Everyday photos as tools to enhance the museum experience

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Abstract:

Purpose - Inspired by a recent museum visit, the present work wished to study the effect of the use of photos in cultural technologies.

Design/methodology/approach - We used ancient museum objects with contemporary photos, showing people performing similar activities in antiquity and today. Qualitative data from interviews were collected and analyzed to study the participant's reflections when they saw the images of ancient objects and contemporary photos.

Findings - Results revealed the importance of contemporary photos and the possibility of including them in cultural heritage technologies since they assist visitors in understanding and reflection processes.

Originality/value - Photos can function as interpretation aids and also allow participants to make multiple connections between past and present, across societies and cultures, between current and prior knowledge, and permit connections to personal experience, leading to the conclusion that critical constructivist approaches take place when people are presented with the two images and meaning-making processes.

Index Terms — museum contextualization, visitor meaning making, photography, constructivism, design requirements.

I. INTRODUCTION

In Chalcis, a city in Euboea (Greece) with a vibrant history from ancient, Roman, byzantine, ottoman, and industrial times and with multicultural communities throughout its history, the New Archeological Museum "Arethousa" presents artefacts and (hi)stories from different eras and communities.

In January 2022, we visited the museum and observed an interesting video installation presenting different museum items. The presentation of each museum item was followed by a relevant modern photograph, showing people performing similar activities as the ones depicted in the ancient art. The video installation did not use any textual or oral information. It simply showed images one after another. The museum has released a short video on social media, presenting a small part of the installation. Looking at this installation, specific questions emerged:

• What kind of connections do visitors make when looking at this photo sequence?
• Can visitors extract meaning from this particular video installation?
• What are the visitors' reflective processes when exposed to this video?
• Can contemporary photos be used in advanced cultural heritage technologies to assist construction further meaning?

In order to further explore these questions, we designed the present study, which collected qualitative data from participants and studied the potential of images to provide adequate information and triggers for meaning-making and reflection. The scientific community has discussed the first three research questions, as it will be explained in section 3, but not within the context of an archaeological museum. The last research question is the authors' idea since, to the best of our knowledge, there are no explicit guidelines for the use of contemporary photos in technologies used in museums. Our visit to the Archaeological Museum of Chalcis inspired us to study further everyday photos' role in museum meaning-making.

II. HOW DO VISITORS HANDLE MUSEUM INFORMATION?

Most museums started their operation in the 18th century, but soon after their establishment, voices criticised the practice of keeping items inside museum walls. In one of the most famous quotes from 1843, Norwegian painter J.C. Dahl warns, "Nature preserves while museums destroy" **[1]**. Removing items from their original environment implied that a significant amount of vital information around their interpretation was gone. Imagine, for example an ancient statue meant to be inside a sanctuary that ends up in a museum, away not only from the building in which it was meant to be but also from all the other surrounding items that once stood inside the sanctuary **[2]**. This issue is described as the museum contextualization problem.

Due to the immense importance of context in understanding cultural objects inside museums **[3]**, museums worldwide apply different means to provide the necessary interpretation context for visitors **[4]**. From maps **[5]** to models **[6]**, dioramas **[7]**, and information labels **[8]**, museums try to provide the information needed for visitors. Technology is also often employed to provide context for museum objects. For example, Augmented Reality can project the museum item in its original environment **[9]**. Thus, the importance of context is widely recognized as a necessary requirement for understanding cultural items, the complex interrelationships around them, and the creation of meaning **[10]**. Therefore, context is vital in discovering knowledge and processing information as a whole to maximize cognitive gains **[11]**.

In addition, museum visitors' meaning-making processes are also known as constructivist and researchers view modern museums as constructivist learning environments **[12, 13]**. Visitors use their prior knowledge and personal experiences to build cognitive schemas that accommodate the new information. To do so, they rely on known social and cultural practices, like traditions, cultural practices, customs, language, etc. **[14]**.

However, in order to engage in meaning-making, visitors' attention must be captured, and they must feel motivated to think further. Museums have used different approaches to capture visitor attention and enhance engagement (e.g. **[15]**). Researchers have also constructed theoretical models to understand visitor attention elements and ways to augment them **[16, 17]**. One such method was trying to micro-augment the museum experience, which used only nonlinguistic stimuli of a minimum duration to create an information gap and increase visitors' curiosity. In particular, micro augmentations were used in two different forms. In one form, the visitors heard sounds of short duration and intensity from speakers above the exhibits that released sonic beams, resulting in highly localized sounds **[18]**. In the other form, micro augmentations were used to provide color on ancient statues but only for one second. The color appeared and quickly disappeared without any other information **[19]**. In both cases, visitors were intrigued, and showed increased curiosity and learning motivation.

Regarding the use of photographs in museums, these are also used to provide information to visitors, often as an alternative or addition to text. According to Edwards & Lien **[20]**, photographs can provide museum context and enhance museum exhibitions **[21, 22, 23]**. Consistent with the constructivist tradition, photographs in museums allow visitors to experience alternative viewpoints, provide many layers of historical and cross-cultural experiences **[24]**, and enrich visitors' meaning-making processes. Thus, the present work wishes to study how photographs and what type of photographs can relate to ancient art objects, if and how they allow visitors in meaning-making, and what reflective processes they evoke.

CONTENT IN MUSEUM TECHNOLOGIES AND THE USE OF PHOTOS

Museums have used photos since the 1850s to enhance the visitor experience in multiple ways **[25]**. Cultural heritage technologies also use recent photos frequently for different purposes. One of the most expected uses of recent photos is the photos taken by visitors and shared by them on social media. Museums and cultural heritage institutions are aware of this use of photos by visitors, and in some cases, they decide to exploit such practices. For example, Instagram further communicated the museum experience to the public. Visitors used this social media platform to create their narratives about their museum visits while researchers studied how these narratives were created and shared **[26]**. In another example, the Brooklyn Museum used photos uploaded by its visitors on social media, like Instagram and Snapchat, and organized semi-structured interviews to better understand visitor needs [27]. Social media like Instagram have offered tools to the public that were previously only available to professionals, thus making photography more accessible and easier to share and changing the visual meaning-making over time **[28]**. By taking photographs, people engage in an embodied experience that requires them to touch, rub, and click to get photos and share them on social media. These embodied actions increase involvement and meaning-making **[29]**. Embodied interaction can be viewed as a way to interpret the museum content **[30]**.

Social sciences have used photos to understand people's perceptions and behavior; over the years, multiple methods have been used **[31]**. Especially in ethnographic research, photos are practical tools to elicit deeper thinking from participants and help engage in deeper meaning-making processes **[32]**. In this light, researchers have specifically asked museum visitors to take photos of items that captured their attention to provide data for further analysis **[33]**. In another study, students were asked to take photos during their museum visit to exercise their critical thinking and history learning **[34]** since photographs have been successfully used in the educational domain and seem to enhance learning and visual literacy **[35]**. Photos have also been used by museums to increase empathy and perspective-taking. Presenting specific historical events at a museum, i.e. apartheid in South Africa, photos made people better understand the historical events and the perspectives of different racial groups **[36]**.

To extract meaning from people's photographs, a theoretical framework is needed that will consider the person who took the photo, the researcher who will analyze it and the context of the process. In the framework of interpretive engagement, five elements are considered necessary: the researcher, the participant, the image and the context of its production and the audience/s. Thus, museums can only understand what visitor images mean when considering all the above elements **[37]**. In a study by Loeffler **[38]**, photos were used to extract meaning through a photo-elicitation interview. Participants explained their photos to the researchers from an outdoor activity. As

photos were explained and analyzed, researchers identified some recurring themes: connection with the physical space, connections with others, self-discovery and gaining perspectives.

Photos have also been used to provide further context for archaeological items. In a study by Antoniou et al. **[9],** visitors could see the museum objects through their mobile phones while in the background, they could also see 360 photos of the original excavation site that the objects came from. Photos were in this case implemented in the Augmented Reality (AR) application that allowed the museum items to be viewed in relation to their original site. Museums also know that the way photos are presented within an exhibition can change the meaning of the exhibition. In other words, the presentation order and the placement of photos in the physical environment of the exhibition can significantly alter the meaning-making processes **[39].** In addition, photos seem to change the understanding of historical phenomena when used in museums **[40]**. As a Docket et al. [41] study revealed, one visual element might provide information without an interpretation context. Two or more photos seen together allow different connections to emerge and assist understanding and reflection.

Furthermore, photographs of relevant themes to the museum and its items are highly effective in visitor interpretations **[42]**. Photographs do not simply work as cues in an interpretation process, but they are meaningful artefacts that assist interpretation of the past and reflection. Photos seem to boost remembering of relevant ideas, stimulation of emotions, production of narratives, association discovery and therefore, meaning-making **[43]**.

Different projects have used photos to enhance the user experience. The H2020 EU project CrossCult **[44]** used photos of ancient and contemporary items to enhance visitor reflections and allow them to make easy connections between objects, concepts and different cultures. For example, the narrative discussing how people use clothing as a code to convey messages about themselves to others used the photos of ancient museum statues and teenagers around the world today, etc. **[44]**. In addition, "muse" is a project that will use the photos taken by visitors during their visit to extract valuable information for museums through data analytics and allow them to know their visitors better. A similar concept was implemented by the ArtClix project, where visitors were encouraged to take multiple photos and share them with friends. The museum again gained valuable insight into the user experience, and the visitor was also actively engaged with the exhibits **[45]**. The EU project GIFT allowed visitors to use photos to personalize museum items that could then be 3D printed and given to the visitor as a personalized item from her museum experience. Finally, museums worldwide, like the Smithsonian National Air and Space Museum, use different photographs to allow visitors to engage better with the exhibits since photos provide images of the items in use (e.g. aeroplanes flying).

Museum narratives delivered through technology often use photos to enrich the stories **[46]**. As museum human guides use the actual exhibits to unfold their narratives **[47]**, technology-assisted tours use different photos to provide information in multiple modalities maximizing their (learning) effect **[48]**. The importance of photos in narratives leads to the automatic generation of themed photo narratives that go beyond the museum visit **[49].**

However, although frequently used by cultural technologies, different uses of photos seem to be used intuitively by researchers without a structured framework for their use. The present work aims to study their actual interpretation power and reveal how people perceive photos in a museum setting.

Finally, the main objective of the present work is to study the effect of everyday photos as tools that assist visitors meaning-making processes. In addition, we explore the potential of photos to be used in current museum technologies to enhance the visitor experience and allow easy construction of meaning.

III. METHODOLOGY

A. Participants

The researchers made an open call within their institutions for volunteering students to participate in the study. The first ten would be called in for participation. All participants were familiar with ancient Greek civilization, since they were students of History and/or Archaeology and/or Archival and Library Studies. We chose participants with a specialized background because we wished to remove possible novelty effects from introducing objects that participants would be unfamiliar with. In addition, based on Sandelowski **[50],** ten participants may be judged adequate for homogeneous sampling in qualitative research when the issues studied are not of high complexity. In this case, the phenomenon studied was of low complexity, and the participants were all of a specialized background. However, because of the sampling process, the results would be biased and cannot be generalized to the general population. The importance of this work lies in showing photography's possible effects in visitor reflection processes and revealing issues for future exploration.

All participants were students either at the University of Vigo or the University of West Attica. There were ten participants in total. The profiles of the participants are as follows:

Participant 1 (P1l): Greek-speaking, male, background in Archival, library & information studies.

Participant 2 (P2l): Greek-speaking, female, background in Archival, library & information studies.

Participant 3 (P3h): Spanish-speaking, Historian specializing in free time culture and medieval architecture

Participant 4 (P4l): Greek-speaking, female, background in Archival, library & information studies.

Participant 5 (P5a): Spanish-speaking, Archeologist with a specialization in Greek funerary objects.

Participant 6 (P6h): Spanish speaking, male, history

background but not archaeology

Participant 7 (P7h): Spanish-speaking, female, background in history and Egyptology. Some knowledge of Greek archaeology.

Participant 8 (P8l): Greek-speaking, female, background in Archival, library & information studies.

Participant 9 (P9h): Spanish-speaking, female, background in History and Geography, some knowledge of ancient Greek archaeology

Participant 10 (P10l): Greek-speaking, female, background in Archival, Library and Information Studies.

Since all the archaeological items were from Greek antiquity, it would be easy for Greek-speaking participants to read the inscriptions on some items. The initials a, l and h were added next to the participant number and correspond to their background to assist the reader in easily seeing the participant's background knowledge. (a stands for Archaeology, l for Library studies and h for History).

B. Materials

All the images were shown to the participants with a PowerPoint presentation. All images used had the necessary licenses (Appendix 1).

The link that unites all the selected images is women, establishing connections between their tasks in Ancient Greece and today. Gender studies in History, after some resistance from the Academy, have been integrated into historical research and are considered relevant, also in Antiquity **[51]**. However, museums do not usually have a specific section dedicated to transmitting the knowledge of a fundamental part of societies, such as women. This situation is repeated in all historical periods, and we have selected Ancient Greece, precisely the classical period (479-323 B.C.), a period marked by patriarchal ideology, as can be seen in that only males were fully entitled to acquire citizenship. At the same time, females, at most, were only necessary for its transmission **[52]**. This reality means that the sources of information are less explicit about the female domain than the male domain. For this reason, iconography is a fundamental source for learning about aspects of women's daily lives **[53],** and we have selected the images with the intention that they reflect various essential areas in their lives: domestic activities inside and outside the oikos, aspects that relate the educational system and the role of women **[54,55]**. In addition, we asked participants only to focus on ancient Greek objects since our participants were familiar with ancient Greek civilization, in an attempt to remove novelty elements.

C. Procedure

Students from the 2 Universities were invited to participate in the study. The students that responded were invited to individual Zoom sessions. The material was organized in a PowerPoint presentation and the researcher shared her screen with the participants. The only instructions were that participants should only describe what they see and anything that comes to their mind throughout the presentation. Participants were also informed that there were no right or wrong answers.

Participants saw an ancient item and in the next slide they saw the same item together, with a contemporary, relevant photo. This process was repeated 7 times (7 ancient items and 7 relevant photos). We used 7 sets of images to prevent participant fatigue since people's working memory can only handle 7 plus or minus 2 units of information **[56]**. After the end of the presentation, participants were asked if they had any general comments. The session for each participant was about 30 to 40 minutes. Due to the sampling process (university students that might know the researchers), extra measures had to be taken to reduce data biases. The researcher only told students to report what they saw in the photos and anything that came to their minds without any further comments from the researcher. The only two questions used were: "What do you see?" for the first image in the series and "Now, what do you see?" for the first and second images in the series when the images were shown together. The researcher did not provide comments of agreement or disagreement; she simply recorded the answers and continued with the next set of images.

IV. RESULTS

In this section, we will present the participant answers by slide in the same order as in the presentation shown to the participants. For every two slides, we had one theme. We used Soren's classification of cognitive changes when people interact with cultural objects to analyse the data. More specifically, Soren **[57]** observed cognitive changes emerging from interactions with cultural content when people had:

• An opportunity to have experiences with authentic objects.

• An unexpected experience and/or highly emotional experience.

• A new cultural/attitudinal understanding.

• Motivation to become more proactive.

• Realized that historical phenomena had a lasting nature. In essence, historical phenomena are social phenomena, and some still exist today (how certain phenomena are relevant to people of different societies and times).

Researchers have used Soren's classification of visitors' experiences in the past to study visitors' reflective processes. For example, Antoniou et al. **[58]** studied the effect of narratives on museum visitors and the lasting impact of mobile technology before, during and after a cultural visit. Similarly, Poulopoulos et al. **[59,60]** used the same classification to study people's cognitive changes when interacting with cultural content on social media.

In addition, we also used indications of meaning-making constructive processes, like use of personal experience and prior knowledge by participants, as an essential element of a constructionist approach **[61]**, as well as triggers of curiosity and motivation, like uncertainty of participants, leading to information gaps **[18]**.

Theme: Woman handling wool (figures 1, 2)
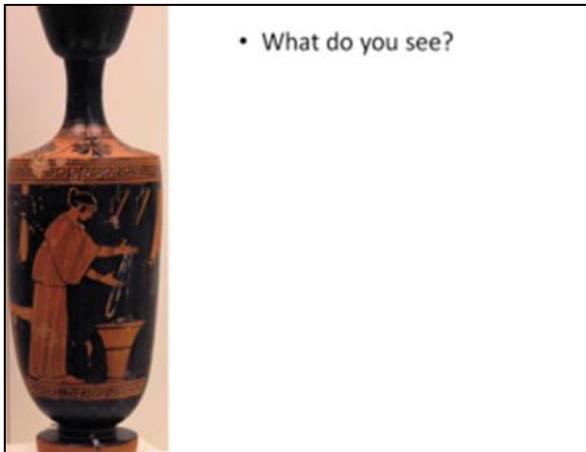
Fig. 1. Woman handling wool, first slide

Seeing this image (figure 1), all participants could not understand what the figure was doing. Only 4 people realized that this was a domestic activity, like washing or cooking (P4l,5a,8l,10l). P5a, who is also an archaeologist, specializing in Greek funerary objects, could also not identify the activity and mentioned: "It is a woman, she does some housework, but I cannot say exactly what she is doing". The remaining 6 participants used their imaginations and offered explanations like music playing (P3h), ceremonial activity and ritual (P6h,7h), or even handling of a snake (P2l). The lack of context as also pointed out by P7h, leads to uncertainty. P7h: "A type of vessel with specific decoration. The main figure is a woman involved in a ritual using specific objects depicted in the scene. The vessel is for liquid. The activity of the figure does not involve liquids. It is very difficult to understand the scene because we do not have context". Participants show uncertainty when they describe the image and discuss that necessary information is missing to understand the object further.

Fig. 2. Woman handling wool, second slide

When participants saw the following image (figure 2), most of them expressed their surprise as they realized what they saw. P3h said: "Ah! She is working with wool. She is

doing the same in antiquity in the first photo". Most immediately connected the two images, even though they were not asked to do so and realized that these women were doing the same type of work. P6h: "I can see an old woman working with tissues or animal hair, maybe with wool. Now I can see similarities in both images… I think the first one could be something similar or even the same. It seems like a daily activity". It was only P2l that did not directly connect the two images regarding wool handling, and she only found general similarities: "An old lady ... but I cannot know what this is ... is it what pillows have inside? Goose feathers? What exactly is this white thing she is holding? In the 2 photos 2 women are doing some manual work ... just that they do some work". Nine out of ten participants correctly identified the activity in both images and connected the past with the present, showing signs of constructivist learning since the presence of the two images together seemed to provide the necessary context.

Theme: Women carrying water (figures 3,4)

Fig. 3. Women carrying water, first slide

Almost all participants identified the scene (figure 3) correctly with more or less confidence, apart from P2l that thought that it was some kind of celebration. P1l for example, was not very confident when he said: "I see girls in something like an aqueduct. On the right I see a fountain and a girl filling up water. I see some girls with amphorae on their heads. And perhaps they are discussing". However, all the other participants were very confident with their answers. P9h also went a step further and explained how she knew what this was, based on her prior knowledge: "A woman with a vase on her head. This reminds me of something recent… They are working to get water from a fountain. They are also talking". For the majority of the participants the information in the object was adequate for them to make connections to their previous knowledge and correctly identify the activity shown.
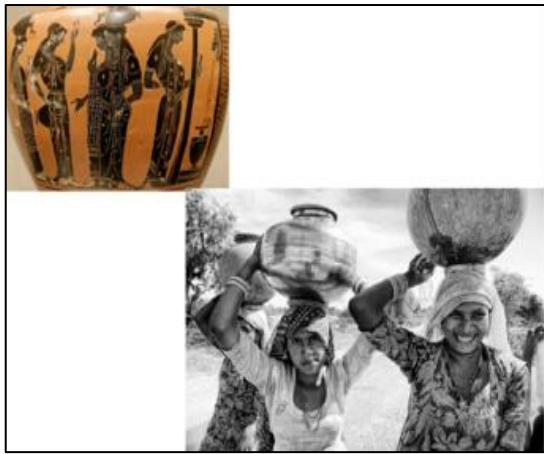
Fig. 4.Women Carrying water, second slide

Thus, when participants saw the next slide (figure 4), they were not surprised and simply confirmed what they had stated previously. Even P2l, who did not understand that the women in both figures carry water, nevertheless stated, "They do exactly the same thing (as in the previous photo), but much later in time. They have jars on their heads. Because I see a woman happy, it must be a celebration. Because I see grandma, mom and granddaughter, it must be something like a custom or a celebration. They do the same in both photos". It was also interesting that P1l and 7 made connections to their prior knowledge when they described the images: P1l: "I also see girls perhaps from Africa because I have seen documentaries like that. Perhaps something similar happened with the amphorae. This image is from Africa or Asia". P7h: "They also carry vessels with liquid on their heads. This is typical for cultures in Asia, Africa and South America. A daily life activity too". Finally, P8l connected past and present across cultures when she said: "Exactly the same process in modern times and in a different country". Thus, the second image functions as a confirmation of a hypothesis most participants had formed. The fact that images like the ones in figure 4 are often shown in documentaries from around the world helped participants make connections between the past and the present, enhanced cultural understanding and allowed them to build on their previous knowledge.

Theme: Girl playing (figures 5,6)
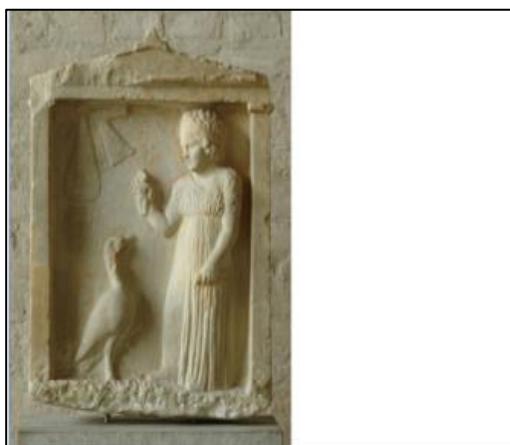
Fig. 5. Girl playing, first slide

Regarding the theme of the playing girl (figure 5), three participants were sure when they said this is a girl playing (P2l,4l,5a). P2l: "This is a little girl holding a toy. The girl is holding a doll, and (there) is also a goose that obeys like a dog, so it must have been a pet of the time". Although four more participants mentioned that this must be a scene of a girl playing, they were not very sure about it (P1l,7h,8l,9h). P9h: "Is she holding a doll? Is this a bird? or a duck? I do not know what she is doing because she seems like she is holding a doll and has a duck…" P7h being uncertain, also forms a hypothesis for alternative explanation: "It is very interesting. A small girl holding a small figure in front of a duck. Is it a child activity? or do objects like that have another meaning? Because in antiquity, women were also associated with gods". Three participants did not identify the girl in the image and thought it was a woman (P3h,6h,10l). Not realizing this is a girl and thinking it is a woman left the participants puzzled about the activity depicted in the stele, leading to wrong conclusions. P3h: "Seems like a woman is showing a doll to a goose or a duck. Over the duck, I see a ham leg as we have in Spain". The uncertainty of what was shown forced P3h to use personal knowledge and apply it in an attempt to understand the image (i.e. ham leg from Spain). Lack of context seems to lead people to apply prior knowledge (which, in this case, leads to wrong conclusions).

Fig. 6. Girl playing, second slide

While most participants simply confirmed what they had suspected from the previous image, when P3h,6h and 10l that were wrong previously saw this slide (figure 6), they were all immediately able to connect the two images and correctly identify the activity in both images. P3h: "Ah! she was a child (referring to the previous image). That makes more sense because of its size". In addition, P5a although she had correctly identified the objects in the first image, after looking at the contemporary one, she makes the connections to today's practices: "We continue playing with the same things today. Perhaps we are more sophisticated but still playing with the same things". The second image provided the necessary context and all participants managed to correctly identify the activity in the ancient object. Participants effectively connected the past with the present

and the two with their personal childhood experiences, understanding the lasting character of the activity.

**Theme: Bride's preparation (figures 7,8)**
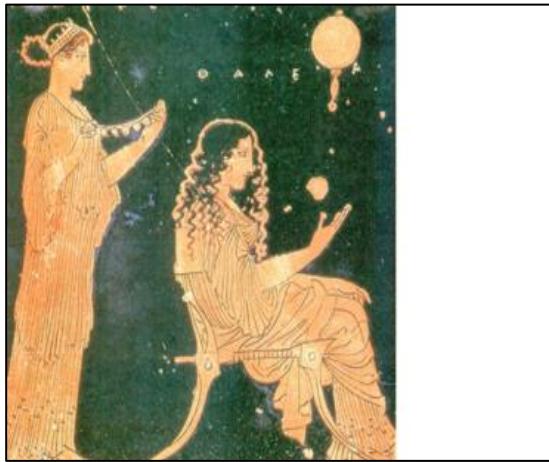
Fig. 7. Bride's preparation, first slide

Eight out of the ten participants were uncertain when they saw this image (figure 7), although most suspect it was an important event, like a celebration of some sort. For example, P1l said: "Two girls. The standing one is trying to decorate the seated one. Perhaps this is a scene from a celebration of some sort that the second girl is spruced up. This thing on top right…I do not know what it is…a balloon? A lamp? They did not have lamps…I do not know". Only three participants were sure this was a bridal preparation, and P2l stated without hesitation: "A girl and someone behind her fixes her hair. She must be a bride".
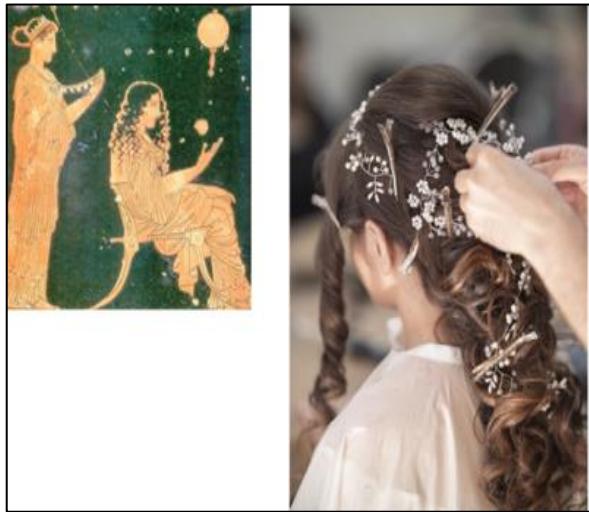
Fig. 8. Bride's preparation, second slide

However, seeing the next slide (figure 8), most participants understood that this was preparation for an important event, like a wedding. P10l: "A! One woman doing another woman's hair. Could it be for a wedding? or a celebration? So, something similar was also happening in the previous one". By seeing this image, most return to the previous one and reconsider. Many participants made such comparisons between the two images and even observed details they had missed before, like P1l: "I see a wedding

scene. I also see a lady taking care of the bride. The first photo could also be a preparation for a celebration. Could this item in the previous photo be a mirror? that is painted like that? or a lantern?" Only P3h remains puzzled and does not realize what these images really show: "She was doing something on her hair. She was supposed to roll this item on her hair. Because the photo had names, it could be goddesses or royalties". Again, in this slide, we observe participants connecting the past and the present and discussing the endurance of cultural phenomena across times. P2l: "This is a similar picture in modern times, where a hairdresser treats a girl to get married. From what I see some ancient customs and habits are preserved to this day". Again here, the second image assists in understanding and connections between past and present. It was easy for participants to realize the lasting nature of the phenomenon and make connections to prior knowledge.

Theme: Family scene (figures 9, 10)

Fig. 9. *Family scene, first slide*

All participants understood that this image (figure 9) was related to a baby. Some called it a birth scene (P1l,6h,9h), others called it a celebration (P1l10l) and even a baby shower party applying today's customs to ancient societies (P3h). We can follow P1l's line of thought: "This is the birth of a little boy and someone on the left is bringing presents. But the little boy is bigger than that…is not born now… what could it be? Like they try to crown the boy? like they are discussing something around the boy? some kind of ceremony around the little boy". Four participants clearly stated that this is a family scene (P2l,4l,5a,9h). P4l: "I see a woman holding the child. A man is in the middle. It may indicate that they are a couple and that they are a family. I will say with reservation that it is a family gathering."
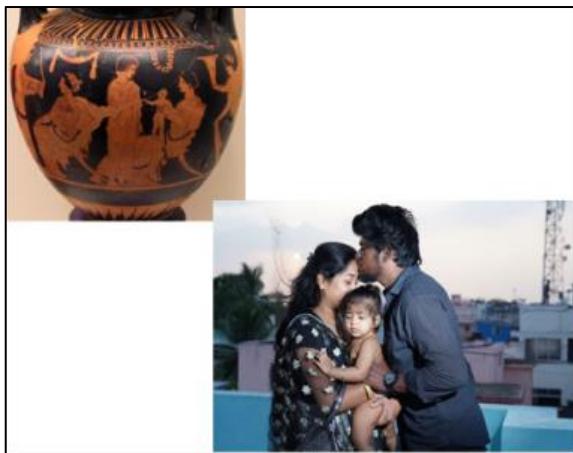
Fig. 10. Family scene, second slide

The family scene in the following image (figure 10) made most participants realize that both images show a family. P10l: "And here I see a family. I imagine this was the case in the previous too". Some participants hypothesize that this is a naming ceremony (P1l,8l,9h), while P1l stated that he remained confused even after seeing the second image: "This is a scene from Asia or Africa…or a scene from a baptism? They hug the kid…a scene of affection. Concerning the previous photo, I am a little confused….some kind of ceremony around the little boy…" Nevertheless, after observing the second image, most participants made comparisons to the ancient one. P6h: "I see a family. A woman with a child. Just a family, not doing something special. This is a familiar scene. For the image before, maybe the person standing is also a father or a protector".

Theme: Mourning (figures 11, 12)

Fig. 11. Mourning, first slide

Most participants (apart from P5a, an expert in ancient Greek funerary objects) spent a few seconds observing this item before describing it (figure 11). Since many figures were involved, it was harder to understand what they were doing. However, almost all participants (9 out of 10) said that this is a funeral with different degrees of certainty (P3h & 6h were uncertain, while P1l,5a,7h,8l,9h10l were certain). P4: "We have a funeral ... for sure. If we assume that the 3 women are lying down and crying ... they mourn him. The others are men. We have a funeral". Only P2l did not

mention a funeral but thought that this is an important event like the crowing of a king: "There are some men gathered. They do a ceremony because there is a boy in the middle. Should he be a prince who will become king? They do some ritual. He is the offspring of a good family". In observing the object, most participants expressed uncertainty although they suspected what was happening.

Fig. 12. Mourning, second slide

However, the next image left no doubts that there were funeral scenes (figure 12). All participants said that this is definitely a funeral scene. P1l had made observations about the posture of the figures in the two images and found similarities: "Again, here there are figures in despair that hold their faces. In the first image, the dead is in a bed, while in the second he is in a coffin". P5a connects to today's funerary practices: "It still continues to be done today. They place the body in a place for people to see". Similarly, P8l mentioned: "A funeral. Above him are the people, and they mourn. Corresponding scene, but in another era. They are essentially the same customs and traditions". P6h observed differences in the behavior of men and women, which, although identical in the ancient images, were not previously noticed: "Also a funeral. It could be from many parts of the world. Women are next to the coffin, and the men are behind. They are separated. Men seem silent while women are crying. There are different expressions. They are standing." Although the majority of participants had correctly identified the funeral scene by looking at the ancient item alone, the second image allowed them to confirm their hypothesis and view more details on the ancient object. The contemporary photo functioned as a confirmation, and most participants returned to the deeper observation of the ancient object. Realizations of past and present connections and new questions emerged, like the role of men and women.

Theme: At the cemetery (figures 13, 14)

Fig. 13. At the cemetery, first slide

This image (figure 13) was the most confusing of all, since participants could not understand what they saw, apart from P5a, who is an expert in ancient Greek funerary objects and said: "Another funerary tool. It is a woman that goes to the grave to pay respects to the dead". Thus, participants P2l,4l,9h,10l saw that the person was holding something, but they could not say more apart from that. P2l tried to make a guess, which was wrong: "A woman must have embroidered something like a scarf or shawl, and she hangs it somewhere. Maybe give it somewhere". The remaining participants (P1l,3h,6h,7h,8l) described a shrine or a temple and the person offering something closer to the correct interpretation of the image. However, they were all very uncertain about their statements. P1l, although wrongly identifies a man, described with uncertainty: "A man holding something like sheaves..is this an altar? Does he make a sacrifice on an altar? He leaves some things."

Fig. 14. At the cemetery, second slide

Clearly, the presentation of the next image (figure 14) helped most participants understand the scene in the ancient item. P3h: "It is a grave! They are in a cemetery in both photos. I do not remember burial traditions in ancient Greece, but I think it is a cemetery." P5a connects the past with today's reality and says: "We do the same. We go each year to our dead to give our respects". P10l stated: "A! It was probably .... a woman in front of the grave of a loved one. Maybe she is reading a prayer. A memorial perhaps? I cannot understand what the girl is holding in her hands (referring to the previous photo), but it is a similar scene where she has gone to the grave of one of a loved one to mourn. Both images have flowers. In front of them are tombs." Signs of constructivist processes are present again since participants connect the past and the present, show surprise and emotional engagement, connect with personal experiences, and show cultural understanding.

When asked to provide any final comments, participants made different comments. In particular, P1l and 7h discussed how the contemporary images provided context for interpreting the ancient ones. P1l went a step further and explained how such an approach could also be applied to other forms of art, not only ancient ones: "To see (images from) contemporary times and because we are used to seeing images from today's world, help us to have a context and understand what ancient people wanted to portray. Through contemporary photographs, I managed to understand what the initial images showed. This could be a proposal for improving the way we view works of art in museums. To understand better what they show. The contemporary framework assists the understanding of these items".

P2l,6h,8l,9h explained how this sequencing of images allowed them to connect the past and the present and see how lasting certain phenomena might be. P2l: "Some customs that existed from ancient times are preserved until now, such as the bride's decoration, dolls and tombstones".

P3h and 10l said that these images allowed them to observe aspects of ancient daily life. Especially as P3h mentioned: "Images from daily life. Things we are not used to seeing in ancient art. We are used to seeing heroes, warriors, gods…these are stereotypes we have about ancient Greek art. However, here we see common people's lives. It is mostly women. We are not used to seeing children and especially young girls".

Finally, P4l and 5a focused on women and noticed that these images showed women in different aspects of life. P4l has good knowledge of traditional life and customs since she comes from a small village on a Greek island, where many of these traditions remain. She showed high confidence in understanding the ancient images and applied knowledge from her life in the village. She concluded: "The female presence prevails in the images and in terms of the depictions in the objects and the photographs. It may show women to be in very important moments of their lives and important rituals of life, but also tasks such as water bringing and wool handling". Similarly, P5a, an archaeologist, said: "Most of these activities are done by women. They care for the children, the dead, they mourn, and they preserve the memories of the family. What happened in the classical Greek past still happens today. Possibly more in the East than in Western societies, but still women maintain this."

V. DISCUSSION

Based on the study results participants showed clear signs of meaning-making once they saw the ancient items together with the modern photos. More specifically, the ancient items made participants uncertain about what they saw (P1l, P8l, P10l). On many occasions, participants said they were unsure what they saw. Participants almost always used the modern image that followed the ancient one to confirm a hypothesis they had formed previously (P1l, P3h, P6h, P7h, P8l, P9h) or to realize what the ancient item showed (P1l, P3h, P6h, P8l, P9h, P10l). Participants, like P7h explicitly stated that seeing archaeological items out of context made it very hard to understand how to conclude. However, when participants saw the relevant photo, some were initially surprised (P3h, P8l) but could then understand the previous image. Moreover, participants could make connections to their prior knowledge (P1l, P3h, P5a, P7h, P9h, P10l) and their personal experiences (P5a), implying the construction of meaning. Concerning Soren's classification, again, participants were able to have unexpected emotional experiences (P2l), had the opportunity to focus on natural objects (P3h), understand how ancient societies function (P9h) and finally make connections between the past and the present (P2l, P4l, P5a, P6h, P7h, P8l, P9h, P10l) and realize that there are many similarities between ancient societies and today's world (P6h, P8l, P10l). Fig. 15 shows some indicative comments of participants. All participants were more or less familiar with ancient Greek art due to origin, studies or both. However, it was not easy even for them to understand ancient objects when they stood alone. The second images provided the necessary context and decreased uncertainty. All participants always went back to rethink the ancient object once the contemporary image was shown, although they were not asked to. The information gap and the uncertainty people experience needs to be resolved, and this is probably why people used the contemporary images as tools to understand the ancient ones. The contemporary photos alone, without any further explanation, were adequate in triggering reflection and enhancing the construction of meaning.

VI. CONCLUSIONS

The present study showed that it is hard even for experts to understand what items convey when not in context. As participants stated, detecting the details and understanding what they show is not easy. However, in most cases, the contemporary photo next to the ancient item was adequate to make people immediately realize what they saw. In addition, the photos not only function as interpretation aids but also allow participants to make multiple connections between past and present, across societies and cultures, between current and prior knowledge, and permit connections to personal experience. All these elements indicate critical constructivist approaches taking place when people are presented with the two images and meaning-making processes.

One participant (P1l) went beyond the use of contemporary photos to explain ancient items in archeological museums and suggested using photos in other types of museums, like art galleries. We find this suggestion worth studying further, since all types of art go through interpretation processes.

From the current study, we observed that photos of contemporary life are essential interpretation elements that assist meaning-making in museums since they allow people to make connections between museum items with familiar situations from current societies. However, it is important to note that all the selected archaeological items showed activities still performed today in many societies, and participants were more or less familiar with them. Thus, when they saw the contemporary photo showing the same activity, they easily understood what was depicted on the ancient item. It is unclear how photos would work for practices that are not performed today. The issue of finding alternative interpretation strategies and methodologies in museums remains a challenge. The present work proposed one possibility that works well under certain circumstances. Future work should also focus on different populations, like children, the elderly, etc., to further study the interpretation effect of photographs in museums.

In the present work, we only showed participants 7 sets of images in an attempt to reduce cognitive overload and avoid fatigue. In a museum, fatigue is a common phenomenon. In using photos as part of applications for museum use, we need to consider fatigue issues. For this reason, carefully designed museum experiences should find the balance between the material presented to the visitors and possible fatigue. Based on the "7plus or minus 2" rule, we suggest using a limited number of photos in museum applications. Thus, the material presented to the user through contemporary technology, which could incorporate everyday photos for further enhancing meaning-making, should be carefully selected and kept in low numbers. In other words, an app can choose to focus on 5 to 9 important objects and provide enhanced material, including everyday photos. The museums as physical spaces already contain a plethora of stimuli and technology wishing to assist museum visits should always consider issues of museum fatigue.

As seen in the introductory sections, museums use photos in different ways. One of the most popular uses is the exploitation of photos in social media to promote the museum and the exhibitions. Social sciences have also used photos to study visitor needs and understand how people make meaning and engage with the museum content. Fewer studies use photos to provide additional context. Within those, the present work directly looks into the processes of meaning construction by the visitors and possibly the only one that connects archaeological items with everyday photos. Confirming previous studies **[40]**, the present work also revealed the power of photos to assist people in understanding historical phenomena. The present work also tested the power of a single image with objects from a single domain (i.e. ancient Greek). Again, the presentation of one

image was not adequate even for people with special knowledge to understand fully, as also seen in Docket et al. **[41]** who also suggest the use of two or more similar photos together. Moving beyond Docket et al. **[41]**, we showed how only two images of similar themes can function well in providing the necessary context for comprehension and reflection. As past research has also shown **[42]**, keeping the images' theme area consistent is crucial, which was also applied in the present work. Thus, the current research successfully combined elements from previous works **[40, 41, 42]** and studied all the elements together, showing how the importance of photos in understanding cultural heritage and reflecting on the past. Finally, we can further confirm the findings of past studies **[43]** showing that photos have indeed the potential to function as necessary meaning construction tools, and they form meaningful artefacts that can enhance museum experiences.

The sample of the present work was limited, and since only university students participated, the results cannot be generalized. Thus, the present work only provides indications that contemporary photos could be beneficial when included in narrations regarding historical objects when this is possible (when there are relevant photos available). In order to further improve the content provided to museum visitors by cultural technologies, further research is needed. Advanced cultural heritage technologies can easily incorporate different visual aids to accompany narratives and provide an experience that allows visitors to make easy connections between the past and present, finding similarities to her life and overall assisting reflection processes.

In our future work, we will compare cultural technologies that include contemporary photos in the narratives of historical objects and ones that do not and will study visitors' interpretation strategies and meaning-making processes.
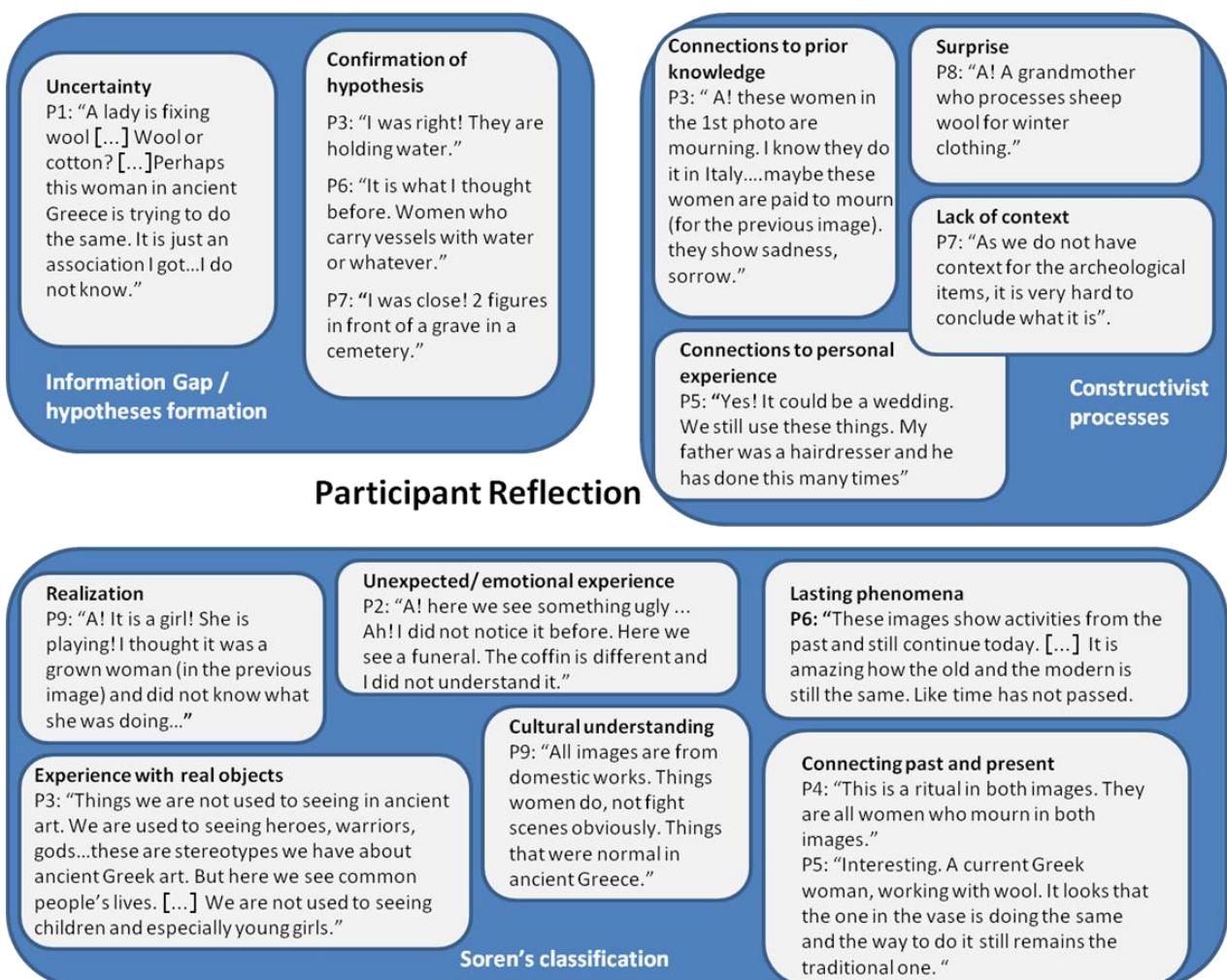

Fig. 15. Indicative participant comments and reflections

VII. APPENDIX A

Table 1 shows all the images used in the study with their licenses.

Table 1.Images used in the study with the licenses.

| Image	License
	https://es.wikipedia.org/wiki/La_mujer_en_la_Antigua_Grecia#/media/Archivo:NAMA_Travail_de_la_laine.jpg Creative Commons BY-SA 2.5
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	https://es.wikipedia.org/wiki/La_mujer_en_la_Antigua_Grecia#/media/Archivo:NAMA_Gynécée_2.jpg CC BY-SA 2.5
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	https://commons.wikimedia.org/wiki/File:Khaled_Mohamed_Saeed%27s_mother_visiting_his_grave.jpg Creative Commons Attribution Share Alike 2.0 Generic

VIII. REFERENCES

1. Lending, M. Landscape versus Museum: JC Dahl and the Preservation of Norwegian Burial Mounds. *Future Anterior* 2009, *6(1),* xi-17. https://muse.jhu.edu/article/364594

2. Lending, M. Negotiating absence: Bernard Tschumi's new Acropolis Museum in Athens. *The Journal of Architecture* 2018, *23(5),* 797-819. https://doi.org/10.1080/13602365.2018.1495909

3. Duffy, T. M.; Jonassen, D. H. *Constructivism and the technology of instruction: A conversation.* Routledge: New York, USA, 2013. https://doi.org/10.4324/9780203461976

4. Ellis, R.' Without decontextualisation': the Stanley Royd Museum and the progressive history of mental health care. *History of Psychiatry* 2015, *26(3),* 332-347. https://journals.sagepub.com/doi/10.1177/0957154X14562747

5. Gheorghiu, D.; Ştefan, L. A fractal augmentation of the archaeological record: the time maps project. In *Augmented Reality Art,* 2nd ed; Geroimenko, V., Ed.; Springer, Cham, 2018; pp. 297-316. https://doi.org/10.1007/978-3-319-69932-5_16

6. Montusiewicz, J.; Czyż, Z.; Kayumov, R. Selected methods of making three-dimensional virtual models of museum ceramic objects. *Applied Computer Science* 2015, *11(1),* 51-65. https://www.infona.pl//resource/bwmeta1.element.baztech-3af193c0-5d39-4208-a357-64c9de212251

7. Kamcke, C.; Hutterer, R. History of dioramas. In *Natural history dioramas;* Tunnicliffe, S., Scheersoi, A. Eds.;. Springer: Dordrecht, Netherlands, 2015; pp. 7-21. https://doi.org/10.1007/978-94-017-9496-1_2

8. Serrell, B. *Exhibit labels: An interpretive approach.* Rowman & Littlefield: New York, USA, 2015.

9. Antoniou, A.; Lepouras, G.; Kastritsis, A.; Diakoumakos, J.; Aggelakos, Y.; Platis, N. " Take me Home": AR to Connect Exhibits to Excavation Sites. Proceedings of AVI²CH@ AVI, Salerno, Italy, September-October 2020.

10. McMahon, M. Social constructivism and the World Wide Web-A paradigm for learning. Proceedings of the ASCILITE conference, Perth, Australia, December 1997.

11. Di Vesta, F. J. The cognitive movement and education. *Historical foundations of educational psychology* 1987, 203 - 233. https://doi.org/10.1007/978-1-4899-3620-2_11

12. Hein, G. E. The constructivist museum. *Journal of Education in Museums* 1995, *16(1),* 21-23.

13. Hellin-Hobbs, Y. The constructivist museum and the web. Proceedings of the Electronic Visualisation and the Arts (EVA), London, UK, July 2010. https://doi.org/10.14236/ewic/EVA2010.13

14. Fosnot, C. T. *Constructivism: Theory, perspectives, and practice,* 2ⁿᵈ ed.*;* Teachers College Press: New York, USA, 2013.

15. Sandifer, C. Technological novelty and open-endedness: Two characteristics of interactive exhibits that contribute to the holding of visitor attention in a science museum. *Journal of Research in Science Teaching* 2003, *40(2),* 121-137. https://doi.org/10.1002/tea.10068

16. Bitgood, S. *An attention-value model of museum visitors*. Center for Advancement of Informal Science Education: Washington, DC, USA, 2010.

17. Bitgood, S. Attention and value: Keys to understanding museum visitors. Routledge: New York, USA, 2016.

18. Antoniou, A.; O'Brien, J.; Bardon, T.; Barnes, A.; Virk, D. Micro-augmentations: situated calibration of a novel non-tactile, peripheral museum technology. Proceedings of the 19th Panhellenic Conference on Informatics, Athens, Greece, October 2015. https://doi.org/10.1145/2801948.2801959

19. Alachouzakis, K.; Veneris, N. D.; Kavvadias, S.; Antoniou, A.; Lepouras, G. A study of micro-augmentations: personality, gender, emotions and effects on attention and brain waves. Proceedings of the 22nd Pan-Hellenic Conference on Informatics, Athens, Greece, November 2018. https://doi.org/10.1145/3291533.3291582

20. Edwards, E.; Lien, S. Museums and the Work of Photographs. In *Uncertain images: museums and the work of photographs;* Edwards, E.; Lien, S. Eds.; Ashgate: Farnham, UK, 2016; pp. 3-20.

21. Edwards, E.; Mead, M. Absent histories and absent images: Photographs, museums and the colonial past. *Museum and Society* 2013, *11(1),* 19-38. https://journals.le.ac.uk/ojs1/index.php/mas/article/view/220

22. Edwards, E.; Lien, S. *Uncertain images: Museums and the work of photographs*. Ashgate Publishing: Farnham , UK, 2016.

23. Edwards, E.; Morton, C. *Photographs, museums, collections: between art and Information*. Bloomsbury Publishing: London, UK, 2015. https://doi.org/10.14434/mar.v10i1.20591

24. Edwards, E. *Raw histories: photographs, anthropology and museums*. Routledge: London, 2021.

25. Crane, S. A. Photographs at/of/and Museums. In *The Handbook of Photography Studies;* Pasternak, G, Ed; Routledge, 2020 pp. 493-512.

26. Weilenmann, A.; Hillman, T.; Jungselius, B. Instagram at the museum: communicating the museum experience through social photo sharing. Proceedings of the SIGCHI conference on human factors in computing systems, Paris, France, April 2013. https://doi.org/10.1145/2470654.2466243

27. Villaespesa, E.; Wowkowych, S. Ephemeral storytelling with social media: Snapchat and Instagram stories at the Brooklyn Museum. *Social Media+ Society* 2020, *6(1),* 2056305119898776. https://doi.org/10.1177/2056305119898

28. Poulsen, S. V. Becoming a semiotic technology–a historical study of Instagram's tools for making and sharing photos and videos. *Internet Histories* 2018 *2(1-2),* 121-139. https://doi.org/10.1080/24701475.2018.1459350

29. Fors, V. Sensory experiences of digital photo-sharing— "mundane frictions" and emerging learning strategies. *Journal of Aesthetics & Culture* 2015, *7(1),* 28237. https://doi.org/10.3402/jac.v7.28237

30. Steier, R.; Pierroux, P.; Krange, I. Embodied interpretation: Gesture, social interaction, and meaning making in a national art museum. *Learning, Culture and Social Interaction* 2015, *7,* 28-42. https://doi.org/10.1016/j.lcsi.2015.05.002

31. Pauwels, L. Photography in the Social and Behavioral Sciences: Intersections, Research Modes, and Prospects. In *The Handbook of Photography Studies*; Pasternak, G. Ed.; Routledge, 2020, pp. 122-138.

32. Gube, J. Photo-eliciting technique as an integrated meaning-making practice: An introspective look at diversity, identities, and voice-giving. *Visual Studies* 2021, *37(1-2),* 116-127. https://doi.org/10.1080/1472586X.2020.1854053

33. Insulander, E.; Selander, S. Designs for learning in museum contexts. *Designs for Learning* 2009, *2(2),* 8-20. https://www.diva-portal.org/smash/get/diva2:390826/FULLTEXT01.pdf

34. Marcus, A. S.; Levine, T. H. Knight at the museum: Learning history with museums. *The Social Studies* 2011, *102(3),* 104-109. https://doi.org/10.1080/00377996.2010.509374

35. Britsch, S. Photo-booklets for English language learning: Incorporating visual communication into early childhood teacher preparation. *Early Childhood Education Journal* 2010, *38,* 171-177. https://doi.org/10.1007/s10643-010-0412-2

36. Markham, K. Two-dimensional engagements: photography, empathy and interpretation at District Six Museum. *International Journal of Heritage Studies* 2017, *25(1),* 21-42. https://doi.org/10.1080/13527258.2017.1378900

37. Drew, S.; Guillemin, M. From photographs to findings: Visual meaning-making and interpretive engagement in the analysis of participant-generated images. *Visual Studies* 2014, *29(1),* 54-67. https://doi.org/10.1080/1472586X.2014.862994

38. Loeffler, T. A. A photo elicitation study of the meanings of outdoor adventure experiences. *Journal of leisure research* 2004, *36(4),* 536-556. https://doi.org/10.1080/00222216.2004.11950035

39. Gauthier, L.; Staszak, J. F. Framing Coloniality: Exotic Photographs in Swiss Albums, Museums, and Public Spaces (1870s–2010s). *Photography and Culture* 2015, *5(3),* 311-326. https://doi.org/10.2752/175145212X13415789393207

40. Tucker, J. Photography and the making of modern science. In *The Handbook of Photography Studies*; Pasternak, G. Ed.; Routledge, 2020, pp. 235-254.

41. Dockett, S.; Einarsdottir, J.; Perry, B. Photo elicitation: Reflecting on multiple sites of meaning. *International Journal of Early Years Education* 2017, *25(3),* 225-240. https://doi.org/10.1080/09669760.2017.1329713

42. Wright, D.; Sharpley, R. The photograph: Tourist responses to a visual interpretation of a disaster. *Tourism Recreation Research,* 2017, *43(2),* 161-174. https://doi.org/10.1080/02508281.2017.1409921

43. Fawns, T. Cued recall: Using photo-elicitation to examine the distributed processes of remembering with photographs. *Memory Studies* 2022, 17506980211073093. https://doi.org/10.1177/17506980211073093

44. Kontiza, K.; Antoniou, A.; Daif, A.; Reboreda-Morillo, S.; Bassani, M.; González-Soutelo, S.; ... López-Nores, M. On

How Technology-Powered Storytelling Can Contribute to Cultural Heritage Sustainability across Multiple Venues—Evidence from the CrossCult H2020 Project. *Sustainability* 2020*, 12(4),* 1666-1692. https://doi.org/10.1080/24701475.2018.1459350

45. Wyman, B.; Forbes, J. ArtClix: The High Museum of Art's foray into mobile aps, image recognition, and visitor participation. Proceedings of MW2013: Museums and the Web 2013, Portland, USA, April 2013.

46. Liao, M. H. One photo, two stories: Chinese photos in British museums. *East Asian journal of popular culture* 2015*, 1(2),* 177-191. https://doi.org/10.1386/eapc.1.2.177_1

47. Papakostopoulos, V.; Vaptisma, A.; Nathanael, D. Narrative Structure of Museum Guided Tours. Proceedings of the 31st European Conference on Cognitive Ergonomics, Belfast, UK, September 2019. https://doi.org/10.1145/3335082.3335095

48. Paivio, A. Dual coding theory: Retrospect and current status. *Canadian Journal of Psychology/Revue Canadienne de Psychologie* 1991*, 45(3),* 255-287. https://doi.org/10.1037/h0084295

49. Hargood, C.; Millard, D. E.; Weal, M. J. A semiotic approach for the generation of themed photo narratives. Proceedings of the 21st acm conference on hypertext and hypermedia, Toronto, Canada, June 2010. https://doi.org/10.1145/1810617.1810623

50. Sandelowski, M. Sample size in qualitative research. *Research in nursing & health* 1995, *18*(2), 179-183. https://doi.org/10.1002/nur.4770180211

51. Cid López, R. M. El género y los estudios históricos sobre las mujeres de la Antigüedad. Reflexiones sobre los usos y evolución de un concepto. *Revista de Historiografía* 2015, 25-49. https://e-revistas.uc3m.es/index.php/REVHISTO/article/view/2645

52. Morillo, S. R. La maternidad: de la infancia a la adolescencia en la Grecia antigua. In *Los trabajos de las mujeres en el mundo antiguo: cuidado y mantenimiento de la vida*; Delgado Hervas, A.; Picazo Gurina, M., Eds.; Institut Català d'Arqueologia Clàssica: Tarragona, Spain; 2016, pp. 119-128. https://dialnet.unirioja.es/servlet/articulo?codigo=5994834

53. Morillo, S. R. Childhood and motherhood in Ancient Greece: an iconographic look. In *Motherhood and infancies in the Mediterranean in antiquity;* Cid Lopez, R.; Sanchez Romero, M., Ed.;, Oxbow Books: Oxford, UK, 2018, pp. 135-151.

54. Morillo, S. R. Dialogar con las divinidades en femenino: Espacios y ritos relacionados con la maternidad en la Antigüedad griega. In *Cartografías de género en las ciudades antiguas*. *Editorial Universidad de Granada;* Martine Lopez, C.; Ubric Rabaneda, P., Eds.; Universidad de Granada: Granada, Spain; 2017, pp. 181-206. https://dialnet.unirioja.es/servlet/articulo?codigo=6279598

55. Morillo, S. R. Emociones en femenino, de madres a hijas. El ejemplo de los rituales fúnebres en la Grecia antigua. In *Madres y familias en la Antigüedad: patrones femeninos en la transmisión de emociones y de patrimonio*; Cid Lopez, R.M.; Dominguez Arranz, M-A.; Saez, R.M.M., Eds.; Trea: Spain, 2021, pp. 21-38.

56. Miller, G. A. The magic number seven plus or minus two: Some limits on our capacity for processing information. *Psychological Review* 1956*, 63*, 91-97.

57. Soren, B. J. Museum experiences that change visitors. *Museum Management and Curatorship* 2009*, 24(3),* 233-251. https://doi.org/10.1080/09647770903073060

58. Antoniou, A.; Morillo, S. R.; Lepouras, G.; Diakoumakos, J.; Vassilakis, C.; Nores, M. L.; Jones, C. E. Bringing a peripheral, traditional venue to the digital era with targeted narratives. *Digital Applications in Archaeology and Cultural Heritage* 2019*, 14,* e00111. https://doi.org/10.1016/j.daach.2019.e00111

59. Poulopoulos, V.; Vassilakis, C.; Antoniou, A.; Lepouras, G.; Theodoropoulos, A.; Wallace, M. The Personality of the Influencers, the Characteristics of Qualitative Discussions and Their Analysis for Recommendations to Cultural Institutions. *Heritage* 2018*, 1(2),* 239-253. https://doi.org/10.3390/heritage1020016

60. Poulopoulos, V.; Vassilakis, C.; Antoniou, A.; Lepouras, G.; Wallace, M. Personality Analysis of Social Media Influencers as a Tool for Cultural Institutions. Proceedings of the Euro-Mediterranean Conference, Nicosia, Cyprus, October 2018. https://doi.org/10.1007/978-3-030-01762-0_20

61. Gash, H. Constructing Constructivism. *Constructivist Foundations* 2014*, 9(3),* 302-310.

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