

## Museum education activities in Hong Kong: Teachers' and Students' Perspectives

<sup>1</sup>Sammy King-Fai Hui, John Chi-Kin Lee, Joe Tin-Yau Lo and Mandy Yuen-Yee Au

### Abstract

---

Museums provide direct learning experiences. In museums visitors can encounter objects and exhibits from specific times and places, related to concepts and disciplinary subjects in the arts, history, science, and social sciences. A museum is an educational fair. The Hong Kong Special Administrative Region Government's recent primary school General Studies curriculum guide recommends learning through museums as an informal learning pathway for all students. This project is an up-to-date exploratory study of why and how Hong Kong primary school teachers and students visit museums educationally and how they perceive those visits and the accompanying learning experiences. A survey study from a sample of five local primary schools, 90 teachers and 415 senior form students, shows that although teachers and students may not visit museums very frequently for academic purposes, they do have a strong interest and motivation to visit more often, attracted by different elements. Students' learning and interaction with technology, adults and peers, and the museum environment during a visit, as well as the attractiveness of museum content, tend to correlate with their motivations. This has a range of implications which we discuss. This study will be useful for museum experts, educators and the wider public to map meaningful museum education journeys for students. (205 words)

---

*Keywords:* museum education / museum learning / primary school teachers and students / interactivity / motivation

### 1. Introduction

According to Semper (1990, p. 50) “a museum is an educational fair” in which individuals can explore and discover through inquiry. Through museums, visitors can encounter objects and exhibits from specific times and places, related to concepts and disciplinary subjects in the arts, history, science, and social sciences. This partly echoes the description by Andre, Durksen and Volman (2017, p. 48) of museums as public spaces for learning. Such learning, according to Eadie et al. (2022, p. 103), is about “science, history, archeology and arts, involving various objects and exhibits (line and/or simulated) and programs”.

Falk and Dierking (2000) suggest that children learn not only through formal settings (e.g., classrooms) but also in informal settings (e.g., experiential programmes). Learning through visiting museums is one of many informal ways of learning that are qualitatively very different from formal learning in schools. A museum is an informal terrain of public pedagogy that involves educative sites of memorialization (Huang & Lee, 2018; Kridel, 2010; Sandlin, O'Malley & Burdick, 2011, p. 13). In Hong Kong, museum education is considered one of the informal curricula to pursue “life-wide learning”, a Key Learning Area (KLA) in Personal, Social & Humanities Education (PSHE) (Curriculum Development Council, 2002). Museum visits are arranged in the form of co-curricular activities/ project-learning to allow students to learn beyond the classroom, and to cater for their diverse needs at various stages of schooling (i.e., what students should know, value and be able to do). These include, for example: 1) understanding one's own interests, emotions and behaviours, and their influence on oneself and others, 2) identifying one's roles in different social groups, 3) maintaining human relationships and healthy lifestyles, 4) understanding the impact of natural and human activities, and 5) knowing the important features of Chinese culture and the impact of significant people and events in the history of the country and the nation. In the latest *General Studies curriculum guide for primary schools (primary 1 – primary 6)* (Curriculum Development

---

<sup>1</sup> Principal Lecturer, Department of Curriculum & Instruction, The Education University of Hong Kong, Tai Po, NT, Hong Kong. Email: [skfhui@eduhk.hk](mailto:skfhui@eduhk.hk); Tel: (852) 2948-7550; Fax: (852) 2948-7563

Council, 2017), the importance of museum learning is further emphasized as an opportunity to give students “the opportunities to learn in authentic contexts” (p. 147).

It recommends that primary schools add appropriate museum learning to their school curriculum, deploy teaching teams effectively, and cooperate with the tour guides of museums to design learning objectives and strategies that offer students more meaningful learning trips (p. 148). In *The Chief Executive's 2022 Policy Address*, there highlighted Continuously upgrade cultural infrastructure that,

We will map out a new 10- year development blueprint for arts and cultural facilities, including plans to increase the number of LCSD's museums to 19 and the number of seats at performance venues by about 50%. (The Hong Kong Special Administrative Region of the People's Republic of China, p. 19)

In response to the expanding needs of museum education and learning in the local school community, this paper reports a study of the perspectives of primary school teachers and students from Hong Kong on museums and museum learning and offers a comprehensive understanding of their learning experiences and motivations. This paper will contribute to discussion on how to better position museum education activities in Hong Kong.

## 2. Literature Review

### 2.1 Perspectives of Museum Education and Learning

There has been a shift from the authority of the museum and art gallery towards more “visitor-centred” learning approaches that emphasize expert museum educators skilled and equipped in listening, supporting, probing and negotiating meaning (Burnham & Kai-Kee, 2011; Clover, Sanford & Johnson, 2018). Packer and Ballantyne (2016, p. 133) summarize that visitors' experiences tend to be inherently personal and subjective, responsive to the affordances of external or staged activities, settings, or events, bounded in space and time, and significant to the visitors. The content of the museum is as important as the concrete materials such as objects and exhibits in enhancing museum learning (Hooper-Greenhill & Moussouri, 2000). In art museum education for example, one of the purposes of encountering artefacts is “to develop visitors' faculties in the acquisition of knowledge” and the purpose of learning from objects is “to enable the development of sense-perception” (Hooper-Greenhill, 1996, pp. 121-123). Donald (1991, p. 371) suggests that museum learning can be measured under such categories as time on task, knowledge gained, thinking and problem-solving skills, motivation or attitudes, and creativity. Hooper-Greenhill (1999, p. 22) however remarks that while museums “claim to be for everyone”, they “are not experienced equally by all” (de Castro, Moreno-Serrano & Real, 2022, p. 203). Rosenblatt (1994, 1995) advocates the transactional museum pedagogy where the real values of objects and exhibitions, while valuable in themselves, are located in, and depend on, how students engage with them (Hansson & Öhman, 2021, p. 8). Sabeti (2015) considers that inspiration and multidirectional creativity hinge, not in the objects, but in the agency of “persons” with whom those objects are shared. A study in Indonesia suggests that museum-based learning can influence both student and teacher creativity, such as the generation of new ideas, as well as the variety of problem-solving solutions available to students (Astuti et al., 2021, p. 219).

There are various models or approaches to understanding museum experiences. The IPOP model of experience, originating in the Office of Policy and Analysis at the Smithsonian, identifies four key dimensions: Ideas (I) pertaining to conceptual and abstract thinking; People (P) highlighting emotional connections; Objects (O) composing of visual language and aesthetics; and Physical experiences (P) focusing on somatic sensations (Pekarik, et al., 2014). Drawing on museum visitor studies and other leisure and visitor research, Packer and Ballantyne (2016, p. 136) developed a multifaceted model of the visitor experience which comprises physical, sensory, spiritual, hedonic, emotional, relational, cognitive, restorative, introspective and transformative experiences (Zhao, 2021, p. 257).

According to self-determination theories (Deci & Ryan, 2000; Wilde & Urhahne, 2008), “open tasks” provide learners with substantive learning experiences that can induce much higher intrinsic motivation than “closed tasks”. The Interactive Experience Model (IEM), later renamed the Contextual Model of Learning (CML), further suggests that museum visitors' experience is a key variable to examine the nature of museum learning (Chang, 2006; Falk & Dierking, 1992, 2000). Falk and Dierking (2000) promote CML as an approach to understanding and organizing the complexities of learning within free-choice settings. The CML comprises three interacting components: a visitor's (hypothetical) personal, sociocultural, and physical contexts over time. Twelve factors, further categorized under these three contexts, may influence one's museum learning experiences (Falk & Storksdieck, 2005, p. 745). Personal context, for example, entails visitor motivation and expectations, while sociocultural context highlights within-group social mediation (e.g., among students and between teacher and students) and mediation by others outside the immediate social group (e.g., between teacher and students and museum staff and docent). In contrast, physical context emphasizes orientation to the physical space in the

museum, design of, and exposure to, exhibits and programmes, and subsequent reinforcing events and experiences outside the museum (Falk & Storksdieck, 2005, p. 747).

These models or approaches suggest that with regard to museum experiences, the preferences and learning of visitors are not confined to cognitive aspects but tend to be multifaceted and diversified according to the individuals themselves, the contexts and contents and objects of museum exhibits and activities, as well as possible interactions among people.

Museum education and museum learning research needs to consider visitor motivation for the visit (Donald, 1991; Jiang & Lin, 2020; Wilde & Urhahne, 2008). In a case study of visitor motivation at the Shanghai Museum in China, Jiang and Lin (2020) identify four types of motivation factors: “social and family interaction”, “diversified consumption”, “escape” and “learning motivation”. They find “social and family interaction” and “diversified consumption” to be the two dominant types of motivation factors (p. 37).

In Western culture, according to Falk (2011), seven distinct types of motivations are observed in museum visitors: 1) Explorers: To fulfil their intellectual curiosity; 2) Facilitators: To help facilitate the experience and learning of others, in particular, children; 3) Professional/Hobbyists: To fulfil their desire to satisfy a specific content-related objective; 4) Experience Seekers: To fulfil their perception of a museum as an important place to visit and a must-do in their itinerary; 5) Rechargers: To look for a contemporary, spiritual and/or restoration experience and a refuge from their daily work, or a place to confirm their religious beliefs; 6) Respectful Pilgrims: To fulfil a duty or an obligation; and 7) Affinity Seekers: To search for a sense of heritage and/or personhood (Bond & Falk, 2012; Chen, 2015, p. 105). In this regard, this study is significant in offering a Chinese perspective on museum education and learning, and the experiences and motivations of primary school teachers and students regarding museum visits.

## 2.2 Museums and Museum Education Related Studies in Hong Kong

The earliest museum in Hong Kong was situated in its former City Hall and dates back to 1857. That City Hall was demolished in 1947. In 1962, the City Museum and Art Gallery was established in a newly-opened City Hall. In 1975 its collections and functions were split, separated into the Hong Kong Museum of History and the Hong Kong Museum of Art. Another designated museum, known as the Fung Ping Shan Museum, which has become the University Museum and Art Gallery of the University of Hong Kong, was founded in 1957 (Tang, 2010, p. 8). From the 1980s to the early 1990s, under the operation of Leisure and Cultural Services Department (LCSD), other museums were built and managed. Under LCSD, there are today seven major museums in operation: the Hong Kong Museum of Art (1962), the Hong Kong Museum of History (1975), the Hong Kong Space Museum (1980), the Hong Kong Science Museum (1991), the Hong Kong Heritage Museum (2000), the Hong Kong Museum of Coastal Defence (2000) and the Dr Sun Yat-sen Museum (2006) (Leisure and Cultural Services Department, 2018).

From the 1990s onwards, more independent museums were founded in Hong Kong. They include the Hong Kong Museum of Medical Sciences (1996), the Hong Kong Racing Museum (1996) and the Hong Kong Museum of Education (2009) within the Education University of Hong Kong (formerly known as the Hong Kong Institute of Education). As highlighted by Yau (2001) in the special article posted on the website of Hong Kong Museum of History, “Museums have assumed a new role of establishing themselves as a place of learning and enjoyment, which allows visitors to enjoy more thoughtful pursuits and learn in a highly cognitive sense with excitement and enhanced interest.” Recently, as part of the development of the West Kowloon Cultural District, the M+, West Kowloon opened in November 2021 and the Hong Kong Palace Museum, West Kowloon launched in July 2022.

Whilst there is an increasing number of museums in Hong Kong, there is a dearth of recent museum education related studies. In a survey of Hong Kong preschools and kindergartens, Piscitelli et al. (2008) found that 90% of the responding kindergartens visited a museum during the year in question and that these visits were mainly curriculum-related (pp. 90-92). In another study using the Hong Kong Museum of Art as an example, Wong and Piscitelli (2017) found there were variations in learning experiences based on dialogues and communication between the docents and children on the one hand, and between teachers and children on the other. Communication between the docents and children tended to highlight materiality and meanings of the art objects, while communication between teachers and children tended to generate dialogue based on the children’s art knowledge, experience, and feelings (p. 23).

With reference to secondary schools, Lo (2011) conducted a multi-phase study on teachers’ and students’ perceptions of learning in the museum. In a survey sample of 28 in-service teachers in the first phase, about 60% of the respondents had considered field-based learning to widen students’ learning space. The major reasons for

organizing field-based learning were to motivate students' interest in learning, utilize community/field-based resources or authentic contexts for learning, and broaden students' learning experiences.

Connecting student learning in the formal curriculum with learning in the informal curriculum outside the classroom was considered relatively important (pp. 305-306). Regarding the Hong Kong Museum of History for example, in follow-up interviews teachers said they considered that museum visits had enhanced affective and interpersonal dimensions, such as increasing student awareness of the development of local and national history, culture and identity, helping them to learn from the past and to trace the historical origins of some contemporary issues, and developing their social skills through group and discussion activities. Group interviews with 37 secondary three students further revealed that students' learning tended to be varied, sporadic and sensational, rather than very cognitive (pp. 313-314). Students were not aware of how their museum learning might improve their skills development. There were also variations in the affective and interpersonal experiences of the students, exemplified by their consciousness of understanding of being Hongkongers, enjoyment of freedom of learning outside the classroom context, and learning through sharing ideas and discussion (pp. 315-316).

Generic skills and positive values are critical domains for students to acquire during primary school years. Generic skills are the "foundation" of students' capabilities for learning to learn, an important claim by the Education Bureau based on its past experiences of implementing curriculum reform and in response to dynamic changes in society (Curriculum Development Council, 2017, p. 15). It is recommended that schools give students sufficient time for enquiry-based learning and life-wide learning activities, including museum education activities, to develop their generic skills and positive values. Against this backdrop and in the face of a limited body of local museum research in primary school settings, this study will also provide a baseline for other research on the expected impact of museum education and learning on students' growth and development.

### 3. Methodology

#### 3.1 Research Framework: Facilitating Strategies and Activities in Children's Learning in Museums

Kelly (2007) proposes the 6P model of museum learning (p. 6) which comprises person (e.g., gender, personal interest), purpose (e.g., motivation, interests, choice), process (e.g., doing something, objects and tools), people (e.g., museum staff and teachers), place (e.g., museums, school) and products (e.g., meaning making, facts & ideas) (Zhang, Xia & Yu, 2017, p. 106). This study, to some extent, echoes Kelly's 6P model, with one of its key foci being the motivation of museum visitors in a Chinese context (Hong Kong teachers and students as referred to in this study) towards museum visits and museum learning, as well as their perspectives on the whole museum learning journey.

An Australian study highlights six themes on museum programmes for young children: access, museum facilitator experience, expectations, children's interests, interactions with children, and interactions with artefacts (Eadie et al., 2022, p. 105). With the advent of technology, the increasing use of augmented reality (AR) technology and learning tools enables children to explore museum artefacts more fully (Lee et al., 2021). Many museums have digital learning centres and makerspaces which provide visitors of different levels of digital literacy with in-depth experiences of the museum's digital collections, or chances to participate in digital activities (Forbes & Fresa, 2016, p. 6).

Andre, Durksen and Volman (2017, p. 52) have developed a framework to conceptualize how children learn in museums, the "framework of facilitating strategies and activities in children's learning in museums". The 3 key domains with which "children" often interact in the course of learning are "adults/peers", "technology" and "environment" (see Figure 1):

1. Children-adults/peers interactivity: Children's learning is guided by humans, including teachers, museum staff/docents, non-profit organizations' trainers, parents, etc., and they can learn from conversational interactions such as asking questions;
2. Children-technology interactivity: Children's learning is guided by technological applications in the museum environment, such as virtual tours/visits, online games, mobile phone tasks, etc.; and
3. Children-environment interactivity: Children's learning is guided by interactions with objects in the museum environment, such as hands-on activities, virtual visits, guided visits, free exploration, etc.

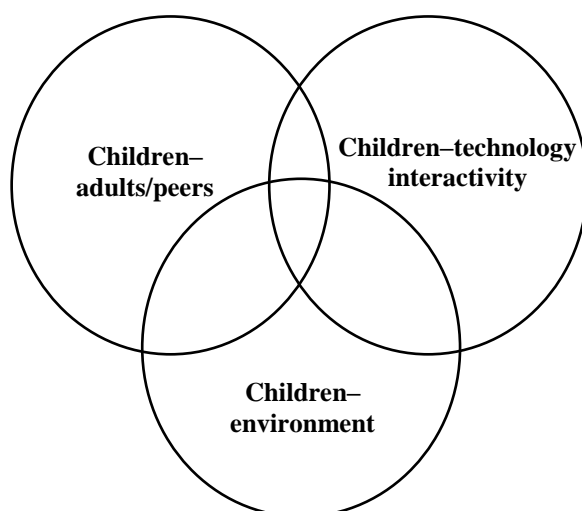


Figure 1

*The framework of facilitating strategies and activities in children's learning in museums* (adopted from Andre, Durksen & Volman, 2017, p. 52)

This study adopts Andre, Durksen and Volman's (2017) framework to some extent, as it highlights the vital roles of teachers, museum docents and peers as well as the technology and environment intrinsic in museum visits. In this regard, apart from understanding students' perspectives, it is important to investigate how teachers perceive meaningful museum learning experiences, to what extent they relate to motivating students to undertake museum visits, and whether there are discrepancies between teachers' and students' learning experiences, perceptions, and motivations. In addition to this framework, Donald (1991, pp. 373-378) suggests a range of variables to be examined in measuring museum learning, including time on task, knowledge gain, thinking and problem solving, and creativity or intellectual provocation, which affect student museum learning.

### 3.2 Research Objectives and Questions

The primary research objectives of this study are to investigate Hong Kong primary school teachers' and students' learning experiences from and motivations for museum visits, and to give insights to how to better position museum education activities. The specific research questions that guide the course of investigation are:

1. What were the preferences of primary school teachers and students in museum visits?
2. What were primary school teachers' and students' experiences of museum visits and their perceptions of the importance of different museum elements? Were there any differences in their experiences and perceptions?
3. What were primary school teachers' and students' motivations for museum visits? Were there any differences in their motivations?
4. What were the relationships between learning experiences and motivations among primary school teachers and students in museum visits?

### 3.3 Questionnaire Design

A self-administered survey questionnaire was developed. The questionnaire consisted of three major parts. The first provided a list of commonly known museums in Hong Kong partly based on the Expat Living website (2022) and asked whether participants had visited each or any of the listed museums in the past three years (from September 2019 to September 2021) and whether they had any plan to visit these museums in the coming three years (Table 1). A list of seven general types of museums (e.g., arts-, history-, culture-, technology-related, etc.) was included to assess participants' preference.

The second part included two 5-point Likert scale measures of "learning experiences" of and "motivations" for museum visits. In terms of "learning experiences", items were classified with reference to Andre, Durksen and Volman's (2017) framework, the three types of interactivities. "Learning experiences" were conceptualized as perceptions of different kinds of "museum elements". Different common interactions with "adults/peers" (e.g., teachers, museum staff/docents, non-profit organizations' trainers, parents, etc.), "technology" (e.g., virtual tour/visits, online games, mobile phone tasks, etc.) and "environment" (e.g., hands-on activities, virtual visits, guided visits and free exploration, facilities, etc.) were included. There were 20 items which asked, for example, how important participants found museum elements.

They included: “The museum content is interesting”, “There are VR/AP experiences prior to the museum visit”, “I can ask questions during the museum visit”, “There are worksheets to supplement learning”, “The docent is positive and enthusiastic”, “There is a souvenir shop”, etc.

Regarding “motivations”, 15 items were developed in accordance with the work of Luke and Windleharth (2013, p. 5) and Hooper-Greenhill et al. (2004, p. 9), to assess how much participants prioritized different “aims” of museum visits. These were classified under 4 specific dimensions: “focus on museum theme”, “focus on historical development and traditional culture”, “focus on learning”, and “focus on personal gains”. The items asked how much participants agreed with given aims of museum visits, for example: “To understand the museum theme”, “To understand the traditional culture of Mainland China”, “To understand the historical development of Hong Kong”, “To supplement what has been learnt in the classrooms”, “To facilitate friendship with classmates and friends”, “To relieve pressure from work/ study”, etc.

The third part included basic demographic information such as gender, age and (for teachers) subjects taught.

### 3.4 Fieldwork and Data Analysis

Written invitations were sent to all Hong Kong primary schools in Fall 2021 to collect responses from one class of each of the senior forms (i.e., three classes in each school) and around fifteen to twenty teachers. Five primary schools replied, returning 90 primary school teachers’ questionnaires (31.5% males and 68.5% females) and 415 senior form students’ questionnaires (51.4% boys and 48.6% girls). The number of questionnaires for the three senior forms was roughly evenly distributed.

Collected data was entered into the software Statistical Package for Social Sciences (SPSS) and Analysis of Moment Structures (Amos) version 26 for analysis and different statistical techniques were employed (Arbuckle, 2019; Bollen, 1989; George & Mallery, 2020; Gorsuch, 1983). Descriptive statistics were used to report frequencies and distributions. Both exploratory and confirmatory factor analyses (EFA and CFA) were conducted to extract the psychological constructs that underlying teachers’ and students’ “learning experiences”. Inferential statistics were used to test group differences and measure associations.

## 4. Findings and Discussion

### 4.1 Museum Visits were Not Frequent Activities for Teachers and Students

Our sample of 90 primary school teachers and 415 primary school students revealed that schools did not arrange museum visits frequently (Tables 2 and 3). Only about 75% of respondents (67 teachers and 310 students) had visited museums in the last 3 years. Most of those visits were private visits (over 85%). Only 43.3% and 30.6% of teachers and students had visited with schools. Those visits were limited to better known and well-established museums (Table 4). The most frequently visited museums for teachers were: Hong Kong Science Museum, (~70%), Hong Kong Museum of History (~61%), Hong Kong Space Museum (~60%), Hong Kong Heritage Museum (~52%) and Hong Kong Museum of Art (~52%). Student respondents had mostly visited: Hong Kong Space Museum (~74%), Hong Kong Science Museum, (~71%), Hong Kong Museum of History (~52%), Hong Kong Heritage Museum (~39%) and Hong Kong Railway Museum (~34%). The percentages of teacher and student respondents who visited the rest of the listed museums were less than 30%. Over half of the museums accounted for less than 10% of visits. This implies that schools may not be proactive enough in organizing museum learning opportunities for students.

In recent years, the Hong Kong Special Administrative Region (HKSAR) Government, local school communities, and arts and cultural organizations, have increased their promotion of museum visits. As a result, teacher and student respondents have become more interested in planning to visit museums in the next three years. Most notable this included not only the better known and well-established museums but also some newly-established ones (Table 4). For example, ~81% and ~76% of the teacher respondents planned to visit M+ and Hong Kong Palace Museum, West Kowloon respectively, as did ~44% and ~46% of the student respondents. They also planned to visit: Hong Kong Space Museum (~51% and ~48% for teacher and student respondents), Hong Kong Museum of Art (~50% and ~41%), Hong Kong Science Museum (~44% and ~41%), Madame Tussauds Hong Kong (~37% and ~34%), and Hong Kong Museum of History (~34% and ~51%). This to some extent echoes the official *General Studies curriculum guide* document which suggests, “Museums are community resources” and “Museums provide rich learning resources that cannot be provided by classroom learning. Students can learn about history and science in museums” (Curriculum Development Council, 2017, p. 148 & 189).

#### 4.2 Strong Interest and Motivations of Museum Visits, in Favour of Different Museum Elements

Table 5 indicates that our sample of teacher and student respondents had a strong interest in visiting different types of museums (with the majority of mean values over 3.5 on a 5-point Likert scale). However, as revealed in the t-test analyses, there were significant differences in preference. Teachers tend to prefer visits to arts-related museums, while students express more interest in science and technology-related museums (with mean value of 4.22). Students as 21<sup>st</sup> century learners and museum visitors are immersed in science and technology, partly because of the global STEM education trend. Science and technology have come to dominate students' everyday life. In examining the "plus" that science museums can offer to schools, Peñaloza et al. (2020) highlight that, "museums do not have the limits that are inherent in the school, such as the curriculum, disciplines limits and times, among others" and "museums can be a means through which knowledge can be used to interpret (reading) other contexts; it is about bringing other contexts to school and enriching them" (pp. 218-219).

Table 6 shows the relative importance of museum elements, as a representation of learning experiences, perceived by teacher and student respondents. The high mean values of items relating to "museum content", "VR/AP experiences", "learning activities" and "museum docents" informs the contribution of Andre, Durksen and Volman's (2017) three types of interactivities in facilitating museum learning, not only for children but also for adults. Social interaction and the museum context are important factors in museum learning and meaning making (Falk & Dierking, 2000). Significant differences were revealed between teachers and students regarding some specific items. In terms of increasing the motivation for the visit, teachers tend to attach more importance than students to visitors' (students') interest to learn, specialty of themes, alignment of museum content with school learning, and promotion of museum content. On the other hand, students tend to accord a higher level of importance to whether there are VR/AR experiences prior to and during the visit, whether they have chances to ask questions and receive feedback, whether the museums provide diversified learning activities and games-related learning, and whether they have different facilities and a souvenir shop. It is clear that students are inclined to favour more interesting learning experiences and environment. Echoing Andre, Durksen and Volman (2017), more attention should be given to children's perspectives as co-creators of the research process and outcomes. Based on this, "museum educators and teachers could partner and supply practical tools for designing effective learning experiences" (p. 67). Also, digital technologies could extend museum experience (Simone, Cerquetti & Sala, 2021).

Table 7 shows respondents' motivations for museum visits (i.e., what they see as the "aims" of museum visits). Both teachers and students had relatively high motivations for museum visits (with majority of mean values over 4.0 in a 5-point Likert scale). Teachers tend to show a higher level of motivation to facilitate their "understanding of museum theme". It is notable that t-test analyses did not reveal any significant difference between teachers' and students' perceptions of museum visits as aiding understanding of the "historical development" and "traditional culture" of Hong Kong and other parts of the world. There were also no significant differences in teachers' and students' perceptions of visits as ways to enhance diversified learning. Compared with teachers, students did find that museum visits improved their understanding of the traditional culture of Mainland China, fostering their friendship with classmates and friends, and relieving their study pressure.

#### 4.3 Museum Elements are Critical but Vary in Teachers' and Students' Motivations for Museum Visits

In addition to the descriptive and preliminary analyses, more sophisticated statistical techniques were applied to the two measures of museum visits, "learning experiences" (conceptualized as perceptions toward different kinds of "museum elements") and "motivations", to provide a more exhaustive view of museum education and learning in the local primary school context. In terms of motivations, the 15 items were grouped into one construct. The Cronbach alpha values for teachers' and students' cohorts were 0.88 and 0.92 respectively.

With reference to learning experiences, exploratory factor analyses (with principal component as method of extraction, followed by oblique rotation) were first conducted. The initial solution for all respondents produced a 5-factor model. After removing 5 items which had the fewest correlations with other items, a 4-factor model was retrieved for our sample of 90 primary school teachers and 415 primary school students. These 4 factors explain 60.3% of the total variance. Three of the factors match Andre, Durksen and Volman's (2017) three types of interactivities: "learning and interaction with technology", "learning and interaction with adults and peers" and "learning and interaction with museum environment". The fourth extra factor is "attractiveness of museum content". Confirmatory factor analysis (with maximum likelihood as method of extraction, followed by orthogonal rotation) further inferred that the model was a good fit (Chi-square = 177.56;  $df = 51$ ;  $p = 0.000$ ). A high value of KMO (0.816) indicated the analysis was "meritorious" to "marvelous" (Kaiser, 1974).

A large value of Bartlett's test (2137.93) rejected the null hypothesis that the correlation matrix was an identity (associated level of significance  $p = 0.000$ ). Additional fit indices in Amos further confirmed that the model was considered a good fit (TLI = 0.808; CFI = 0.865; PCFI = 0.606). A comparatively small value of Root Mean Square Error of Approximation (RMSEA = 0.085) indicated the model was considered as a fair fit (MacCallum, Browne & Sugawara, 1996). Table 8 presents the rotated factor matrix.

Table 9 shows the correlations between the 4 types of learning experiences and the single construct of motivation. Very different results were found between the teachers' and students' cohorts. For teachers, motivation correlated significantly only with "learning and interaction with technology", "learning and interaction with adults and peers" and "attractiveness of museum content", not with "learning and interaction with museum environment". For students, motivation correlated significantly with all 4 types of learning experience, and its correlation with "learning and interaction with adults and peers" was much stronger ( $r = 0.566$ ) than that of teachers' ( $r = 0.312$ ). This suggests that students are more likely to be motivated to museum visits when different museum elements are enhanced, providing both attractive museum content and high interactivity with adults/peers, technology and environment. Falk's (2011, p. 11) analysis of the link between one's museum experience and identity-related needs is insightful:

The closer the relationship between a visitor's perception of his/her actual museum experience and his/her perceived identity-related needs, the more likely that visitors will perceive that their visit was good and the more likely they will be to return to the museum again and encourage others to do so as well.

## 5. Implications

International trends in museum education highlight the training and enhancement of the skill and capacity of volunteers, staff, and pre-service teachers to help visitors make meaning. This includes forging partnerships with other organizations to expand the museum's capacity and effectiveness, and facilitating visitors' experiences so they can develop their affective connections with museum artefacts and activities (Robinson, 2021, p. 283). When schools are encouraged to engage in museum education, the museum is seen as an educational vehicle or platform. Andre, Durksen and Volman (2017) insightfully suggest that, "museum researchers and educators should co-create learning environments that welcome children with effective and powerful learning strategies and activities that enhance their learning by combining different interactivity types" (p. 68).

The findings of this study in Hong Kong, to some extent, echo this trend. The literature review on museum education, in particular, highlights the importance of enhancing the training of teachers and fostering partnership among museums, universities and schools, as well as the use of technology and other innovative approaches to museum education. Diverse types of connection between museums, universities and schools are not only possible but recommended (Heath et al., 2018).

### 5.1 Implications for Collaboration and Cooperation of Museums with Non-profit Organizations, Schools and Universities for Developing Museum Education

Given that relatively small-scale and less well-known museums in Hong Kong receive fewer organized visits from teachers and students, and that many visits by teachers and students tend to be private, there seems to be room for museums to plan more activities and publicity for schools. It is also desirable for museums to collaborate with non-profit organizations, schools and universities in endeavours related to museum education that can enhance proactivity. Kampschulte and Hatcher (2021, pp. 77-78 & 81-82) assert that there are infinite possibilities for museums to foster cooperation and collaboration, even though they may differ in sharing, motivation, partnership, and ownership. For collaboration, museum curators, educators, and designers could work together to develop exhibitions with a shared vision and concept. On the other hand, museum curators and educators could collaborate to develop a concept, and then pass it to a designer for implementation, another form of cooperation (Kampschulte & Hatcher, 2021, p. 78). Museums may also explore collaboration and cooperation with educational institutions in object-based learning and design of tailor-made visitor programmes. For university/research institutions, museums could explore collaboration and cooperation in research, student or internship or placement programmes, as well as exhibitions. There are also opportunities for community and corporation collaborations for exhibits, programmes, and education that embrace a wider variety of perspectives and various kinds of support, including sponsorship (pp. 79-81). There are examples of museum-university partnerships where pre-service student teachers are engaged in learning "including invitations to explore, critique, and contribute to exhibit design and/or redesign" (Hamilton & Margot, 2020, p. 474).

This study also suggests that the more often students interact with the museums in terms of adults/peers, technology, and environment, the greater their motivation to learn.



This has implications for how museums enhance their facilities, arrange exhibitions and design activities that engage students with multiple forms of direct and indirect learning experiences, and facilitate student interaction with peers in collaborative learning. In Hong Kong, the new Hong Kong Palace Museum, West Kowloon intends “to enrich and transform people’s understanding of Chinese art and culture” through innovative strategies, new technologies, and partnerships with various stakeholders (West Kowloon Cultural District Authority, 2021, para 14, p. 5). These encouraging developments could help chart new pathways for museum education in Hong Kong.

## **5.2 Implications for Professional Development of Teachers and Museum Educators in Museum Education**

The findings of this study suggest that teachers may need to develop their abilities to address students’ interests in certain aspects of museum learning, such as the use of technology or technology-related museum visits. In addition, Pringle (2018, p. 16) refers to Dobbs and Eisner’s (1987) viewpoint, remarking that art museum educators may lack sufficient training in museum-related research and evaluation methods. Also, museum educators may be expected to facilitate the professional development of teachers (Baron, Sklarwitz & Coddington, 2021). Currently there seems to be, in the Hong Kong Special Administrative Region (HKSAR), China, a lack of systematic training in local universities for pre-service and in-service teachers to plan and implement museum-related learning activities. It is, however, noteworthy that the newly established M+, West Kowloon seeks to forge partnerships with academic institutions through conducting research and providing short courses related to visual culture (West Kowloon Cultural District Authority, 2021, para 12, p. 4).

## **5.3 Towards Balancing Students’ Museum Learning in Terms of Contents and Orientations**

To echo teachers’ and students’ preference for diversified learning, and teachers’ perceptions of the importance of museum content, and in alignment with school knowledge, it may be necessary to balance the learning experiences of students in museum learning by means of visits to different categories or types of museums. In the Hong Kong primary school General Studies curriculum, the six strands of Health and Living, People and Environment, Science and Technology in Everyday Life, Community and Citizenship, National Identity and Chinese Culture and Global Understanding, and the Information Era (Curriculum Development Council, 2017, p. 15) may be linked with different museum learning activities. For example, Lei Cheng Uk Han Tomb Museum could offer learning experiences related to Chinese History (Education Bureau, 2021). On the other hand, some museums, such as the Hong Kong Maritime Museum, provide a clear example of how their exhibits and museum content are related to specific themes in the General Studies curriculum (Hong Kong Maritime Museum, 2020). Furthermore, there is a tendency under the influence of a postmodern society, to blur the divisions between disciplines, adopting multidisciplinary or interdisciplinary perspectives of museum education (Hooper-Greenhill, 2007; Szostak, 2017). Taking art museum education as an example, Chinese art and culture can be integrated with Chinese literature and Chinese History in offering education and extension services (Lam, 2003).

We may need to pay more attention to museum contents that enhance understanding of the historical development and traditional culture of Hong Kong and other parts of the world to increase motivation for teachers and students to visit museums.

Given the increasing emphasis on socio-emotional learning internationally and in the Hong Kong Special Administrative Region (HKSAR), China, there is the potential to leverage museums as partners in schooling to promote such socio-emotional learning (SEL). Eppley (2021, pp. 511-514) advocates five aspects of SEL covering self-awareness, self-management, social awareness, relationship skills, and responsible decision-making. In museum art education, these five aspects can help children and adults understand how external situations affect artists and their emotions in creating artworks, adopt thinking strategies to help students process their emotions, help us to investigate a wide array of cultures and perspectives, and to understand and reflect on how others perceive the world.

## **5.4 Future Development and Implementation of Museum Education Activities Using Technology**

The results of this study reveal that students tend to favour technology in museum learning. This resonates with the notion of technology that can “bring museums back to life” (Museum Next, 2022). Technological innovations improve the visiting experience (Pop & Borza, 2016). Nonetheless, technology is only the beginning, not the end. According to Clarke-Vivier, Bishop & Markin (2021, p. 132), “Meaningful collaboration goes beyond developing content and acquiring collections to together determining the best ways to present content through exhibit design, use of appropriate technologies, and long-term data, collections, and content management.”

There have been meta-analyses of the effects of technology application on museum learning. Some results suggest that while resource constructive, auxiliary, and interactive technologies can effectively enhance museum learning outcomes, resource reconstructive technology, which comprises a range of various digital exhibits, digital humanities, information visualization and different forms of electronic publishing, significantly improves museum learning outcomes compared with the other two types of technologies (Xu et al., 2021, pp. 3-8; Xu, Dai & Shen, 2022, p. 576).

## 6. Conclusion and Limitations of the Study

The literature review undertaken for this study identifies a dearth of evaluation studies of museum learning in the local context. In future, there could be opportunities for universities in Hong Kong to explore collaboration or cooperation with museums to conduct studies of visitors' motivations as well as their learning outcomes and meaning-making experiences (e.g., Chen, Sung & Chen, 2020; O'Connor et al., 2020). This study is an updated and exploratory study of primary school teachers' and students' perceptions of their museum visits, their learning experiences, and their motivations for visits. It has several limitations. First, the sample size of this study is relatively small, partly due to the influence of COVID-19 which may have affected the overall response rate from schools. As COVID-19 restrictions have persisted for a considerable period, the pattern found in the study may not be representative of museum activities during a normal period. Second, the self-designed instrument has not been validated against other established measures to ascertain its own validity. Third, the learning experiences may be further conceptualized with an affective domain of learning, to supplement the cognitive domain. Finally, a mixed-method approach could be adopted, and qualitative interview findings would be useful to unpack the motivations and learning experiences of teachers and students.

## References

- Andre, L., Durksen, T., & Volman, M. L. (2017). Museums as avenues of learning for children: A decade of research. *Learning Environments Research*, 20(1), 47-76. DOI:10.1007/s10984-016-9222-9
- Arbuckle, J. L. (2019). *IBM SPSS Amos 26 user's guide*. IBM.
- Astuti, E. P., Suardana, I. W., Ambarwati, D. R. S., Wulandari, D., & Isa, B. (2021). Teachers' perceptions of museum-based learning and its effects on creativity: A preliminary study. Proceedings of the 4th International Conference on Arts and Arts Education (ICAAE 2020). *Advances in Social Science, Education and Humanities Research*, 552, 215-221. DOI:10.2991/assehr.k.210602.043
- Baron, C., Sklarwitz, S., & Coddington, N. (2021). Hidden in plain sight: Museum educators' role in teacher professional development. *Teacher Development*, 25(5), 567-584. DOI:10.1080/13664530.2021.1897659
- Bollen, K. A. (1989). *Structural equations with latent variables*. New York: Wiley.
- Bond, N., & Falk, J. (2012). Tourism and identity-related motivations: Why am I here (and not there)?, *International Journal of Tourism Research*, 15, 430-442. DOI:10.1002/jtr.1886
- Burnham, R., & Kai-Kee, E. (2011). *Teaching in the art museum: Interpretation as experience*. Los Angeles, CA: The J. Paul Getty Museum.
- Chang, E. (2006). Interactive experiences and contextual learning in museums. *Studies in Art Education*, 47(2), 170-186.
- Chen, K. (2015). The motivations of visitors for visiting museums: A comparative study of museum visitors in Western countries, Malaysia and Thailand. *Apheit Journal*, 4(2), 100-114.
- Chen, L. S., Sung, T. C., & Chen, S. Y. (2020). Generic learning outcomes in museums: A case study of the temporary exhibition "Goldfish Festival" in the National Museum of Marine Science and Technology. *Journal of Museum & Culture*, 19, 3-34 [in Chinese].
- Clarke-Vivier, S., Bishop, R., & Markin, J. (2021). Small tech, big impact: Twenty-first century educational collaborations to preserve and share rural museum collections. *Journal of Museum Education*, 46(1), 127-137. DOI:10.1080/10598650.2020.1864607
- Clover, D., Sanford, K., & Johnson, K. (2018). Museum and gallery pedagogic strategies for change. *International Journal of Lifelong Education*, 37(1), 1-3. DOI:10.1080/02601370.2017.1406547
- Curriculum Development Council (2002). *Personal, social & humanities education: Key learning area curriculum guides (primary 1 – secondary 3)*. Hong Kong: Education Bureau. Retrieved from <https://www.edb.gov.hk/attachment/en/curriculum-development/kla/pshe/PSHE%20KLA%20Guide%20Eng.pdf>
- Curriculum Development Council (2017). *General Studies curriculum guide for primary schools (primary 1 – primary 6)*. Hong Kong: Education Bureau. Retrieved from [https://www.edb.gov.hk/attachment/en/curriculum-development/cross-kla-studies/gc-primary/GSCG\\_2017\\_Eng.pdf](https://www.edb.gov.hk/attachment/en/curriculum-development/cross-kla-studies/gc-primary/GSCG_2017_Eng.pdf)

- de Castro, L. S. V., Moreno-Serrano, L. M., & Real, C. G. (2022). Museum education, cultural sustainability, and English language teaching in Spain. *Pedagogy, Culture & Society*, 30(2), 201-223. DOI:10.1080/14681366.2020.1794947
- Deci, E. L., & Ryan, R. M. (2000). The “what” and “why” of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry*, 11(4), 227-268. DOI:10.1080/10598650.2021.1900680
- Dobbs, S. M., & Eisner, E. W. (1987). The uncertain profession: Educators in American art museums. *Journal of Aesthetic Education*, 21(4), 77-86. DOI:10.2307/3332832
- Donald, J. G. (1991). The measurement of learning in the museum. *Canadian Journal of Education/Revue canadienne de l'éducation*, 16(3), 371-382. DOI:10.2307/1494885
- Eadie, P., Young, S., Suda, L., & Church, A. (2022). Facilitator and teacher perspectives on museum programs for young children. *Journal of Museum Education*, 47(1), 103-112. DOI:10.1080/10598650.2021.2000770
- Education Bureau (2021). *Learning and Teaching Resource CD for Primary General Studies (History and Culture)*. Retrieved from [https://www.edb.gov.hk/tc/curriculum-development/kla/general-studies-for-primary/lt\\_resource\\_pri\\_gs\\_hist\\_culture/index.html](https://www.edb.gov.hk/tc/curriculum-development/kla/general-studies-for-primary/lt_resource_pri_gs_hist_culture/index.html) [in Chinese]
- Eppley, H. (2021). Museums as partners in preK-12 social-emotional learning. *Journal of Museum Education*, 46(4), 509-518. DOI:10.1080/10598650.2021.1979299
- Expat Living (2022, April 26). *12 of the best museums in Hong Kong*. Retrieved from <https://expatliving.hk/best-museums-hong-kong/>
- Falk, J. H. (2011). *Reconceptualizing the museum visitor experience: Who visits, why and to what affect?* (ICOFOM 2011). Retrieved from <https://studylib.net/doc/7600309/j.h.-falk-11-6-11-icofom-2011-reconceptualizing-the-museum>
- Falk, J. H., & Dierking, L. D. (1992). *The museum experience*. Washington, DC: Whalesback Books.
- Falk, J. H., & Dierking, L. D. (2000). *Learning from museums: Visitor experiences and the making of meaning*. California: The Rowman & Littlefield Publishing Group.
- Falk, J., & Storksdieck, M. (2005). Using the Contextual Model of Learning to understand visitor learning from a science center exhibition. *Science Education*, 89(5), 744-778. DOI:10.1002/sci.20078
- Forbes, N., & Fresa, A. (2016). Museum education with digital technologies: Participation and lifelong learning. RICHES Think Paper 06. Retrieved from [https://resources.riches-project.eu/wp-content/uploads/2016/04/rch\\_thinkpapers\\_06.pdf](https://resources.riches-project.eu/wp-content/uploads/2016/04/rch_thinkpapers_06.pdf)
- George, D., & Mallery, P. (2020). *IBM SPSS statistics 26 step by step: A simple guide and reference* (16<sup>th</sup> ed.). London: Routledge.
- Gorsuch, R. L. (1983). *Factor analysis* (2<sup>nd</sup> ed.). Hillsdale, NJ: Lawrence Erlbaum.
- Hamilton, E. R., & Margot, K. C. (2020). Learning to teach in a museum: Benefits of a museum–university partnership. *Journal of Museum Education*, 45(4), 462-475. DOI:10.1080/10598650.2020.1807242
- Hansson, P., & Öhman, J. (2021). Museum education and sustainable development: A public pedagogy. *European Educational Research Journal*, 1-21. DOI:10.1177/14749041211056443
- Heath, R. D., Anderson, C., Turner, A. C., & Payne, C. M. (2018). Extracurricular activities and disadvantaged youth: A complicated—but promising—story. *Urban Education*. DOI:10.1177/0042085918805797
- Hong Kong Maritime Museum (2020). *School Visits*. Retrieved from <https://www.hkmaritimemuseum.org/school-and-community-visits>
- Hooper-Greenhill, E. (1996). *Museum and their visitors*. New York: Routledge.
- Hooper-Greenhill, E. (1999). Education, communication and interpretation: Towards a critical pedagogy in museums. In E. Hooper-Greenhill (Ed.), *The educational role of the museum* (2<sup>nd</sup> ed.) (pp. 3-27). London: Routledge.
- Hooper-Greenhill, E. (2007). Education, postmodernity and the museum. In S. Knell, S. MacLeod & S. Watson (Eds.), *Museum revolutions: How museums change and are changed* (pp. 367-377). Florence: Routledge.
- Hooper-Greenhill, E., & Moussouri, T. (2000). *Researching learning in museums and galleries 1990-1999: A bibliographic review*. Leicester: Research Centre for Museums and Galleries.
- Hooper-Greenhill, E., Dodd, J., Philips, M., Jones, C., Woodward, J., & O’Riain, H. (2004). *Inspiration, identity, learning: The value of museums. The evaluation of the impact of DCMS/DfES Strategic Commissioning 2003-2004: National/Regional Museum Education Partnerships*. U.K.: Department for Culture, Media and Sport and Research Centre for Museums and Galleries (RCMG), University of Leicester.
- Huang, X. H., & Lee, J. C. K. (2018). Extend beyond the boundaries and nature of schooling: Perspectives of public pedagogy. *Journal of Curriculum Studies* (Taipei), 13(1), 77-91 [in Chinese]. DOI:10.3966/181653382018031301004
- Jiang, Y. Y., & Lin, W. L. (2020). A study on visitor motivation at the Shanghai museum. *Journal of Museum & Culture*, 19, 35-66 [in Chinese].

- Kaiser, H. F. (1974). An index of factorial simplicity. *Psychometrika*, 39, 31-36.
- Kampschulte, L., & Hatcher, S. J. (2021). Changing museums through cooperation and collaboration. *Journal of Museum Education*, 46(1), 74-85. DOI:10.1080/10598650.2020.1842046
- Kelly, L. (2007). *Visitors and learners: Adult museum visitors' learning identities*. Paper presented at the ICOM-CECA Conference November 2007, Vienna, Austria. Retrieved from <https://media.australian.museum/media/dd/Uploads/Documents/9316/Paper%20CECA%202007.58e735c.pdf>
- Kridel, C. (2010). Places of memorialization—forms of public pedagogy: The Museum of Education at University of South Carolina. In J. A. Sandlin, B. D. Schultz & J. Burdick (Eds.), *Handbook of public pedagogy: Education and learning beyond schooling* (pp. 281-290). New York, NY: Routledge.
- Lam, A. S. H. (2003). The effectiveness of artifact study in art museums of Hong Kong: An evaluation exercise on art museum experience by secondary school students in local context. *Education Research Journal*, 18(1), 57-72. Retrieved from [https://www.hkier.cuhk.edu.hk/journal/document/ERJ/erj\\_v18n1\\_57-72.pdf](https://www.hkier.cuhk.edu.hk/journal/document/ERJ/erj_v18n1_57-72.pdf)
- Lee, J. H., Lee, H.-K., Jeong, D., Lee, J. E., Kim, T. R., & Lee, J. H. (2021). Developing museum education content: AR blended learning. *The International Journal of Art & Design Education*, 40(3), 473-491. DOI:10.1111/jade.12352
- Leisure and Cultural Services Department (2018). *Introduction – Museums*. Retrieved from <https://www.lcsd.gov.hk/en/facilities/facilitieslist/museums/introduction.html>
- Lo, J. T.-Y. (2011). Learning in the museum: Perceptions, practices and problems. In C. N. Leung & J. T. Y. Lo (Eds.), *Education and heritage: Historico-cultural perspective* (pp. 301-323). Hong Kong: Hong Kong Education Publishing.
- Luke, J. J., & Windleharth, T. (2013). *The learning value of children's museums: Building a field-wide research agenda*. Arlington, VA: Association of Children's Museum.
- MacCallum, R. C., Browne, M. W., & Sugawara, H. M. (1996). Power analysis and determination of sample size for covariance structure modeling. *Psychological Methods*, 1, 130-149. DOI:10.1037/1082-989X.1.2.130
- Museum Next (2022). *How technology is bringing museums back to life*. Retrieved from <https://www.museumnext.com/article/how-technology-is-bringing-museums-back-to-life/>
- O'Connor, M. C., Nelson, K. C., Pradhananga, A., & Earnest, M. E. (2020). Exploring how awareness-making elicits meaning-making in museum visitors: A mixed-methods study. *Journal of Museum Education*, 45(2), 187-199. DOI:10.1080/10598650.2020.1739466
- Packer, J., & Ballantyne, R. (2016). Conceptualizing the visitor experience: A review of literature and development of a multifaceted model. *Visitor Studies*, 19(2), 128-143. DOI:10.1080/10645578.2016.1144023
- Pekarik, A. J., Schreiber, J. B., Hanemann, N., Richmond, K., & Mogel, B. (2014). IPOP: A theory of experience preference. *Curator: The Museum Journal*, 57(1), 5-27. DOI:10.1111/cura.12048
- Peñaloza, G., Quijano, L., Falla, S., & Márquez, S. (2020). Making meaning of science: An experience of a science museum in fostering dialogue between young people and science. *Human Arenas*, 5, 207-221. DOI:10.1007/s42087-020-00143-5
- Piscitelli, B. A., Chak, A. W. S., Wong, K. M. B., Yuen, W. K. G., & Ngan, S. F. (2008). The use of museums by Hong Kong preschools. *Hong Kong Journal of Early Childhood*, 7(2), 87-94.
- Pop, I. L., & Borza, A. (2016). *Technological innovations in museums as a source of competitive advantage*, MPRA Paper No. 76811, University Library of Munich, Germany. Retrieved from [https://mpra.ub.uni-muenchen.de/76811/1/MPRA\\_paper\\_76811.pdf](https://mpra.ub.uni-muenchen.de/76811/1/MPRA_paper_76811.pdf)
- Pringle, E. (2018). *Teaching and Learning in the Art Museum*, *Oxford Research Encyclopedias*. Retrieved from <https://oxfordre.com/education/view/10.1093/acrefore/9780190264093.001.0001/acrefore-9780190264093-e-399>
- Rosenblatt, L. M. (1994). *The reader, the text, the poem: The transactional theory of the literary work*. Carbondale, IL: Southern Illinois University Press.
- Rosenblatt, L. M. (1995). *Literature as exploration* (5<sup>th</sup> ed.). New York, NY: Modern Language Association of America.
- Robinson, C. (2021). International perspectives: What is museum education? *Journal of Museum Education*, 46(3), 283-284. DOI:10.1080/10598650.2021.1957374
- Sabeti, S. (2015). "Inspired to be creative?": Persons, objects and the public pedagogy of museums. *Anthropology & Education Quarterly*, 46(2), 113-128. DOI:10.1111/aeq.12094
- Sandlin, J. A., O'Malley, M. P., & Burdick, J. (2011). Mapping the complexity of public pedagogy scholarship: 1894-2010. *Review of Educational Research*, 81(3), 338-375. DOI:10.3102/0034654311413395
- Semper, R. J. (1990). Science museums as environments for learning. *Physics Today*, 43(11), 50-56. DOI:10.1063/1.881216

- Simone, C., Cerquetti, M., & Sala, A. L. (2021). Museums in the infosphere: Reshaping value creation. *Museum Management and Curatorship*, 36(4), 322-341. DOI:10.1080/09647775.2021.1914140
- Szostak, R. (2007). Modernism, postmodernism, and interdisciplinarity. *Issues in Integrative Studies*, 25, 32-83.
- Tang, M. Y. M. (2010). *Museum educational services & the senior secondary curriculum in Hong Kong*. Master of Arts in Museum Studies, University of Leicester.
- The Hong Kong Special Administrative Region of the People's Republic of China (2022). *The Chief Executive's 2022 Policy Address*. Hong Kong: Hong Kong Special Administrative Region Government.
- West Kowloon Cultural District Authority (2021, September 6). *Learning and Community Engagement Initiatives of the West Kowloon Cultural District*. LC Paper No. CB(1)1270/20-21(01) for discussion on 6 September 2021, Legislative Council Panel on Development and Panel on Home Affairs Joint Subcommittee to Monitor the Implementation of the West Kowloon Cultural District Project. Retrieved from <https://www.legco.gov.hk/yr20-21/english/panels/wkcdp/papers/wkcdp20210906cb1-1270-1-e.pdf>
- Wilde, M., & Urhahne, D. (2008). Museum learning: A study of motivation and learning achievement. *Journal of Biological Education*, 42(2), 78-83. DOI:10.1080/00219266.2008.9656115
- Wong, K. M. B., & Piscitelli, B. (2007). New audiences for art: Lessons from visits of young children to the Hong Kong Museum of Art. *Asia-Pacific Journal for Arts Education*, 16(2), 1-30.
- Xu, W., Dai, T.-T., & Shen, Z.-Y. (2022). Effect sizes and research directions of technology application in museum learning: Evidence obtained by integrating meta- analysis with co- citation network analysis. *Journal of Computer Assisted Learning*, 38(2), 565-580. DOI:10.1111/jcal.12628
- Xu, W., Dai, T.-T., Shen, Z.-Y., & Yao, Y.-J. (2021). Effects of technology application on museum learning: A meta-analysis of 42 studies published between 2011 and 2021. *Interactive Learning Environments*. DOI:10.1080/10494820.2021.1976803
- Yau, R. (2001). *Museums are for People*. Retrieved from [https://hk.history.museum/en\\_US/web/mh/publications/spa\\_pspecial\\_04\\_01.html](https://hk.history.museum/en_US/web/mh/publications/spa_pspecial_04_01.html)
- Zhang, J., Xia, W., & Yu, Y. (2017). Museum learning in information age and its research outline. *Open Education Research*, 23(1), 102-109 [in Chinese].
- Zhao, X. (2021). Testing the contextual model of learning in a Chinese context. *Journal of Museum Education*, 46(2), 255-271. DOI:10.1080/10598650.2021.1900680

## Appendices

Table 1

*List of Museums in Hong Kong (Not Exhaustive)*

No.	Name of museum	No.	Name of museum
1	Hong Kong Museum of History	16	Hong Kong Museum of Art
2	Hong Kong Museum of Coastal Defence	17	Sam Tung Uk Museum
3	Fireboat Alexander Grantham Exhibition Gallery	18	Hong Kong Heritage Discovery Centre
4	Lei Cheng Uk Han Tomb Museum	19	City Gallery
5	Dr Sun Yat-Sen Museum	20	Lions Nature Education Centre
6	Law Uk Folk Museum	21	The Blue House
7	Hong Kong Heritage Museum	22	Madame Tussauds Hong Kong
8	Hong Kong Railway Museum	23	Jockey Club Museum of Climate Change
9	Sheung Yiu Folk Museum	24	Centre for Heritage, Arts and Textile (CHAT)
10	Hong Kong Science Museum	25	Hong Kong Museum of Education
11	Museum of Tea Ware	26	Sun Museum
12	Police Museum	27	Hong Kong Museum of Medical Sciences
13	The Hong Kong Racing Museum	28	Hong Kong Correctional Services Museum
14	Hong Kong Film Archive	29	M+, West Kowloon
15	Hong Kong Space Museum	30	Hong Kong Palace Museum, West Kowloon

Table 2

*Numbers (and Percentages) of Teachers' and Students' Who Have Participated or Otherwise in Museum Visits in the Last 3 Years*

Museum visits in the last 3 years	Teachers (N = 90)	Students (N = 415)
Participated	67 (74.4%)	310 (74.7%)
Not participated	23 (25.6%)	105 (25.3%)

Table 3

*Numbers (and Percentages) of Teachers and Students and In What Way They Visited Museums Past 3 Years*

In what way they visited museums past 3 years	Teachers (N = 67)	Students (N = 307)
With schools	29 (43.3%)	94 (30.6%)
With non-school organizations	2 (3.0%)	27 (8.8%)
Private visits	65 (97.0%)	262 (85.3%)

Table 4

*Percentage Ranges of Museums which Teachers and Students (a) Visited in the Last 3 Years and (b) Plan to Visit in the Next 3 Years*

Percentage range	Teachers		Students	
	(a) Museums visited*	(b) Museums they plan to visit*	(a) Museums visited*	(b) Museums they plan to visit*
50% to at most 80%	1, 7, 10, 15, 16	15, 16, 29, 30	1, 10, 15	1
35% to not more than 50%	---	7, 10, 22	7	2, 5, 7, 8, 10, 12, 14, 15, 16, 27, 29, 30
10% to not more than 35%	2, 3, 5, 8, 11, 18, 21	1, 2, 3, 4, 5, 8, 9, 11, 12, 14, 17, 18, 19, 20, 21, 23, 24, 25, 26, 27, 28	2, 3, 4, 5, 8, 11, 16, 18, 20, 22	3, 4, 6, 9, 11, 13, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28
Less than 10%	4, 6, 9, 12, 13, 14, 17, 19, 20, 22, 23, 24, 25, 26, 27, 28	6, 13,	6, 9, 12, 13, 14, 17, 19, 21, 23, 24, 25, 26, 27, 28	---

\* Please refer to Table 1 for the name of the museum.

Table 5

*Means of Teachers' and Students' Favourite Types of Museums*

Favourite type of museum	Teachers' mean*	Students' mean*	<i>p</i> (by t-test)
Arts-related	3.88	3.63	0.016
History-related	3.90	3.86	0.682
Culture-related	3.93	3.76	0.056
Science and technology-related	3.90	4.22	0.000
Medical and health-related	3.44	3.61	0.080
Nature-related	3.79	3.90	0.225
Public transportations-related	3.60	3.53	0.512

\* In computing the mean, 1 = Very much unfavour, 2 = Unfavour, 3 = Average, 4 = Favour, and 5 = Very much favour

Table 6  
*Means of Importance of Different Museum Elements to Teachers and Students*

Museum element	Teachers' mean*	Students' mean*	<i>p</i> (by t-test)
Museum content:			
Interesting	4.48	4.18	0.000
Special museum theme	4.35	4.07	0.001
Align with school learning	3.83	3.59	0.009
Promotion	3.79	3.56	0.010
Prior to the visit:			
Provide an overview	3.60	3.46	0.150
Provide VR/AR experiences	3.17	3.75	0.000
During the visit:			
Provide VR/AR experiences	3.30	3.92	0.000
Provide game-related learning	3.54	4.13	0.000
Provide diversified learning activities	3.85	4.12	0.007
With autonomy to choose visit routes	4.02	3.97	0.544
Opportunities to ask questions	3.56	3.88	0.004
Opportunities to receive feedback	3.49	3.86	0.002
Provide worksheets to supplement learning	3.02	3.07	0.714
Can take photos	3.66	3.82	0.141
After the visit:			
Extended learning opportunities	3.44	3.56	0.220
Museum docents:			
Knowledgeable	4.00	3.86	0.167
Positive and enthusiastic	4.13	4.17	0.771
No docent and can explore freely	3.44	3.55	0.248
Venues:			
Have different facilities	3.67	4.06	0.001
Have a souvenir shop	2.82	3.57	0.000

\* In computing the mean, 1 = Very unimportant; 2 = Unimportant; 3 = Neutral; 4 = Important; 5 = Very important



Table 7  
*Means of Teachers' and Students' Motivations for Museum Visits*

Motivation	Teachers' mean*	Students' mean*	<i>p</i> (by t-test)
Focus on museum theme:			
Aims to understand the museum theme	4.30	4.17	0.047
Aims to learn in-depth through the objects and exhibits	4.20	4.14	0.412
Focus on historical development and traditional culture:			
Aims to understand the historical development of Hong Kong	4.11	4.21	0.166
Aims to understand the traditional culture	4.13	4.16	0.675
Aims to understand the historical development of Mainland China	3.99	4.11	0.127
Aims to understand the traditional culture of Mainland China	3.98	4.14	0.023
Aims to understand the historical of other parts of the world	3.97	4.06	0.210
Aims to understand the traditional culture of other parts of the world	4.01	4.03	0.791
Focus on learning:			
Aims to supplement what has been learnt in classrooms	4.08	3.94	0.101
Aims to enhance diversified learning	4.16	4.14	0.855
Aims to enhance diversified life experiences	4.13	4.10	0.683
Aims to have direct exchange with museum docents and teachers	3.66	3.72	0.544
Focus on personal gains:			
Aims to facilitate friendship with classmates and friends	3.60	4.05	0.000
Aims to relieve pressure from work/ study	3.71	4.01	0.009
Aims to expand living space outside of work/ study	4.03	4.09	0.576

\* In computing the mean, 1 = Strong disagree; 2 = Disagree; 3 = Neutral; 4 = Agree; 5 = Strongly agree

Table 8  
*Rotated Factor Matrix of Museum Elements by Confirmatory Factor Analysis*

Museum element	Factor loading			
	1	2	3	4
<i>Factor 1: Learning and interaction with technology</i>				
Provide VR/AR experiences (during the visit)	0.883			
Provide VR/AR experiences (prior to the visit)	0.821			
Provide game-related learning (during the visit)	0.600			
<i>Factor 2: Learning and interaction with adults and peers</i>				
Opportunities to receive feedback (during the visit)		0.769		
Opportunities to ask questions (during the visit)		0.761		
Extended learning opportunities (after the visit)		0.461		
Knowledgeable (museum docents)		0.408		
Provide diversified learning activities (during the visit)		0.391		
<i>Factor 3: Attractiveness of museum content</i>				
Align with school learning (museum content)			0.682	
Promotion (museum content)			0.625	
Provide an overview (prior to the visit)			0.459	
Special museum theme (museum content)			0.431	
<i>Factor 4: Learning and interaction with museum environment</i>				
Have a souvenir shop				0.672
Have different facilities				0.643
Can take photos (during the visit)				0.407

Method of extraction: maximum likelihood; method of rotation: orthogonal

Table 9  
*Correlations of Museum Element Factors and Teachers' and Students' Motivations for Museum Visits*

Museum element factor	Teachers' motivations	Students' motivations
Factor 1: Learning and interaction with technology	0.333**	0.358**
Factor 2: Learning and interaction with adults and peers	0.312**	0.566**
Factor 3: Attractiveness of museum content	0.535**	0.542**
Factor 4: Learning and interaction with museum environment	0.159	0.365**

\*\*  $p < 0.01$