during the construction of the CPR, we established a partnership with a school in the north end of the city of Winnipeg, a socially "devoid of government attention and were the most socially vulnerable end up, such as immigrants and the poorest" (Towens, 2018, p. 40). For this, 15 students from the 5th grade are being selected, since the social science curriculum taught in this specific grade corresponds to the teaching of the construction of the CPR and also of the civilizational expansion of the city of Winnipeg itself.

The fixed exhibition selected for our research was the Engine House, a full-size 1950s locomotive that poses as an interactive work of art and seeks to entertain MCM visitors while teaching them about geometry, math and physics, all fields known to be linked to STEM. In order to encourage studies in the social sciences, our project will have as its main design the use of the active methodology "Hacking the Museum". According to de Oliveira Jayme Museum Hacking is a "methodological innovation that puts the museum visitor in the curator's place, and intends to reveal stories that have not been told before to everyone, presenting new narratives and revealing specific choices in the structuring of a discourse of that work or show" (de Oliveira Jayme, & Gough, 2016, p. 220). This action consists of allowing the participants (in our case, our 15 students) to carry out artistic interventions in the selected work in order to present their own critical view of what is being exposed, and henceforth, unveil new narrative possibilities to understand that work of art and also to oppose the discourse that is presented initially organized by the museum itself and its curators.

In order to bring new perspectives from outside the museum into it, the artistic interventions that will "hack" the MCM are being developed by the students after the teaching of lectures given by the researchers where they present the historical-social context of both the place and the city works that support our research. With the help of theoretical-philosophical instruments such as cultural and social semiotics (Morin, 2008; Greimas, 1992; 1987), new ways of using icons and symbols that represent immigrants and the first nations of the Canadian region are being brought to students in the perspective of provoking them to carry out interventions that bring this narrative into the museum space and promote reflections about the social role that the CPR and also the MCM itself have in society.

Finally, the project that is in the execution phase will seek to carry out photographic exhibitions with all the works of art that "hack" the MCM and will also provide new results that will allow researchers to present new pedagogical plans for the museum with the inclusion of the arts in its active teaching methodology, allowing STEAM to also be applied to other permanent exhibitions at the site.

3. Objectives

Framed within STEAM Education (Science, technology, art, and mathematics) the overall objective of this research partnership is to, *collaboratively with grade 4–5 students, expand the Engine House, a permanent exhibit in the MCM from STEM design to STEAM design, to illuminate middle years social studies curriculum.* More specifically, working with a group of 15 middle years students, this partnership will:

1) Describe and articulate the ways in which the (CPR) is a social marker that divides the city of Winnipeg in two distinct social classes;

2) Unpack students' understandings of the past to tailor future social studies educational program in the MCM;

3) Artistically explore with middle years students, social phenomena that make up the Canadian society, such as colonialism, immigration, marginalization, gender, and diversity;

4) Create a new student–centered, inquiry and arts–based social studies educational program to the MCM that will benefit generations to follow.

4. Methods of research and analysis

The methodologies applied to our study, which are being carried out until April 2023, fall within the fields of qualitative and quantitative research.

At first, vast bibliographic research was carried out on the history of the place that today houses the MCM, and consecutively on the entire process of construction of the CPR and the civilizational expansion of the city of Winnipeg. Concomitantly, a curricular survey on a school teaching in themes related to social sciences was carried out, pointing out the relationship with the contents taught for 5th

grade. Still within the qualitative field, an observational study of the Engine House fixed exhibition was carried out through photographic captures and studies related to the image and its semiotic representation, giving us dimensions about what the work is before the Museum Hacking artistic intervention and how it could look, according to the unintentionally directed choices of the research participants. Theoretical classes on the importance of imagery representations of immigrants and also of first nations will be given to participating students, as well as art instruction workshops on painting, cutting and collage for the production of the artworks that will hack the MCM.

In the field of quantitative research, the 15 selected students are undergoing two interviews that coincide with the beginning of the project and shortly after the exhibition of their artistic works. In these meetings, it is intended to verify what are the students' perceptions about the importance of social sciences and also of art in a fixed exhibition at MCM before the theoretical-critical classes and what are their perspectives about their artistic interventions after the Hacking the Children's Museum. With the data obtained in the two interviews with all the participants, it will be possible to assess whether there has been any evolution of critical thinking and the perception of the importance of historical-social references as a background for hidden narratives.

The analysis of data collection is currently under development along with the evolution of the research. We gathered the data referring to the bibliographic research on the historical-sociological context of the city of Winnipeg and the CPR and also from the first analyzes on the aesthetics of the "Engine House" and its real size 1950s train, which led us to prospect the dimension of artistic interventions of students and also how the artworks can be arranged in and around the exhibition.

5. Discussion and contributions

The greatest contribution that this work brings is the opportunity to present the union of an active methodology of education - represented here by Museum Hacking - with a curricular restructuring of an education-entertainment environment that will adopt an approach that transcends STEM and becomes STEAM. In the opportunity to bring – initially – social studies and the arts to the permanent exhibition Engine House, we managed not only to provoke the curators and staff of MCM to look at the works of art from another perspective, but we were also able to invite the target audience of the space to do it. The use of Museum Hacking in an installation aimed at children is unprecedented so far and having its artistic interventions carried out by middle-aged students that will reveal new narratives and modify discourses using elements of the social sciences and art becomes an element still stronger than seeking to understand how the vision of the youngest can unveil new ways of observing the present and expanding other learnings that need space to manifest themselves.

The selection of 15 participants from grade 5 coincides with factors that go beyond the programmed content in their school curriculum that also address issues historically and sociologically relevant to understanding the MCM; the age group of these students who are between 11 and 12 years old also comprises a happy match with the age group that also frequents this same environment. By delimiting the participation of students from our partner school, which is located in one of the regions with the lowest income distribution in the city of Winnipeg, we are intentionally bringing representatives of those same peoples who originally built the CPR and the very establishment where the MCM is located today to that they can express, through art that will be included in the Engine House exhibition, all their ideas and dissatisfactions regarding the civilizing process, the distribution of income and the removal of the first nations from the city center to the peripheral regions. In addition, it will also be one of promoting new forms of educational provocation, since many of our participants had not been able to visit the MCM before due to the price of entry to the space being outside of what their families can spend on entertainment.

Finally, the way in which the artistic interventions are being designed and built are also within a transdisciplinary contribution, since elements of education are used such as curricular study, learning in the social sciences and instrumentalization of artistic knowledge with other theoretical-critical tools such as social semiotics, which proves to be an important ally in the composition of the critical perception of history and also of the imagery arts that are initially instructed to the participants and then are being developed by them. The meeting of diverse skills provides us with a unique field that richly provides material for us to understand how the shift from STEM to STEAM is important for high school students, how their active involvement in the artistic creation processes can reveal new narratives and important discussions and how theoretical instruments can provide practical materials so rich as to be shared in scientific exhibitions and articles in Canada and around the world.

6. Expected outcomes

Although the present research is still in the execution stage and the final data have not been completely collected, it is already possible to highlight that the innovation in using an active methodology such as Hacking the Museum in an environment aimed at children and whose artistic action is carried out by children is already something challenging and also very rich for the provision of future data.

When elaborating this research that involves fields of education and semiotics with the curricular expansion from STEM to STEAM at MCM, we proposed that the vision of middle school students could propose real changes in the permanent exhibition through their unique perspectives and discoveries of new narratives. . Even though we have not yet carried out the making of the artworks and the artistic intervention to hacking the Children's Museum, the initial data are already very encouraging since the participants themselves present numerous ideas on how to use imagery references from tribes of first nations and of immigrants from the East and East of Europe in their works of art.

Such materials can also be of great provocation to other museum visitors since they also present a cultural-semiotic reference that will reveal narratives that were hidden and that are essential to understand how that place that includes the MCM got there, what it is important in history and its responsibility for the present and the future.

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