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Making Sense of Visitors' Sense-making Experiences: The REMIND Method

Daniel SCHMITT and Michel LABOUR

DeVisu laboratory, University Polytechnic Hauts-de-France **Making Sense of Visitors' Sense-making Experiences: The REMIND Method**

Abstract: Ten years of studying museum visitors' sense-making processes have led to developing two *in situ* research methods. First, from a conceptual "enactive" perspective, our REMIND method seeks to understand more clearly visitors' sense-making processes. This involves employing an eye-tracker video recording of visitors' gaze points as the basis of semi-guided interviews conducted on the site of the museum immediately after the visit. Second, our E-MOTION method traces visitors' paths in the museum linked to their declared level of emotions. In doing this, the method creates an emotion-map of a visitor's journey in the museum. The two methods identify museum features conducive to sense-making, which can be linked to Gardner's (1993) multiple intelligences, and to disengaging "sense-wrecking".

Key words: REMIND method, E-MOTION method, Visitor experience, Sense-making, Sense-wrecking, Enactivism

In search of the dynamics of sense-making

In 1884, Henry Hugh Higgins, the then Honorary Curator of the *Liverpool Museum* (England) and future first President of the *British Museums Association*, was already convinced that important lessons could be learned from questioning visitors about exhibitions (McManus,

1996). During the century that followed, most European and North American studies of museum audiences focussed on visitors' itinerary, postures, attention and fatigue level (Gilman, 1916; Robinson, 1928, 1931; Melton, 1933, Melton *et al.*, 1936). It was not until the early 1960s, in the United States, that research on exhibition evaluation and visitor studies intensified in considering the museum as an essentially learning environment. Studying a museum as learning moments encourages the marshalling of knowledge and research traditions based on disciplines such as those education science and psychology. This led to developing methods either to evaluate the impact of exhibits on visitors, or to measure an increase in knowledge when visiting an exhibition (Shettel, 1968, 1976; Screven, 1974). However, knowledge is difficult to grasp, leading some researchers to question the methods used. The questioning led to seeing the museum not only as a learning environment (Alt, 1977), but also as an environment that stimulates "experiences" (Graburn, 1977).

Understanding a museum visit as an "experience", in the terms of a dynamic of sense-making process (Theureau, 2004, 2006), and not just as learning moments represents a significant paradigm shift. Indeed, if one considers visiting a museum also as an "experience", in its more narrow Theureauian sense, it requires identifying certain key dimensions in order to obtain useful results for the museum and its visitors. However, as Harris Shettel (2008) states, it is difficult to identify a "visitor experience" and, consequently, to evaluate it. On the one hand, such an experience can begin with the very idea of wanting to go to a museum and can continue for years after the visit with the resurgence of ideas or memories linked to a given museum experience (Falk & Dierking, 1992). On the other hand, if a visitor experience starts and finishes with having crossed the threshold of the designated space of the museum, one can argue, without raising many major objections, that the term « visitor experience » includes dimensions that can be qualified as corporeal (feeling hot/cold, moving around, looking,

touching, etc.), cognitive (perceptions, comparing, remembering, expecting, exchanging, speaking, etc.) and emotional (experiencing amazement, attraction, pleasure/displeasure, disgust, repulsion, etc.). However, most research methods into visitor experience, *via* interviews, observations, or questionnaires during or after a visit, fail to capture and rigorously explain the corporeal, cognitive and emotional dimensions a visitor puts in play during a visit (Davallon & Flon, 2013). In itself, third party observations of visitors' external behavior give little reliable insight into a visitor's cognitive and emotional dimensions (Dufresne-Tassé, 1995). This remains so, even when visitors are equipped with eye trackers or are filmed. While such observations can provide indications (signs, indices) of a human activity, they do not provide an unequivocal link with a specific cognitive or emotional activity. Observed indications are mute; they do not directly say anything about visitors' lived experiences or how they make sense of their visit. To do this, a research method requires consenting visitors to verbalize their thoughts and emotions, usually by speaking into a tape recorder, during the visit. The results have shown how visitors use a great deal of creativity to establish a rapport with a perceived museum discourse and its exhibits on show (Dufresne-Tassé 1995; Dufresne-Tassé *et al.*, 2002). Nonetheless, little is known about the more inner processes of visitor sense-making, and associated experiences, during a visit beyond what an individual can verbalize at a given moment in time.

As a concept, "sense-making" designates a transformative process that purposely connects selected meaningful entities in response to a specific problem-situation from a given point of view (Labour, 2016: 55). This point is reiterated by others, like Ybema & Willems (2015: 14563) for whom sense-making "usually imagines situations fraught with difficulties which challenge subjects to forge order out of chaos". From this perspective, a sense-making process can generate cognitive "resonances" with a view of creating a "coherent" response to a

perceived problem (Labour, 2014: 292). For Labour (2016: 74, 78) such a process puts in play an enactive set of meaningful corporeal, cognitive and emotional dimensions (see below, Di Paolo *et al.*, 2018: 93) of a human being's activity in a given time and place. This is in accord with Di Paolo, Cuffari & De Jaegher (2018: 81) for whom taking "an enactive perspective entails asking why something means something for someone, in the particular historical and interactive situation". Di Paolo *et al.*, (2018: 58) define meaning-making in terms of agent-environment transactions "(...) whereby acts/meanings emerge not only out of placing the right bodily and environmental conditions, as it were, 'next to each other', but through an intimate and mutually transformative intertwining of body and milieu".

This "transformative intertwining of body and milieu" (Di Paolo *et al.*, 2018: 58) corresponds to a dynamically constitutive and intersubjective metabolic overall organization. This implies the integration of the corporeal, cognitive and emotional dimensions of a human being's activity "is never perfect. Each dimension follows the logic of its own autonomy" (Di Paolo *et al.*, 2018: 93). A "transformative intertwining of body and milieu" (Di Paolo *et al.*, 2018: 58) is thus constituted of the different logics of different dimensions, leading to an overall dynamic tension across these dimensions ("integration is never perfect", Di Paolo *et al.*, 2018: 93). In sum, depending on the situation, not all the enactive dimensions have the same weight; "each dimension follows the logic of its own autonomy" within an organic functioning whole (Di Paolo *et al.*, 2018: 93). In some situations, one or two dimensions may dominate, and in others all three dimensions may do so.

In this light, an enactive sense-making process contributes to the integration of the three basic dimensions of lived (organic, sensorimotor and intersubjective) experiences (cf. Di Paolo *et al.*, 2018: 22, 93). Following from this, we posit the phenomenon of (verbal and non-verbal) language as a unifying element in an enactive sense-making process. Indeed, linguist, Charles

Taylor (2016) argues that language creates, alters and breaks connections between people such that it can also “open new spaces of human meanings: through introducing new terms, and/or through expression-enactment” (Taylor 2016: 261). This occurs, notably through the regulatory acts of utterances operating recursively among participants engaged in a dialogue. In this way, “utterances may become braided to other utterances *via* reporting and resonance of all kinds” (Di Paolo *et al.*, 2018: 332). In the same vein, Putnam (1999: 48, 69) affirms that language changes the range of personal experiences, depending on the context, and in so doing extends cognitive relations *with* the world and transforms relations *in* the world. To that end, language becomes a central element of human interaction that “straddles the boundary between mind and body” (Taylor 2016: 333) for as much as the separation of a mind from its body makes any sense.

Methods and materials

The REMIND method was developed with reference to museum visitors’ experiences from which patterns can be inferred, notably from the interactions of an individual’s organic, sensorimotor¹, and intersubjective enactive experiences.

“[C]onflicts between dimensions of embodiment tell us that their relations are complex and nonlinear, that each dimension is indeed a space of ‘free’ possibilities, but a space constrained at the borders” (Di Paolo *et al.*, 2018: 88).

¹ This includes emotions like rage and infatuation (Di Paolo *et al.*, 2018: 88).

In short, while the different dimensions have finite possibilities (“constrained at the borders”, Di Paolo *et al.*, 2018: 88) within an enactive framework, the interactions across the dimensions are neither predetermined, nor predictable (“relations are complex and nonlinear”, *idem*). This approach follows those, such as Froese, Gould and Barrett (2011: 257), for whom the challenge of museum designers consists of obtaining a clearer description of situationally lived experiences, rather than a general understanding of ideas, beliefs, judgments based on disembodied or atemporal experiences. Bearing this in mind, the methods we present are aimed at establishing how museum visitors make sense, or not, of their visit from an enactive perspective. For ease of analysis, the method can be portrayed in three interdependent questions.

- Question 1: What observed traces can be identified about what attract visitors’ attention? These attractors serve as indicators of potentially meaningful items for visitors. This can be associated to a more reactive “sensorimotor” space of an enactive experience.
- Question 2: Linked to Question 1 (above), what is at *stake* for the visitor? This corresponds more to a metabolic-based “organic” space of an enactive experience, in that it includes museum visit-fatigue, hunger, thirst, stress of the presence and noise of other visitors, and includes cognitive expectations.
- Question 3: Based on questions 1 and 2 (above), how does a visitor’s sense-making process operate? Do visitors organize (parts of) their visit? To what extent is their interest for an object more a purposeful decision, rather than that of deambulatory curiosity? This question corresponds more to a deliberative “cognitive” space of an enactive experience, without excluding the sensorimotor space, notably concerning the “deambulatory curiosity” factor.

On a practical research level, in order not to disrupt a visitor’s “natural” (Jambon, Mandran, Meillon & Perrot, 2010) sense-making processes, three features need to be

considered. The first feature of an onsite-museum research method is the need to interview visitors while they are still in the emotional throes of what they have just experienced. Such a method must, at the very least, comply to two basic rules. Rule 1 states that the method must comply to the “silence is golden” rule of museums, which minimizes sustained public verbal expression among visitors. Rule 2 declares that the method should not be invasive for visitors, notably by infringing on how they wish to visit the museum. These two rules would, then, exclude a “think aloud” method (Flaherty 1975; van Someren *et al.*, 1994; Dufresne-Tassé *et al.*, 1998). Talking out loud does not correspond to what visitors normally do, or are allowed, in museums (see Rule 1, above). In addition, the method can create an additional, and potentially invasive, cognitive load on visitors (see Rule 2, above) (cf. Sweller, Ayres and Kalyuga, 2011).

The second feature of not disrupting a visitor’s natural sense-making processes, in the case of an onsite eye-tracking technique method is that it falls prey to the arguable assumption that “eye-movement data provide an excellent on-line indication of the cognitive processes” (Liversedge & Findlay, 2000: 6). At first sight, we take issue with this. When an eye-tracker spots a person’s “gaze point”, it is not possible to ascertain what the person is thinking about or focused on cognitively speaking. In the example of Figure 1 (below), we do not know if the visitor is looking at the book, the notes of the musical staff, the color of the page, or the thickness of the book, *etc.* This does not mean, however, that eye tracking technology is of no use, quite the contrary. We come back to this point below.

(Insert Figure 1)

The third feature of an onsite research method is documenting a visitor’s during-visit behavior such that it is both non-invasive and immediately accessible as recorded data. The aim, here, is to have traces of visitors’ behaviors during the visit that can be used to remind

them of their visit when asked to recall what they experienced in an interview immediately after their visit. The presence of such traces is crucial, without which visitors would have to rely solely on freshly acquired memories. Ebbinghaus's pioneering *Forgetting Curve* (1913) indicate that after about 20 minutes most people tend to lose 68% of what they memorized, and 44% one hour later. Even if these figures can be questioned, it does indicate the impact of temporality on memory. In addition, the *serial position effect* hypothesis affirms that items at the beginning of an experience are easier to remember (*Primacy effect*) than those in the middle of the experience, while items at the end of an experience are the most likely to be remembered (*Recency effect*) (cf. Lieury, 2013: 159).

REMIND Method: recalling Experiences

Our research method, called REMIND (*Reviviscence, Experience, Emotions, Sense-making Micro-dynamics*) was developed within the stimulated recall tradition. The method is based on the stimulated recall concept of Bloom (1953: 161), for whom an individual can be “enabled to relive an original situation with vividness and accuracy if he is presented with a large number of the cues of stimuli which occurred during the original situation”. With this in mind, and also by mobilizing the works on Jacques Theureau's “course of experience” (2006), Schmitt and Aubert (2016) developed the REMIND method to analyze human activities through visitors' situated and embodied utterances *via* a second by second visual recording of eye-tracking gazes during their visit. The REMIND method operates in the following way. After informed consent with the visitor, the research team equips the visitor with a video camera eye-tracker glasses, or a micro-camera attached to the ear, in order to have a first-person audio-visual trace of the person's gaze points during the visit. To ensure the authenticity of the visit in a “natural environment” (Jambon, Mandran, Meillon & Perrot, 2010), the eye-tracker

equipped visitor does not receive any instructions what to do or where to go during the visit. The research team is kept out of sight of visitors so not to influence them in any manner.

The (eye-tracker) video support was used for its capacity to record traces of actions that can be screened immediately after the visit in order to stimulate the episodic memory² of visitors. In effect, the trace is seen as a resource to create situations of communication, deliberation and creation with visitors, rather than to be spontaneously interpreted or evaluated. The trace is involved in a process of a reasoned production regarding interaction links (Leleu-Merviel, 1997) beyond the phases of observation and collection of data (Jeanneret, 2019: 81). No editing or altering of the video recording is done when viewed by the visitor immediately after the visit. In this way, the video becomes a stimulant to “reliving” the museum visit experience. In order to identify what precisely caught the mind’s eye of the beholder, the person is interviewed directly after the visit. This is done because a video recording of multitude of gaze points is not sufficient in itself (see Figure 2, below) to indicate what precise aspect of the gaze caught the visitor’s mind’s eye. It appears that when visitors comment on their actions on the screen, they tend to divide the flux of the action into discrete units that are meaningful to them.

(Insert Figure 2)

The precise moment to interview the visitor occurs when the research team considers the visitor has sufficiently visited the museum (see the “timing of a typical REMIND session”, below). Typically, the interview room must be in a calm setting to avoid distractions and as

² *i.e.* memory that stores temporal episodes and events in terms of emotions centered around the preoccupations of a person in a given situation (cf. Tulving, 1972: 385-386).

near as possible to where the visitor used the eye-tracker so that the visiting experience be as fresh as possible for the person.

Just before the interview is about to start, the eye-tracker is removed from the visitor and the person is led to an interview room and comfortably seated in front of a monitor, for example a computer screen. The person is then asked to watch the recording second by second of his or her gaze points and recall emotions and thoughts experienced while watching the video. The interview is audio recorded with the aim of identifying the items that stimulated a visitor's verbalization (sounds, focus of the gaze, valence, *etc.* during a visit).

It is essential that such interview situation be a free-flowing spontaneous ("natural", see above) mode of expression for the visitor. This requires that researchers be disciplined and attentive to the visitor when conducting such interviews. It is thus crucial for the interviewer not to analyze the video with, or in the place of, the interviewee-visitor but, if need be, the visitor can be asked to clarify certain points, set out in a researcher's interview guide concerning a visitor's sense-making process. In line with this, visitors are asked to fill in their emotional mood on a scale -3 to +3 while commenting the video.

Within this framework, the timing of a typical REMIND session is as follows:

- | | | |
|---|--|-------------------|
| 1 | selecting and equipping a visitor | (05 – 10 minutes) |
| 2 | recording the person's actions | (30 – 60 minutes) |
| 3 | de-equipping the person and setting up the interview | (05 – 10 minutes) |
| 4 | interviewing in a simulated reliving mode | (30 – 45 minutes) |
| 5 | post-interview activities | (05 – 15 minutes) |

Total time of the interview: 90 minutes – 120 minutes

At the end of the interview, the research team has (1) visitors' eye-tracker gaze-point videos (see above, Question 1), (2) audio recordings of visitor's recalled experiences (see above, Questions 2 and 3) and (3) indicators of visitors' emotional mood based on a scale -3 to +3 (see above, Question 1). In this way the method allows a triangulation of data to make sense of a visitor's sense-making process.

Theoretically speaking, the REMIND method is based on a theory of enactivism (see above) and on a twofold assumption (Schmitt, 2018). The first assumption is that some items within the recorded eye-tracking gaze points seem meaningful to a visitor. The recorded eye-tracking gaze points offers clues that can enrich how a researcher can make sense of a visitor's meaning-based sense-making process. The second assumption is that visitors were able to verbally express what sense the visit made to them. For example, a visitor can comment on a recorded focus point of his or her own gaze on an object, and/or on a change in an emotional state at different moments of the visit. To that end, data are analyzed according to six basic components, see Table 1 (below).

(insert Table 1)

In Table 1 (above) "*Representamen*" and "Involvement in the situation" components refer primarily to interactions between the metabolic-based organic and reactive sensorimotor enactive spaces, and their differing logics. The "Expectations" component appeals to what is at stake (organic enactive space) as well as to a more deliberative cognitive space. The "Referential" and "Interpretant" components relates to the cognitive space. The "Emotion" component applies to the logic of the sensorimotor space. In this way, Table 1 (above) makes it possible to have a reasonable sense of the dynamics of visitors' actions and their (re)constructed knowledge and emotional enactive spaces. From this perspective, Table 1

(above) allows the researcher to make sense of visitors' sense-making processes, notably in the way they declare connecting up different meaningful points during their visit (Schmitt, 2016).

E-MOTION: Emotion mapping

Regular analysis of the REMIND method led to the creation of the E-MOTION method in order to identify the paths visitors take in the museum *via* the declared intensity of “well-being”³ and how this well-being can be described (Schmitt *et al.*, 2018). In this way, E-MOTION builds an emotion-based map of a visitor's path in the museum. The working hypothesis is that an emotion-based mapping of visitors' paths could guide reflections on how to organize a museum space in accordance to visitor' sense-making processes. The map has three basic features.

The first feature of the emotion-based map is that its corpus of emotions is taken from visitors' verbalizations of their experiences collected over 10 years from about 10 museums⁴ with the REMIND method. This involved about 250 interviews⁵. The verbalizations were interpreted as situated enactive utterances. The utterances were inductively extracted and categorized into “labels” such as “*I like it.*” and “*I think it's beautiful.*”. The labels were then positioned on a *Valence-Arousal Grid* of a smartphone. The positioning of labels on the

³ *i.e.* that which harnesses “psychological and physical energy to pursue valued activities, particularly activities for which the person feels ownership and motivation” (Ryan and Deci, 2018: 256)

⁴ In France, the *Musée zoologique de Strasbourg*, *Musée de l'Œuvre Notre Dame*, Strasbourg, *Le Vaisseau*, Strasbourg, *Musée d'Art moderne et contemporain*, Strasbourg, *Palais des Beaux-arts*, Lille, *Musée Bargoin*, Clermont-Ferrand, *Muséum national d'Histoire naturelle*, Paris, *Musée du Parfum*, Paris, *Muséum-Aquarium de Nancy*, and in Belgium, the *Musée du Doudou*, Mons.

⁵ see Schmitt, 2012, 2016 ; Blondeau *et al.*, 2019 ; Blondeau *et al.*, 2020 ; Lagasse *et al.*, 2020.

smartphone is dynamic and stabilizes itself automatically with visitor use. While the corpus of emotions does not include all possible emotions experienced in a museum, a significant part of the declared emotions of visitors questioned are present on the *Valence-Arousal Grid*.

The second feature of the emotion-based map is based on what about 110 museum visitors indicated as their emotions on a *Valence-Arousal Grid* screen while standing in front of exhibits (see Figure 3, below). Each time visitors indicated an emotion, a pop-up feature appeared with a list of words – that had been used by previous visitors – from which to choose.

(Insert Figure 3)

The third feature of the emotion-based map is that in order to identify the paths of visitors (see Figure 4, below), a smartphone was used with a small 45° angle mirror attachment in front of the camera of the smartphone. In this way, each time a visitor indicated an emotion, the smartphone automatically took pictures of where the person was located in the museum. This technique enabled researchers to locate the visitor in the museum.

(Insert Figure 4)

In a nutshell, the E-MOTION method allows museum visitors to indicate the intensity of their emotions and the location where emotions were expressed during a visit. In this way the method allows different visitors in front of a same artefact, piece of art, exhibit or device, to leave a real time trace of their declared emotions (for a discussion on different methods of explicating emotions see Thébault *et al.*, in press).

Results

The findings of our work fall into two broad groups. First, features of a museum visit that lead to a process, called “sense-wrecking” (Labour, 2016: 190-192). Second, features identified as conducive to a sense-making process (Labour, 2016: 55).

Sense-wrecking

The REMIND and E-MOTION methods have highlighted items that we call “irritants”. Such irritants drain the energy of visitors and distract them from appreciating the full museum experience, such as the designers of the museum visit would have wished.

Irritants are seen as “perceptual noises” that can lead visitors to disengage from a positive experience of the museum. If irritants are prevalent, a sense-wrecking⁶ process is activated when the irritants become so annoying or unfathomable that they can lead to disengagement from the museum experience. Examples, of sense-wrecking features are:

- Physical or ergonomic irritants. As Benjamin Gilman (1916) showed, exhibits are not always displayed at a « reasonable » height. The size of the font of exhibit labels can be too small or can be positioned too low, too high or in places that are not easy to find or read. People with back problems cannot straighten up easily after having bent down to read the label of a display. Windows or lighting that reflect on the glass surfaces of showcases or varnish of a painting do not present the exhibit in a most favorable way. Too much contrast in the lighting of spaces, not enough light on texts or certain spaces, or lack of directional signs to seats for visitors, if any exist, to admire exhibits.

⁶ “wreck” alludes to something in movement (like a cognitive process) destroyed in its progress by an obstacle.

- Cognitive irritants. These include the absence of information, as shown by Edward Robinson (1928), with labels written in incomprehensible or difficult to understand language, awkward ergonomics of mediation (*e.g.* electronic) devices, content incommodiously laid out (*e.g.* inappropriate scenarios), badly explained (*e.g.* highly technical details), or seemingly nonsensical (*e.g.* incongruous). The most unpleasant irritant, however, is the "out of order" sign that tends to make visitors feel robbed of their museum experience.

Beyond the physical and cognitive discomfort studied by Gilman and Robinson (1928), we observed that the repetition of "irritants" leads to a form of visitor disengagement. Indeed, it is not an isolated "irritant" that can disrupt the visit, but rather the succession of irritants that discourage visitors to make efforts of perception, reading, and moving around. In the case of interactive devices, it was noted that visitors could experience a disagreeable sense of being "stupid" when failing to interact with games or digital cartels (Schmitt, 2015, Blondeau *et al.*, 2020).

Sense-making

Table 1 (above) categorizes the data collected from visitors in terms of artefacts, works of art, devices, use of space, *etc.* on display in the museum. One of the results of the process is an agreeable sense of well-being each time a visitor makes sense of a work of art or a device. To illustrate this, we can take visitors' sense-making processes in a museum about the Middle Ages.

The museum in question had a small black room, with adjacent to it a very large and white room with major sculptures. In a study we conducted, we sought to make sense about

why about one third of visitors preferred the small dark room – which the museum’s curator considered as not particularly interesting – more than the larger white room with its beautiful sculptures. Our findings revealed that certain visitors had a perception of the Middle Ages as a dark and violent period of history and, because of this, they appreciated the small, black room because it echoed their pre-conceptions of the oppressive mood of those times. The visitors were thus disappointed by the big, white room because it clashed with their preconceptions of the “darkness” of the Middle Ages. Following our findings, the small room was then painted white. This changed the way in which visitors made sense of their visit. With both rooms now being white, all visitors appreciated the original big white room. Visitors did not feel a discordance between the two rooms. This type of finding, led us to conclude that when visitors enter a museum, a science center or such like, they expect there to be meaningful things to be experienced. They expect to encounter meaningful intrigues and unknown items. When intrigues are grappled with and when it all makes resonating sense (cf. Labour, 2014: 291-294), the person experiences an agreeable sense of well-being, as witnessed in the example of the museum about the two rooms about the Middle Ages.

More broadly, the results of our studies have identified six domains of sense-making. It turns out that they appear to echo, in part, aspects of the multiple intelligences of Howard Gardner (1993). The matching of Gardner (1993) to our enactive approach is necessarily approximate. Nevertheless, we do so in order to advance graspable indications of what can be involved in visitors’ sense-making processes. With this in mind, Gardner (1993: 278) has at the

core of his system an “information-processing device” enabling, in this case, visitors to adopt one, or a combination, of intelligences⁷ at different moments of their visit, in the form of:

1. ... a *cognitive and corporeal* link with the world. This would seem to correspond to a more “linguistic intelligence” (Gardner, 1993: 73-77) given that language “straddles the boundary between mind and body” (Taylor, 2016: 333). In enactive terms, the mode would correspond to a deliberative cognitive and organic spaces. In our studies, this link referred to the meaningfulness of labels and captions for visitors in terms of their expectations and background knowledge.
2. ... a *textual* mode where individuals enjoy reading words and sentences for their precision of meaning and also for their lyrical features. This mode would be close to “musical intelligence” (Gardner, 1993: 104, 127) with its aesthetic patterns of sense, pitch and rhythm. The enactive logic of cognitive appreciation and bodily reactions to the “music” of a series of words would seem the most apt here. In our studies, such elements were identified as the pleasure of reading posters and other relatively extensive details about exhibits, beyond a summary description found in some exhibit labels.
3. ... a preference to *organise, classify* and *categorise* things. This would be a form of “spatial intelligence” that grows out of visual observations (Gardner, 1993: 174). The enactive spaces of sensorimotor and cognition would seem to apply here. In our studies, such preference can be found in individuals’ sense-making processes in what they classified as being relevant, or not, in solving different intrigues during the visit.

⁷ *i.e.* sets of know-how, procedures for doing things (Gardner, 1993: 69).

4. ... a focus on *logical relations* between artefacts and texts. Gardner (1993: 129) could have classified this as a “logical-mathematical intelligence”. This category would be strongly linked to a high “cognitive” space of an enactive experience. In our studies, this focus seems to appear most frequently among visitors who need to establish cause and effect relationships in order to relate to things, to understand them, or even, how they rationally plan the itinerary of their visit.
5. ... a *bodily-kinesthetic* awareness, for example people who touch works of art, even when it is forbidden. In Gardner’s (1993: 206) logic, this would describe a capacity to handle objects and controlling bodily motions. This register would seem close to organic and sensorimotor enactive spaces. In our studies, this type of awareness was often related to the need to connect with things by touching or smelling works of art in museums or experimenting with interactive devices to understand the world.
6. ... *emotions* and *empathy*. For example, when visitors look at a sculpture showing suffering, they experience the emotion of suffering. Gardner (1993: 274-276) could have linked this mode to his broad notion of “personal intelligence”. This can be found in an enactive sensorimotor space, which includes emotions. In our studies, empathy and emotions are common. They are sometimes found in the initial visiting experience and are then rationalized: "I love the blue in this painting; in fact, I love blue in general" or "I was afraid of that bug; I hate spiders". This can create strong meaning and, consequently, sense-making links with exhibits, as we have seen in the studies of the E-MOTION method and its *Valence-Arousal Grid*.

It is important to point out that multiple intelligences and the generic categories of Gardner (1993) are functionally interdependent. As Gardner (1993: 278) points out that normally “the intelligences actually interact with, and build upon, one another from the

beginning of life”. Gardner (1993: 104-276) also points out the importance of thinking in terms of “more encompassing categories – the individual’s experiences, his frames of reference, his means of sense-making, his overall world view” (Gardner, 1993: 298).

Discussion

In going beyond a museum experience based essentially on reading labels and captions, a sense-making design approach seeks to help museum designers and visitors better make sense of each other’s preoccupations. Firstly, according to museum professionals themselves, understanding in detail visitors’ experiences, questions and transforms the way in which they conduct their profession (Schmitt, 2018: 2). In this context it must emphasized that many museum professionals consider feedback from visitors as items of reflections, rather than compellingly prescriptions. Secondly, the “grammar of visitor experience” inferred from the research leads to a frame of questioning, critical understanding and action for museum professionals (Blondeau *et al.*, 2020). The building blocks of such a “grammar” of visitors’ experience – identified, for example by their characterization of the exhibition space and its “enticements”, their engagement, resolution, and sharing – reinforce the development of the design of visitor-centered displays based on grassroots research studies.

In this light, Di Paolo *et al.*, (2018: 331) call “participatory sense-making” the way people come to understand each other – in this case museum visitors and museum professionals – by engaging in coordination patterns, breakdowns and recoveries during social encounters. A participatory sense-making approach implies that museums should no longer be seen as spaces of one-way transmission from all-knowing museum professionals to knowledge-impooverished visitors seeking to be “educated”. To that end, museum professionals-visitors interactions, through various feedback modes, can be done to identify visitors’ preferences linked to what they are likely to consider as “meaningful”, or not. This echoes the propositions

of Nina Simon (2010) from whom: “participatory techniques are design strategies that have specific value and can be applied in cultural institutions to powerful effect”.

A starting point for participatory sense-making design would be to examine what is afforded to visitors using Gardner’s (1993: 276) interacting *Object-related*, *Communicative relations* and *Biographical existence* categories, in which different intelligences can be configured. Each of the categories make different demands on visitors depending on which set of “intelligence” is dominant at different moments in the visit. The challenge for museum professionals, like museum designers, is not going from one extreme, of overemphasizing one single sense-making mode (e.g. a textual register), to another extreme by being so multi-modal that it overwhelms visitors. This implies that designers could highlight the categories in various degrees, such that not all “six intelligences” systematically engage the visitor all at once, all the time. If this were to be so, over engaging visitors could exhaust many of them and, consequently, reduce visitors’ sense of well-being and lead to “sense-wrecking”. With this in mind, the E-MOTION method makes it possible to establish which of the three categories of Gardner (1993: 276) appear to attract visitors at different moments of their visit. For instance in a given space, the visitor attraction could be that of a crowd gathered around an artefact, as a form of non-verbal participatory sense-making (*Communicative relations* category). With this in mind, designers could also include moments for explicit participatory sense-making in an active way allowing visitors to make sense collectively (e.g. leaving a message on a big white board) of their visit.

In short, museum designers have the challenge not only of encouraging sense-making but also of avoiding sense-wrecking, via the disengaging effects of irritating features. To avoid sense-wrecking, it is necessary to reinforce a system of observation (e.g. from the museum personnel) and feedback (e.g. quick questionnaires) in order to identify irritants. However, if

limited resources do not allow for a correction of irritants (e.g. a re-writing of captions and labels), then visitors can be encouraged to spend more time at certain displays away from elements that may cause sense-wrecking. To that end, the stimulated recall instrumented methods of REMIND and E-MOTION identify visitors' sense-making/wrecking processes based on the perceived meaningfulness, or not, of textual, cognitive and corporeal, bodily-kinesthetic messages in the overall visitor experience.

The quality of the results obtained from the REMIND method depends on the participants' verbal skills in describing an activity, emotions and thoughts. The Method also depends on the researchers' ability to empathize with visitors' experience and training in conducting this type of semi-guided interviews. For instance, when asking for clarification, the interviewer must not offer suggestions to the interviewee-visitor. Then, there is the issue of how many surveys with the REMIND method does one need for the results to be sufficiently "valid"? It must be noted that the REMIND method is not conducted in a laboratory situation, where the term "validity" has clearly defined boundaries. The essential objective of the REMIND method is for it to be used in varied, grassroots *in situ* situations. Notwithstanding this last point, rigor and coherence is needed through clearly established protocols. On this point, the work of Griffin and Hauser (1993) show that a dozen interviews with a homogeneous segment of people are sufficient to identify about 80% of significant data. In the case of interaction design, such as digital mediation devices, Lewis (1994: 17) established that five carefully chosen interviews can be sufficient to identify 80% of the major problems. Over the years we have found that documenting about a dozen visitors (in our case with similar age, national culture, ability to interact and verbalize) was sufficient to highlight the main difficulties, and identify visitors' well-being and sense-making/wrecking processes.

Conclusion

We began our paper by noting that museum studies tended not to engage with visitors' sense-making processes onsite. This led us to ask how we could better identify the situated and embodied experience of museum visitors. Bearing this question in mind, our studies over the last 10 years have used the enactive paradigm to improve museum design. This has been based on the REMIND and E-MOTION methods aimed at identifying the dynamics of a visitors' lived experiences. A major contribution of the two methods to museum professionals is that they offer a new perspective on making sense of visitors' sense-making/wrecking processes. We argue that meaning-making is a key element in a such sense-making process associated with an experience of well-being. The link between well-being and meaning-making can produce a virtuous circle when exhibitions focus on situated and varied enactive experiences at different moments of a visitor's visit. Given this, we offer two essential recommendations: (1) the importance of setting up structures to encourage *participatory sense-making processes* and (2) the necessity of examining elements that create well-being or, at the very least, reducing elements that impede a *positive sense-making experiences* of visiting a museum.

Taylor (2016: 87) states that when one tries to make sense of what goes on in a situation "a combination would appear to take place according to rules, which we might call grammatical and syntactical". A better understanding of a "grammar" of onsite museum experience could lead to improving enactive-based design with appropriate structure, tools and techniques. Such a grammar would need, however, to identify the porous frontiers and interactions involving emotions, feelings and belief systems on which visitor and museum designer preferences are invariably based. Our research approach and techniques open up innovative perspectives of identifying these preferences and instituting emotions as soft data that can be articulated with semi-structured or hard data harvested from a museum visit. In this light, heightened enactive

experiences through tools, such as Augmented Reality, in museums can be adapted to identify about how visitors make sense of their visit. Such bottom-up feedback can be considered as points of critical reflection for museum professionals rather than “quasi-dictatorial” prescriptions. It is hoped that such approaches encourages more onsite research into visitors’ sense-making processes without falling prey to the impulsive desires of some visitors, nor to the reified desiderata of interested parties.

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Tables with captions

Analysis of the self-reported data	
Components	What components are identified?
Representamen	What strikes the visitor at a given moment?
Involvement in the situation	How does the visitor relate to the <i>Representamens</i> at a given moment?
Expectations	What are the expectations of the visitor at a given moment?
Referential	What knowledge is called upon by the visitor at a given moment?
Interpretant	What knowledge does the visitor (re)construct at a given moment?
Emotion	What is the emotional state of the visitor at a given moment?

Table 1. Analysis of a visitor's situated and embodied utterances

Figures



Figure 1. On the left, a visitor wears an eye tracker, on the right, a first-person video recording shows the gaze point focus, note the dark circle on the middle left of the painting.



Figure 2. On the left, a person wears a side mini-camera near the ear. On the right, a person views her first-person video in order to recall and explain her actions during the visit.



Figure 3. Visitors equipped with an E-MOTION device at the *Palais de Beaux-Arts* in Lille (France).

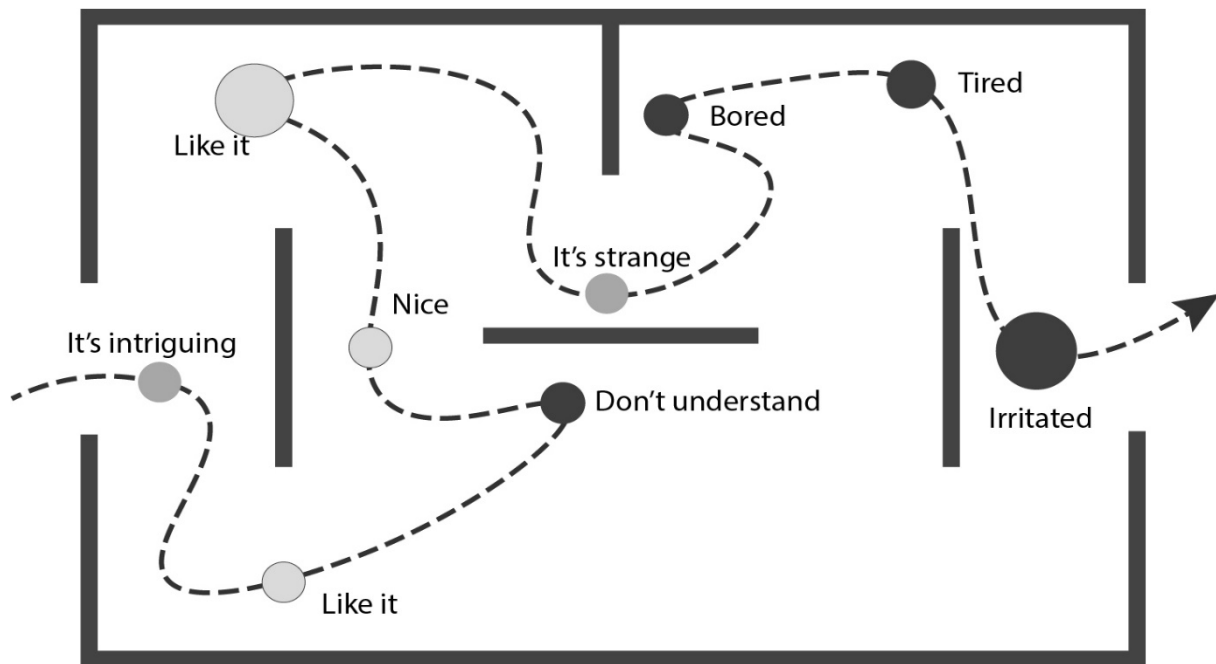


Figure 4. The E-MOTION system identifies a visitor's path and their declared emotions.

List of figure

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