

# Creativity and Standardization: The Ability of Museum-Based Programming to Inform 21st Century Education

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**Abstract:** This paper reports the findings of an investigation of an educational programme situated in a provincial museum complex. Phase One of the research focused on teachers and showed the program promoted observation and reflection. Phase Two assessed the impact on student achievement. The data gathering method necessary for Phase Two revealed tensions between standardization and the arts community. Working with this tension, researchers defined achievement and measured essential program goals of the curriculum (“21<sup>st</sup> century competencies”). The discussion is interpretive and it is argued that museum-based experiential programming could be a contributor to the discussion on 21st century education policy.

**Keywords:** Museum-Based Education; Standardization; 21<sup>st</sup> Century Skills; Educational Assessment

One possible avenue to foster creative pedagogy among elementary grade teachers is through involvement in museum and gallery programs. This paper arises from the context of “21st century” education and examines the underlying tensions related to standardization of school practices. The data was gathered as part of an investigation into the efficacy of a week-long, interdisciplinary, curriculum-based museum program, situated in an Atlantic Canadian province, targeting teachers, and students from kindergarten to grade six. This research involved two phases. Phase One considered the impact of the program on teachers, and Phase Two investigated the impact of the museum program on student achievement. The review begins with an overview of the current socio-political climate to explore standardization within public education and how the arts are situated within that discussion. The paper then turns to a description of the main study. The discussion is qualitative and interpretive and it is argued that, despite the fact that the research did show impacts on teacher practice and improvements in student achievement, the method of data gathering is contentious and revealed the underlying conflict between standardization and the goals of 21st century education. Finally, some suggestions regarding directions for subsequent research are considered.

### **Standardization and 21st Century Education**

Global health threats, more frequent and intense natural disasters, spiraling conflict, violent extremism, terrorism and related humanitarian crises and forced displacement of people threaten to reverse much of the development progress made in recent decades. Natural resource depletion and adverse impacts of environmental degradation, including desertification, drought, land degradation, freshwater scarcity and loss of biodiversity, add to and exacerbate the list of challenges which humanity faces...The survival of many societies, and of the biological support systems of the planet, is at risk. (United Nations General Assembly, 2016, p. 14)

In response to the challenges of our new century, as outlined in the above quote, many international jurisdictions and provinces have produced policy calling for the need to develop “21<sup>st</sup> century learners” (e.g., Australia, 2013; United Kingdom, 2003; United States, 2000; Ontario, 2016; British Columbia, 2013; Alberta, 2011; Quebec, 2007; New Brunswick, 2007). To more clearly define what is meant by 21<sup>st</sup> century learning, in the United States, the American National Research Council (Pellegrino, J. W. & Hilton, M. L., 2012) produced a synthesis of the skills, grouped into three broad domains: cognitive (e.g., creativity, innovation, critical thinking), interpersonal (e.g., leadership, collaboration, service orientation), and intrapersonal (e.g., adaptability, curiosity, perseverance). Yet, while such policies, and publications about these skills are taking place, standardization, a 20<sup>th</sup> century tradition (Guskey & Bailey, 2001; Tyack, 1974), is more entrenched systemically than ever. Currently, at all jurisdictional levels in Canada (internationally through the Programme for International School Achievement (PISA), nationally through the Pan Canadian Assessment Program (PCAP), provincially through each individual province’s assessment program, and locally through district and school-based department exams) governments, administrators, and teachers are systematically gathering achievement data through standardized assessments. As part of this attention to data, achievement criteria are established, measured, and gaps are diagnosed and targeted. This process has been blamed for narrowing subject specific content and limiting the overall programming goals of educational systems (Sahlberg & Oldroyd, 2010, p. 284).

### **Standardization and Arts Education**

Arts-based programming can better reflect the values espoused in the 21st century education literature. Research data from Canada, Europe, and the United States presents a positive view on the impact of museum programs on children. Interactive learning, active learning, informal learning, out-of-class learning, and experiential learning go beyond traditional methods (Eshach, 2007; Falk, 2005; Howley, Howley, Camper & Perko, 2011; Kratz & Merritt, 2011; Lundahl, 2011; Shanklin, 2009; Talboys, 2010; Wiseman, 2002). Museums promote many forms of literacy including content, expressions, printed texts, and more, allowing for connections between the written text and the outside world (Eakle, 2009; Eakle & Dalesio, 2008; Ortuño, 1994; Schwartz, 2008). Relating learning to personal experience is powerful (Adejumo, 2010; Ansbacher, 1998; Burnham & Kai-Kee, 2005; Dewey cited in Ansbacher, 1998; Chang, 2006; Chang, 2012; Davies, 2008; Falk & Storksdieck, 2005; Jorge, 2011; Mathison, Wachowiak, & Feldman, 2007; Ortuño, 1994; Wiseman, 2002). In problem-based learning environments like museum programs, students develop solutions to real life issues while advancing analytical, interpersonal, and

reasoning skills (Mossuto, 2009). Experiential programs promote observation and reflection, and involve critical thinking skills (Howley et al., 2011; Adejumo, 2010; Cochrane, 2004; Constantino, 2008; Jacobs, 2011; McMillan & Wilhelm, 2007; Yost & Vogel, 2012; Ernst & Monroe, 2004). Ferreira and Trudel (2012) found that students are more invested in their own learning when it is problem-based and when they have control over it. Meta-cognition, teamwork, and self-regulated learning are encouraged in problem-based environmental learning because students are given the opportunity to use individual strengths and to work collectively on problem resolution, in which they all have equal investment (Ferreira & Trudel, 2012; Moote, Williams, & Sproule, 2013). Finally, research shows that a strong collaboration between schools and museums is important (Greene, Kisida, & Bowen, 2014; Berry, 1998; Blume, Henning, & Richner, 2008; Cochrane, 2004; Henderson & Atencio, 2007).

### **Description of Study**

This study sought to gather data linking student achievement with arts-based, museum programming through an investigation into the effects of a local museum-based educational program. The museum educational program was officially launched in October 2009. Modelled on a zoo-school program, the museum program developed and today is offered at six sites. The tenets are that teachers relocate their classrooms for one week to an educationally-rich environment thus offering time for teachers and students to slow down and become immersed in the museum complex that includes a natural and cultural museum, provincial archives, and a contemporary art gallery (Open Minds, 2008). The program is curriculum based and multidisciplinary, with open-ended activities. Students (and teachers) reflect upon their own interests and choices in learning as they engage in hands-on experiences and use journal writing and drawing to record observations and thoughts. Each week is unique and tailored to the individual needs of the teacher and students.

In the spring of 2012, the program funders approached the researchers. The request was specific that quantitative data was desired to allow for a clear demonstration of the effects of the program. A research project was then designed to investigate the program's impact on teachers' practice, and children's engagement, sense of confidence, and academic achievement. As per Tri-Council Policy for the Ethical Conduct for Research Involving Humans (2010), ethics approval was obtained. Phase One of the research (2012-2013) involved an on-line survey of students, teachers, parents, and parent volunteers, and a focus group with teachers. Phase Two (2014-2015) involved student surveys to assess the impact on student achievement as measured against the provincial curriculum. While both phases involved the impact of museum programming, this paper focuses more on Phase Two as it revealed tensions between standardization and arts-based experiential educational programming. The following outlines the development of this research.

#### Phase One

Phase One involved on-line surveys with students, their parents, adult volunteers and teachers, and afterwards the participating teachers were invited to attend a focus group. Surveys (Brace, 2008) were developed in collaboration with the museum administrator. The questions asked the 18 participants to reflect on their learning experiences, continued use of skills, writing process, follow-up engagement with the museum facility, and changed

teaching practices. The separate surveys were brief but followed parallel forms so as to complement each other. The researchers used the online survey engine Fluid Surveys, and the surveys were analyzed via on-line technology and SPSS (Statistical Program for Social Sciences).

The follow-up focus group with three teachers was videotaped, and the tapes were transcribed by a professional transcriptionist. The tapes were compared to the transcript and corrections were made to the transcript to ensure accuracy (Giorgi & Giorgi, 2003). The transcript was read by the researchers (independently) to acquire a basic feel for the participants' descriptions, to "make sense" out of them, and to gain closure or gestalt (Colaizzi, 1978; Smith, 2004). The transcript was coded by looking for key statements. Statements were transferred into a Word document and printed. Key phrases were then cut up and physically sorted into broad categories (Colaizzi, 1978; Kane & Trochim, 2007). Utilizing the beginning stages of a concept mapping approach, the researchers independently sorted the key terms and phrases into separate thematic groups that were labelled according to their unique content. The researchers discussed discrepancies that arose in how they categorized the key statements (Kane & Trochim, 2007). They then validated the themes by returning to the original transcript to determine if anything had been missed, or if the cluster of themes suggested something that was not originally implied (Colaizzi, 1978).

### Phase Two

Phase Two of the research involved determining the impact of the museum program on student achievement as measured against the provincial curriculum. The researchers met with museum administrators to determine the purpose and requirements of the research. The administrators expressed concern that the testing might not align with the philosophy of their educational program. However, after a thorough review of the literature produced by and about the museum program, it was determined that the philosophy aligned well with the overarching goals of provincial program of studies, *The Essential Graduation Learnings* which include: Aesthetic Expression, Citizenship, Communication, Personal Development, and Problem Solving (Atlantic Provinces Education Foundation, ND). In addition, this focus would reflect the recent goals of 21st century learning as expressed by the provincial Minister of Education at the time, at the recent Education World Forum in London, England. The minister stated that strategies focussing on improving student learning by encouraging teachers, parents, and the community to work collaboratively to introduce creative initiatives based on local needs and circumstances were required (Council of Ministers of Education, 2013). Through further consultation with the museum, it was determined that these were indeed the attributes already existing in the educational program, and a measurement instrument showing the impacts of their program based on these attributes would be welcomed.

It was decided that to best facilitate these goals, the measurement instrument would take the form of a survey that would be administered to the students by a research assistant prior to the program, with follow up surveys to be administered at the museum at the week's end in an effort to determine the immediate growth in learning during the week. It was also determined that a second follow-up survey would be completed at a later date to determine the lasting effects of the program. Due to logistical issues with cohorts and the school year, and to be sure that the interval after leaving the program was sufficient to get

an idea of what was retained, it was determined that the second follow-up survey would take place two months after leaving the program. To eliminate reliability issues, the survey would not be altered for the different administrations. In preparation, the research assistant spent a week at the museum and the researchers spent extended time in the program to familiarize themselves and identify how the goals of the program are manifest.

### Survey Development

All survey items (questions) were constructed collaboratively in a formal item writing session which included the museum staff, two research assistants hired for the project, and one of the researchers. They were first trained in item-writing, which included a review of the purpose of the survey, the measurement goals (the overall provincial program goals), the survey composition and question types, and guidelines with regards to bias and accessibility. After that session, all item-writers spent the day moving throughout the museum, brainstorming possible survey questions.

After the item writing session, all questions were sent to four item reviewers who were deemed to be expert in museum-based educational programs. The reviewers were asked to rate each survey question individually with regards to relevance and fairness. Reviewers were also asked to determine the ability of each individual question to measure the effect of the program and the reviewers were provided the opportunity to make comments and suggestions.

When the reviewer packages were returned with their comments and evaluations, several of the reviewers were concerned that some questions were above the reading and developmental age of the students attending the program. In response, all survey questions were sent to a specialist in language arts and reading development who individually reviewed each question to determine the grade level of the questions. Each question was evaluated for the suitability for participants in grades three through six and, where necessary, the language specialist provided suggestions for rewriting. Further, the questions were sent to a developmental psychologist who reviewed each individual question for age appropriateness according to developmental age.

The reviewers also questioned the appropriateness of testing in a museum setting and of using a Likert scale for young children. Because of the ethical considerations of working with child participants in research, it is essential to carefully reflect upon the construction of any test instrument to prevent potential negative experiences for the children involved. Aside from which scale is used, other elements of instrument construction must be considered, namely, the number of items in a scale, the wording and direction of the scale items, and the child participant's level of comprehension. A great advantage of using the Likert scale is the simplicity and practicality of developing the scale. Immediate responses are available at every level (Waples, Weyhrauch, Connell, & Culbertson, 2010). Questionnaires and self-report measures are widely used in research with children. Evidence shows that the Likert scale can be effective when used with young children because of the few cognitive demands it places on the respondents. Children find it easy to use, and it allows simple score computation for the investigator (Laerhoven, Zaag-Loonen, & Derkx, 2004).

In order to provide good quality responses when creating a survey to use with children, it is equally important to consider the participants' mental process (Laerhoven et al., 2004). Schwarz & Sudman (1996) and Tourangeau (1984) conclude that a well-

designed question will prompt respondents to go through four key stages. First, the respondents understand the question and task done prior to the survey. Second, they remember the task and are able to retrieve the information required to answer the question. Third, the respondents evaluate the information needed to answer the question and make a judgment. Lastly, they communicate the response by selecting an answer. In order for the Likert Scale to be effective, children must not only be able to comprehend the question, but also understand how to answer it. If the children do not comprehend the significance of the rating scale, they are unlikely to provide reliable responses. Therefore, it is imperative that child participants are explicitly taught to understand the Likert Scale before being tested.

Pilot

The above factors-type of scale, instrument construction, and cognitive ability of participants are important to consider when creating a Likert test for children. Therefore, taking the best qualities from each instrument design, the child participants were tested using a Likert-type scale with the visual elements of a happy face, a neutral face, and a sad face to form a Likert-Visual Analogue melded scale, rating negative to positive from left to right.

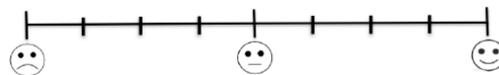


Figure 1. Likert-Visual Analogue Melded Scale

Each survey question was individually aligned with the overarching program goals of the provincial curriculum, as outlined in Table 1:

Table 1.

*Survey Specifications for Overarching Program Goals*

Program Goals	Percentages
Aesthetic Expression	23%
Citizenship	13%
Communication	21%
Personal Development	26%
Problem Solving	18%

The first form (survey) specifications were constructed, outlining number and type of items. The stratified sample was piloted with participating school groups: two grade four classes (both English and French Immersion) and two grade six classes (both Intensive French). To ensure fairness, accuracy, and consistency in administration, the children were first provided with a sample of the Likert-type question, which was then checked by the research assistants. All administrations by the research assistants were scripted. The results were compiled and sent for analysis using a statistical analysis program to determine the reliability of each survey question. The results returned an overall very strong reliability

rating (Cronbach's alpha of .892 for Form A, and .872 for Form B). Each individual survey question was then reviewed for reliability performance, and all strong performing items were used to create the final survey instrument.

### The Final Measurement Instrument

Table 3 outlines the Specifications for the final form. All questions were aligned with the Essential Graduation Learnings and as well as curricular subject.

Table 3.

#### *Question Type: Overarching Program Goals/Curriculum Match*

	Art	Language Arts	Science & Math	Social Studies	
Aesthetic Expression	1, 2, 3		19		4/33 12%
Citizenship	4, 5	28	20	7, 8, 9, 10	8/33 24%
Communication		11, 12, 13, 14, 15, 30			6/33 18%
Personal Development	6	16, 17, 27, 29, 31	21,24		13/33* 39%
Problem Solving			18, 22		2/33 6%
	6/28 21%	12/28 43%	6/28 21%	4/28 14%	

\*NB: Questions 23, 25, 26, 32, 33 align with the Personal Development EGL but apply throughout many different curricular areas.

The final survey consisted of 33 questions on a single, double-sided sheet. The classes and students' names were identified, and responding to the survey took students approximately four minutes. The survey ran from January until March, and due to scheduling logistics, all classes were grade five. In total, 88 students participated in all three administrations.

## **Results**

### Phase One

In Phase One, we had difficulty finding and engaging students who may have participated as long as three years earlier. This was also true for their parents and adult volunteers, thus we had a low response rate to those on-line surveys. The results for these groups were not statistically significant and therefore are not discussed in this paper.

Eighteen out of a potential 60 teachers participated in the on-line survey, providing a strong 30% response rate. Teachers strongly agreed or agreed that the museum program impacted their teaching (95%), they were bringing the museum program elements into their

own teaching practices (95%), they understand students in a broader context now (94%), and their own learning in the content areas covered was enhanced (94%). Further, teachers strongly agreed or agreed that they were surprised by the number of outcomes covered by the museum program (89%) and by the level of engagement of students who are generally “off-task” (89%). They also strongly agreed or agreed that the museum program model supports differentiated instruction (89%), their teaching practices are more cross-curricular since participating (83%), and they connect field trip experiences to classroom studies more since participating (67%).

Three teachers participated in the focus group. Six themes emerged, including: teachers (subthemes of professional development; teacher resources/outcomes; teacher practices and advocacy); students (sub-themes of parents; academic benefits; engagement/motivation; creativity and behaviour); space (sub-themes of impact on students and impact on teaching); collaboration/teamwork (sub-themes of student/student; student/teacher; teacher/The Rooms and teacher/teacher); career and connections.

The teachers were impressed at how this experiential program promoted observation and reflection (Adejumo, 2010; Cochrane, 2004; Constantino, 2008; Jacobs, 2011; McMillan & Wilhelm, 2007; Yost & Vogel, 2012). They noted meaningful learning for the students which involved both cognitive and affective components. This relates to Dewey’s thinking that effective museum experiences involve feeling as well as coming to know (as cited in Ansbacher, 1998).

### Phase Two

The intent of Phase Two was to measure student attitudes and engagement with regards to established curriculum and the overarching program goals of the education system, both established by the province from within which the museum program takes place. The survey, with regards to both item content and format (linear attitudinal scale), resulted in very high reliability scores, with an overall Cronbach’s Alpha score of .937. Statistically, all categories were strongly correlated, with the paired-sample T-Test from administration one to administration three, significant for all categories (using the criteria of 0.05). The mean difference was most significant for citizenship and communication.

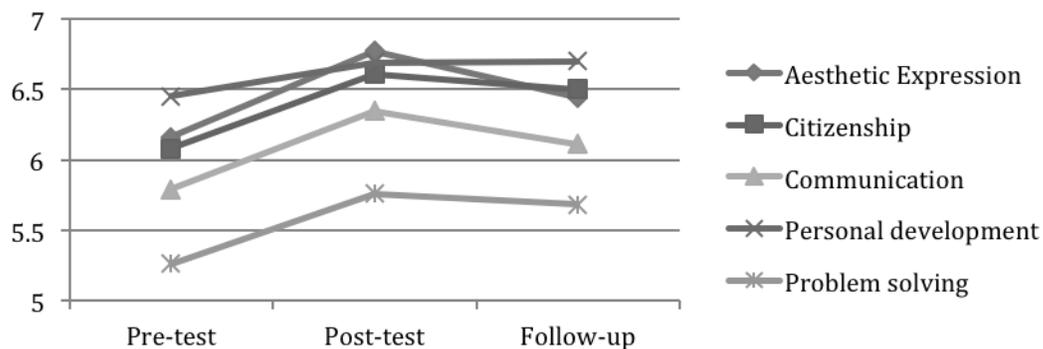


Figure 2. Overarching Program Goals - Total Student Response

Test results demonstrate that after a week of experiential learning at the museum, students who participated showed improvement in every category identified in the curriculum as Essential Graduation Learnings. Through this research, the students involved

in learning at the museum can be measurably seen to have improved their understanding and appreciation of aesthetic expression, citizenship, communication, personal development, and problem-solving. Students gained insight into their community, they broadened their cultural understanding, they developed critical thinking skills, and they discovered intrinsic motivation to learn.

## **Discussion**

In Phase One, we note the high response rate of teachers to the survey as well as the content of their responses in the survey and the focus group, and conclude that overall, teachers found the program substantive and worthwhile. The teachers observed that all students learned well within a program that offered freedom as well as control (Ansbacher, 1998; Bamberger & Tal, 2007; Blume et al., 2008; Constantino, 2008; Dewey cited in Ansbacher, 1998; Eakle, 2009; Falk, 2005; Griffin, 2007; McMillan & Wilhelm, 2007; Viadero, 1998).

The program provided rich professional development for teachers who learned to utilize museum and community art resources (Henry, 2004), and how to lead effective field trips (Rebar, 2012). Teacher professional development is important because teacher learning and student learning are linked across formal and informal contexts (Rivera Maulucci & Brotman, 2010). Further, continuous professional development for teachers is of crucial significance for qualitative arts education in schools (De Backer, Lombaerts, De Mette, Buffel & Elias, 2012).

The results of Phase Two show an increase after the week spent at in the museum program in knowledge and attitudes towards the Essential Graduation Learnings. It must be noted that, despite these positive findings, the researchers are careful about making a definitive claim linking museum and arts-based experiential programming with academic achievement. The survey results did show positive results in the different categories of the overarching provincial educational program goals and curriculum. However, the survey instrument was limited by the number and types of questions that could be asked. While the subject area questions were aligned to the respective curriculum and addressed specific knowledge such as ability to identify patterns and notice relationships, each subject has much more content than what could be measured. Also, the program is relatively short (one week) and there was time and learning in between each administration, which could have accounted for a growth in understanding attributable to classroom or other learning. Further, the survey didn't account for other influences such as motivational factors or group dynamics, which could have influenced the affective aspects of the instrument and the students' responses.

## **Conclusion**

The results of the first phase of the study added to a body of research that focuses on the benefits and challenges of experiential learning and the arts, and the results of the second phase deepened our understanding of the program's impact on student learning. Phase One revealed that the impact of the program on teacher practice was surprisingly powerful. The high response rate of teachers to our survey, the content of their responses, as well as the themes from the focus group lead us to conclude that they found the program substantive and worthwhile for themselves. De Backer et al. (2012) contended that continuous professional development for teachers is of significance for qualitative arts

education in schools. However, they add that sustainable changes can occur only if experts/artists collaborate with teachers for a relatively long time. Within a context where generalist teachers have little professional development in the arts available to them, and given that some of our participants have attended with their classes for three consecutive years, another study might determine whether such changes in teacher practice have been sustained. Additionally, issues such as the importance of the physical space and the program's positive impact on student behaviour are worth further investigation.

Achievement testing in education is a contentious issue and some of the tensions we encountered while creating a method of measuring student achievement during Phase Two brought these tensions to the forefront of the research. There was concern about the philosophical differences and the impact of data gathering on children while experiencing the museum program. There were concerns about the data (numbers) and if it was possible to reveal the true value of the program. There was apprehension regarding language use and age appropriateness, and overall, arts-based reviewers felt uncomfortable with testing students in a museum. Throughout the process, we addressed many of these concerns individually.

We were surprised by the high reliability despite concerns regarding the adaptations to the Likert scale but overall, we were pleased that the results were positive. However, as researchers, we also were left with questions. In particular, one of the critiques of educational measurement is the necessity of establishing measureable criteria that then results in a narrowing of curriculum. Museum-based programming is inherently holistic and reflects concerns about the narrowing involved in testing and measurement. Although we focused on the larger philosophical qualities and goals of education, what is missed as a result of the limitations of testing? By focussing our questions on the Essential Graduation Learnings, what attributes or possible gains from the program are we missing? Conversely, questions relating to deeper issues regarding the perspectives and practices of museum programs were not included in this research.

In the past year, we have been asked to present on the process and results of this program. The audiences in each of these presentations have been different (the general educational community as well as audiences specializing in arts and arts-based education and educational leadership). In these presentations, in hope of feedback, we have ended our talk with the same questions: what are the impacts of this research and what are we narrowing the experience of the museum program to, by asking a limited view and number of questions? To date the feedback has ranged from excitement over the shift in focus to the wider goals of education so as to move towards 21<sup>st</sup> century learning goals, to fear over the "creep" of testing into the arts community. We present these findings as part of this ongoing discussion.

We have examined how while experiential programming benefits student engagement, teacher receptiveness, and academic performance, standardized assessment can act as one of the educational constraints that may separate pedagogical innovation from social innovation. Our research confirmed in numbers what had previously seemed like "common sense" and was obvious for all to see: the program has a positive impact both on teachers' professional development and on students' achievement. We are pleased that the funders continue to support the program. Nevertheless, the method of data gathering was contentious and revealed the underlying conflict between standardization and the goals of

21st century education. Further research on these programs, through an arts-based lens, has significant potential to inform these important educational issues.

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