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Museum Adaptation during COVID-19 Crisis and Its Impact towards Museum Visitors

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Abstract

Museums are required to reconsider their traditional approach to survive and thrive during the pandemic. Changes and innovations have been made not only to combat infectious diseases directly but to suit the uncertainty and series of lockdown periods. The objectives of this paper are to identify museum adaptation in lieu of the COVID-19 pandemic and to investigate the impact on museum visitors. The data collection derives from direct online observation of selected museum websites and a review of the literature. The research found that museum has implemented both physical and digital medium to approach the audience. This study shows that modification of rules and regulations and attention to the digital approach is helpful to keep the museum connected to its audience. Though, it required further consideration in order to minimize the negative impact on museum visitors.

Discipline: Architecture, Museum Studies

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1 Introduction

The first quarter of the year 2020, has witnessed most cultural organizations and events being closed or cancelled to reduce the spread of COVID-19 disease (Atalan, 2020; ICOM, 2020). International Council of Museum (ICOM) has highlighted their concern that the cultural landscape of entire communities and countries might ruin if the situations prolong (ICOM, 2020), hence, the museum is urged to rethink their strategy to adapt to the crisis.

The main purpose of this research paper is to identify museum adaptation in handling the COVID-19 crisis. The new adaptation is varying, yet frequent favor of digital solutions has brought positive and/or negative reactions toward the museum. The second objective will be to discuss the impact of the adaptation on museum visitors which includes the vulnerable group. These minority groups are of interest because the group receives considerable concern in relation to museum adaptation due to the outbreak (Presti, 2021). Balancing the solution and its impact to all types of museum audiences, including the minority is relevant since cultural democracy and inclusion is one of the primary concerns in museum development.

2 Literature Review

In this paper, the review aims to reveal a basic understanding of human-exhibit interaction prior to conducting the cause-effect investigation on museum adaptation during COVID-19 towards museum visitors. This is important because the success of an exhibition highly depends on how good the communicative interaction between the visitors and the exhibit (Wang & Xia, 2019). The review helps to guide the researcher in understanding the relationship between new adaptation and the impact on the visitors. In this case, it will discuss Bitgood's Anatomy of Exhibit as a theory. The model presents a communicative relationship between exhibit environmental input and humans for designing exhibitions (Bitgood, 1992; Wang & Xia, 2019).

2.1 Human-Exhibit Interaction

The basis of human-environment theory relies on the interaction between the social environmental and physical environment. In the context of the museum, Thompson (1993) describes three elements that construct a fundamental of visitor-museum interaction; (1) *the visitor*, (2) *the museum*, and (3) *the outcomes*. Based on a similar basis, Bitgood (1992) extends the idea in the *Anatomy of An Exhibit – "A Summary of the Exhibit-Visitor Analysis"*. Bitgood (1992) illustrates the theory using three main components; *i) Environmental Input*; *ii) Visitors' Processing* and *iii) Outcomes*. The Environmental Input consists of the *exhibit unit*, *exhibit configuration*, and *extra exhibit factors*. Selected input when being combine will shape the exhibit environment within specific variables. According to (Bitgood, 1992), visitors will naturally process the attended variables by interpreting the exhibit and responding to it which is known as 'Outcomes'. The outcomes are classified into two contexts; *Task Outcomes* and *Non-Task Outcomes*; which describe the impact on visitors either positively or/and negatively (Bitgood, 1992). Table 1 shows the adaptation of previous research related to human-exhibit interaction into Bitgood's Anatomy of An Exhibit.

Table 1 displays several studies that have investigated the relationship between environmental input, how visitors process the input and what are the outcomes they receive. For example, hands-on activities in the museum and interactive digital media stimulate visitors'

cognitive, motor and affective processing such as thinking, attention and interest in the exhibit (Duban, 2019; Graven et al., 2020).

Table 1: Adaptation of Human-Exhibit Interaction into Anatomy of An Exhibit (created by the authors)

Source & context of the study	Environmental Input (Variables)	Visitors Processing	Outcomes
(Zıraman & Imamoğlu, 2020) Art Exhibition (Physical)	the ordinal position of viewing the relative size of exhibit objects proximity to larger sized objects	(Cognitive processing) *Attention* (Affective processing) *Interest*	(Task Outcomes) *Attitude Change; Attraction* (Non-Task Outcomes) *Satiation*
Graven, et al. (2020) Art Exhibition (Physical)	Tactile stimuli *(texture, size)* Media -Audio tour /verbal description *(voice tones; sequence of description)* Colour	(Motor Processing) *Haptic Touch* (Cognitive Processing) *Thinking; Attention* *(Affective Processing)* *Interest*	(Task Outcomes) *Knowledge gain, Commentary* *Describing* *Comparing* (Non-Task Outcomes) *Satiation* *Curiosity*
(Duban, 2019) Science Exhibition (Physical /Virtual)	Hands-on exhibition 3D illustration (digital museum) interactive digital display (digital museum)	(Cognitive processing) *Thinking; Learning by doing* (Affective processing) *Interest* (Motor-Processing) *Interacting with materials (doing & experience)*	(Task Outcomes) *Knowledge gain; Permanence of Knowledge (Memory); Literate* (Non-Task Outcomes) *Motivation; Positive attitudes*
(Bitgood, 2000) Varies exhibit - focus on Interpretive Label (Physical)	Stimulus salience *(Isolation; size; contrast background)* Circulation/ traffic flow *(Arrangement of object; Inertia; Right-turn bias)* Minimize perceive effort *(Numbers of words per chunk; the proximity of label to object; density of labels)* Increase Cognitive-emotional arousal *(asking questions; Challenge the reader; writing style)* *Minimize Distraction* *(sound; display object competition)* Size of Reserve *(Visitors' Physical & Mental health/attitude)*	(Cognitive processing) *Attention*	(Task Outcomes) *Reading* (Non-Task Outcomes) *Motivation*
(Pelowski et al., 2017) Art Exhibition (Physical)	Display/Hanging method *(Leaned against the wall/hung alone or in the group)* Frame /without frame Boundaries *(cases, ropes, pedestal)* Lighting *(type of light -warm/cool/spot/uniform)* Extra exhibit media *(labels/text)* Architectural Element *(size of space/ architectural lines)* Circulation/ traffic flow *(Inertia; Right-turn bias)* Homogeneous stimulation Types of exploration (free viewing paradigm; fixed viewing) Viewing Distance Time allocation	(Cognitive processing) *Thinking* (Affective processing) *Interest*	(Task Outcomes) *Knowledge gain; Permanence of Knowledge (Memory)* *Enjoyment* (Non-Task Outcomes) *Satiation* *Fatigue*

However, keep repeating the homogenous stimulation can influence a visitor's satiation towards the object (Pelowski et al. (2017). The previous literature also highlighted that circulation, traffic flow and exhibit configuration such as the sequence of exhibit objects have an influence on visitors' behavior and attention toward the display object ((Bitgood, 2000; Pelowski et al., 2017; Zıraman & Imamoğlu, 2020).

From these studies, it appears that there are many possible environmental inputs in the human-exhibition interaction. According to Xin (2017), sensation is direct information that a person receives through the sensory system. In the context of exhibition design, these environmental inputs are the source of sensation. The inputs shape the outcomes of visitors' experience but depend on how visitors perceive the information to create perception. Perception is actually a brain's overall observation, feeling, integration, processing and interpretation of the stimulant object (Xin, 2017) which Bitgood describes as "*visitor processing*".

In general, COVID-19 forces the museum to make some changes to its environmental input for safety precautions. Eventually, this modification may be affecting the sensation and perception of the visitor. Based on this concept, the paper will further explore the issues by investigating what modification has been made by the museum during post-COVID-19 and how this adjustment will impact the visitors.

3 Method

3.1 Methodology

The research implies primary and secondary research methods for data collection within qualitative approaches. The research conducted an online observation of selected museum websites to browse through their adaptation to the COVID-19 situation. This strategy is chosen based on the tourist consumption pattern which shows an increasing demand for using the internet to gather information prior to making a decision during the pandemic (Toubes et al., 2021). Besides, the stakeholders also widely utilize the digital marketing strategy such as websites as an instrument to present and interact with the target market (Toubes et al., 2021). The observation only focused on Research Question 1 *(RO1) "What are the programs provided by the museum during the COVID-19 pandemic?"*; and Research Question 2 *(RO2) "What are the rules and regulations implies by the museum in lieu to COVID-19 issues?"*. The data was gathered between the years 2020 the mid-year of 2021.

Whereas, the research used secondary data to answer the second objective. It is based on Research Question 3 *(RO3) "How does COVID-19 impact museum visitors?"*. The review was conducted based on the keywords *"museum adaptation"*; *"pandemic impact on the museum"; "covid-19 and museum"; "Covid-19 and cultural life"*; and *"museum visitors and pandemic"*. The literature review was gathered based on the online platform including Google, Google scholar as well as from OpenAthens. In this paper, the Google search engine is used to provide a general overview of

museum goers' reactions pertaining to the new adaptation while the research database offers in-depth articles related to the topics.

4 Result and Discussion

This paper discusses the result of the research in two sections. The first section reveals the post-covid programs at selected museums and the second part concentrates on the impact on museum visitors.

4.1 Museum Post-COVID-19 Adaptation

Museum act as education centers where the methods of delivery are varying; static and dynamic. The COVID-19 pandemic required the museum to either adjust or propose new programs, temporarily or permanently, in the hope to continue engaging their diverse communities (ICOM, 2020). The visitor usually can obtain information regarding new adaptations, rules and regulations pertaining to museum visitors through the museum's official website.

In this study, the research review selected the museum website to identify the post-covid programs available for the museum communities between the year 2020 and mid-year 2021. The list of museums includes; *The Louvre (Paris), the National Museum of China (Beijing), The Metropolitan Museum (Rome), The Vatican Museum (Rome), the British Museum London, Tate Modern (London), the National Gallery of Art Washington, and Museum of Science Boston*. These museums are among the well-known museum in its region and some of them are listed in the 60 Best Museums in the World 2022 by World Cities Ranking. According to the World Cities Ranking, they utilize five criteria as the methodology to establish the ranking including *1) interesting artworks; 2) famous artworks; 3) art display; 4) building* and *5) size of gallery and numbers of presented artworks*.

Based on Figure 4.2, the y-axis outlines the overall list of programs or rules and regulations available on the selected museums' websites while the x-axis represents the percentage of the museum that adopted the programs. The percentage in the x-axis is based on the number of museums adopting the programs towards the total number of the selected museum. What stands out in the chart is, there are more restrictions conducted in the year 2020 compared to the year 2021. Only 16 out of 27 programs applied in both years with the majority showing a declining trend in the subsequent year. A possible explanation for this might be that the reduction of coronavirus restriction is associated with the increasing pace of worldwide vaccination programs in the year 2021, though, it was not 100% lifted as a precaution towards new covid variant that could generate another covid wave (Id et al., 2021). The research also found that there is an increasing number of museums that offers a virtual exhibition in the year 2021 compared to the year 2020. Therefore, this paper will divide the discussion on adaption and the impact on the visitors into two contexts; *1) Physical Museum* and *2) Digital Museum*.

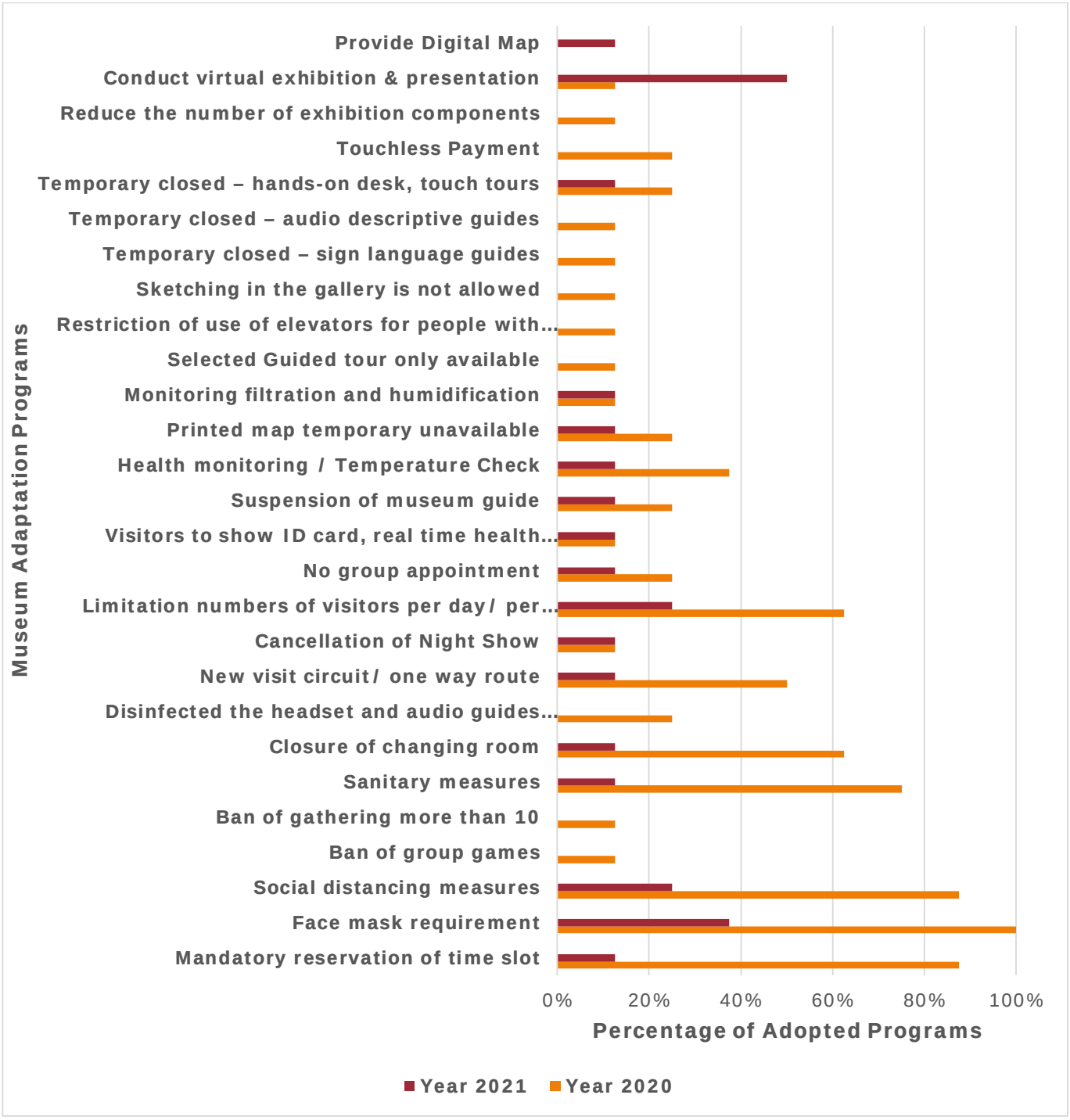

Figure 1: Museum POST-COVID-19 adaptation between the Year 2020 to Mid-Year 2021 (created by authors)

4.1.1 Adaptation and Impact Based on Physical Museum

Figure 1 reveals that sensory-related exhibitions including hands-on desks, touch tours, audio descriptive guides and sign language guides are affected during the pandemic. Some museums opted to suspend their museum guide or only provide selected tour guide programs. Besides, the face mask requirement was compulsory at all museums in the year 2020. Whereas, 37.5% of museums adopted the rules in a consecutive year. It is undeniable that these adaptations are designed as preventive measures due to hygienic concerns. However, the museum is also

responsible to advocate the ICOM Code of Ethics for Museums (2018) which suggests the empathy design in the museum environment. Previous literature (Candlin, 2003; Cecilia, 2021) has shown that the main group that possibly suffers from this restriction will be the visually and hearing-impaired visitors. The value of touch display has been discussed in previous literature such as (Ballarin et al., 2018; Cecilia, 2021; Hudson, 2018). For example, a touch display provides an ability for blind or visually impaired people to 'read' the contour to understand the spatial property of an object, hence, allowing them to explore the artifacts closely. The absence of a touch display will make it difficult for them to appreciate the exhibition and detests them from participating in the reopening of the physical museum (Cecilia, 2021). Paddeu et al. (2019) found that the integration between the tactile display and audio text can increase by 80% of visitors' satisfaction. Whereas, Cecilia (2021) has proven that the absence has led to feelings of distress and discouragement.

The use of face masks has a negative impact on deaf people's communication (Homans & Vroegop, 2022). The adaptation of face masks and the absence of sign language guides in a museum will affect this community by benefiting the museum content. Presti (2021) highlighted that the closure of museums indirectly contributes to the risk of social exclusion for older people and consequently can cause psychological and health disorders. In order to overcome these situations, some museum has extended the physical museum interaction such as providing tactile material and CD audio description through outreach program (Ou, 2020; Presti, 2021). This initiative helps to sustain the connection between the community and the museum, as well as support them from the obsessive stress of being lonely after a long lockdown period.

Figure 1 also shows the majority of museums adopted social distancing regulations in the year 2020 and suspended the group-related event. Cecilia (2021) argues that there is a limited discourse on the practicality of this restriction. For example, visually impaired people rely on the surrounding stimuli to navigate inside the space and are sometimes guided by a dog. Therefore, it is difficult for them to be certain of their distance due to their limitation (Cecilia, 2021), hence, are not convenient with this restriction. Interestingly, this limitation can be resolved through integration with technology such as mobile augmented reality (Kunjir & Patil, 2020). Though the empirical study of this topic is growing, still limited. Therefore, further study that focuses on the topic is encouraged.

The pandemic has also influenced the museum circulation design. Figure 1 shows that 50% of selected museums created new visit circuits or applied one-way routes to control the traffic flow. The circulation, traffic flow and arrangement of the display object can influence visitors' processing and outcomes of the experience (Bitgood, 1992, 2000; Turgay Zıraman & Imamoğlu, 2020). According to them, the setting influence cognitive and affective processing such as attention and interest that eventually change the visitors' attitude, attraction, motivation and satisfaction level in the museum experience. In the recent research on museum adaption due to COVID-19, it was proven that the implementation of a 'one-way route' does not favor museum visitors (Kelley, 2021). It is because the new rules reduce the flexibility and freedom in viewing the exhibition. However,

these researchers (Kelley,2021; Ziraman & Imamoğlu, 2020; Bitgood, 2000; Bitgood, 1992) do not include visually impaired visitors in their research. Cecilia (2021) has highlighted that prior to the COVID-19 pandemic, multiple route choices can create complexity in the visually impaired people's navigation and the possibility to miss out on some of the exhibitions. Therefore, whether one route circulation will be an advantage or not to this vulnerable group can only be determined by further conducting an empirical study on the above topic.

Museums also conduct sanitary measures for COVID safety and health precaution, especially in 2020. This conduct however may not directly impact the museum visitors, but, more on the museum practitioner. It requires the museum to improve in the context of the selection of material and method of display that could ease the sanitizing process without damaging the object of display (Cecilia, 2021). Following the reduction of coronavirus restrictions, therefore, it is not surprising if the data (refer to Figure 1) shows a declining trend in conducting sanitary measures in the year 2021.

4.1.2 Adaptation and Impact of Digital Museum

The investigation has shown a significant increment in the percentage of digital museum adaptation among the selected museums in the year 2021 compared to the year 2020. This finding supports the survey conducted by the Network of European Museum Organisation (NEMO) in 2020 on initiatives and actions of the museum in response to this pandemic. Classification of digital museum adaptation can be done in two groups. There are *communication*-related and *collection*-related (Samaroudi et al., (2020). Table 2 outlines the digital provision that has been identified in the museum during post-COVID-19.

Table 2: Classification of Digital Museum Activities and Content (created by authors)

Communication-related	Collection-Related	Source
Video Conferencing Social Media Challenge Social Media sharing Online Art Discussion Online Art Workshop Science Experiment Live Streaming Tours	360degree model/artefact 3D Virtual Tour Audio/Video Tour Video with a sign language interpreter Live Streaming Tours	(Cecilia, 2021; Kelley, 2021; Markopoulos et al., 2021; Ou, 2020; Presti, 2021; Samaroudi et al., 2020; Tan & Tan, 2021; Tranta et al., 2021)

Digitalization of museum contents has benefitted not only the existing and local visitors during the lockdown period, but, open an opportunity to unlimited types of museum goers that were previously hindered by geographical factors and physical accessibility issues (Cecilia, 2021; Kelley, 2021; Markopoulos et al., 2021). Digital museum allows museumgoers to access the content at any place (Cecilia, 2021; Presti, 2021).

Digital exhibitions can be done interactively or passively. The interactive exhibition involves communicating the collection in various ways. It includes but is not limited to a 360-degree rotation of 3D models, video conferencing, and various workshops that allow the visitors to

conduct experiments or artworks from home by just listening or watching the video. These interactions impact the visitors' processing in many ways such as collaborative learning, reflection, thinking and curiosity that eventually performs creativity, excitement, knowledge gain, and satiation outcomes from the virtual visit. It has encouraged them to spend a long time appreciating the museum content (Markopoulos et al., 2021). For example, Getty Museum in Los Angeles has received a positive response from the public towards their program on recreating a painting in the museum using found objects at home and sharing it on social media. This finding supports Bitgood's Anatomy of Exhibit whereby the transition of display method from physical to digital constructs a new set of environmental input (exhibition variables) that potentially has an influence on visitors' processing, hence, may influence the outcomes of human-exhibit interaction including the behavior (Bitgood, 1992).

Passive interaction usually allows visitors to view the collection through images and supporting text. Despite its unlimited view of images, the passive digital exhibition at the moment has limitations to convey other sensory information such as tactile and odor. Consequently, it is affecting the experience of visitors. However, the major drawback of digital adaptation is that it can only be accessed with the availability of an internet line and suitable equipment (Presti, 2021). Some virtual interaction requires high specification technology in order to function and are sometimes costly (Kahn, 2020). This situation highly impacts the vulnerable group of visitors such as the noob and students who live in rural areas that have not equipped with internet access. Also, the digitalization of museum content requires good preparation from the museum to develop the technology which relies on the museum staff's skills, budget and funding (Kahn, 2020). Therefore, even though the virtual tour is not new in terms of museum provision, yet, the availability is still limited (Samaroudi et al., 2020).

5 . Conclusion

In conclusion, the museum has done various activities to survive and still connected with its audience during this challenging period. They implement both physical and digital adaptations to approach the audience. The new adaptation impact various group of audience including a vulnerable group of people such as disabled people and underprivileged community through its physical and digital implementation. Despite being favorably adopted during the pandemic, the majority of museum visitors are still prone to the physical museum and they demand that physical museum allows them to learn more especially anything related to the museum collection (Kelley, 2021; Presti, 2021; Tranta et al., 2021). One of the major downsides found of the digital approach was regarding access to sensory information. The challenge of the digital museum is not only to adapt the sensory information but to have it in an affordable way so that it can be reached by all types of museum visitors including underprivileged people. At the moment, research that prioritizes the social needs of the vulnerable group in the context of digital museum provision is still limited (Cecilia, 2021; Samaroudi et al., 2020), hence, potentially be explored in the future.

As highlighted by Bitgood (1992), the environmental input of each exhibition influences the visitors' cognitive and affective processing and eventually impacts the outcomes of human-exhibit interaction. The current discussion on visitors' impact on new adaptation is limited to general information pertaining to human-exhibit interaction. Hence, the future empirical study can focus on detail components (*exhibit component, exhibit configuration and extra exhibit factor*s) that construct the positive and negative impact of both digital and physical museums. The finding could enlighten museum practitioners to improve museum communication in the future.

6 Availability of Data and Material

Data can be made available by contacting the corresponding author.

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