Conversations with Art:

The use of chatbots in museums

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Abstract

Interactivity in museums and art exhibitions is a relevant topic since museums face issues related to representation, participation, and education to the most diverse publics. Visitors cannot be perceived anymore as passive recipients of knowledge, but as active actors engaged in the process of interpretation and signification. In this scenario, there is an invisible gap between visitors and collections in terms of engagement and information in museums, what opens opportunities in terms of technology adoption in an attempt to compensate understanding and exploration of collections This research paper has the aim to discuss the relations of text-image and artworks in museums as well as the role of technologies in the relationship between visitors and collection, with special focus on chatbots. Based on a discussion involving concepts such as the *aura*, as defined by Walter Benjamin, *anchorage*, as defined by Roland Barthes, Umberto Eco's *double coding* and *levels of reading*, and museum ways communicate within exhibitions, a reflection is made about technology adoption in museums and the way technology should enhance the visitor experience. Examples of interactive technologies adopted in specific exhibitions or included in the entire museum experience are exemplified, and in combination with the discussion of text-image and technology, an exhibition at the National Gallery of Ireland was chosen as the case study to suggest an approach for chatbot adoption in museums. The relevance of this study relies on the fact that the discussion concerns technology adoption not only as means of entertainment and interactivity but mainly as a tool to highlight the collection and enhance interpretation.

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List of Abbreviations

AI – Artificial Intelligence

API – Application Programming Interface

AR – Augmented Reality

MR – Mixed Reality

NFC – Near Field Communication

NPL – Natural Language Processing

QR Code – Quick Response Code

TUI – Tangible User Interfaces (TUI)

VR – Virtual Reality

VUI – Voice User Interfaces

UI – User Interaction

Introduction

Interactivity in museums and art exhibitions has been studied for many years. Museums nowadays face questions related to representation, participation and civic responsibility to educate and communicate with the most diverse publics. Visitors in the contemporary museum cannot be seen anymore as passive recipients, but as active actors engaged in the process of meaning creation (Kidd, 2014). Visitors desire interactive and participatory exhibitions (Serell, 2015) and there are many ways that interaction with collections can be made, such as through labels, brochures, and audio guides. The few details provided by wall captions, according to Templeton (2011, p. 1), make 'it difficult for non-expert visitors to learn about an artifact, and to find its relevance to other artifacts or to themselves'. Brochures and audio-guides, despite richer in terms of information, have a certain limit on how the visitor can explore and understand an artefact through them (Templeton, 2011). The interactivity with audio guides and multimedia guides, for example, is limited and still related to a museum monologue than user-centred information dialogue (Li and Liew, 2015). Then, according to Li and Liew (2015), there is an invisible gap between visitors' engagement and collection information in museums. Such gap opens opportunities related to technology adoption in an attempt to compensate visitors understanding and exploration of collections (Li and Liew, 2015).

The interest in creating new forms of participation in museums and galleries (Lehn, Heath and Hindmarsh, 2005) opens new opportunities for the usage of digital technologies in those places to engage audiences and increase experience while observing art collections. The growing rate of smartphone users, directly related to the shift from immobile hardware to portable devices adoption (Li and Liew, 2015; Wicks, 2015), is a new alternative to participation, interactivity and to enhance the visitor's creation of meaning while in an exhibition (Lehn, Heath and Hindmarsh, 2005). Mobile guides offer an unlimited amount of information since they can display digital-curated information as well as direct the user to external links (Templeton, 2011). The mobile guide can also contain different learning options tailored to different categories of visitors (Templeton, 2011).

An emerging area of technology adoption in museums is conversational interfaces, such as chatbots. According to Christensen (2011), it is in the interaction between exhibition and visitor that meaning is created within the museum experience. Unlike earlier ways of providing information on exhibited works at a museum, such as wall captions and audio guides, conversational interfaces can enhance the visitor experience by providing a dialogue instead of a curated monologue. Due to the conversational nature of a chatbot, this research aims to discuss

the adoption of chatbots as an onsite interface to bridge the gap between visitors and collections mainly in terms of meaning creation.

Through the experience provided with conversational interfaces, the cultural sector has the opportunity to create new ways of storytelling within the exhibition and also help the user to achieve a remarkable experience while creating meaning and interacting with the objects and whole collections. Therefore, this paper aims to discuss the possibilities that the usage of chatbots can bring to enhance meaning making and visitors experience within museums. The discussion about experience and interactivity in museums already exists, but as Kidd (2014) points out, little is known about how such media impact upon meaning-making in museums. Due to this, the approach of this work will be based on semiotics and museum technology adoption. The relevance of such study resides in the integration of fields that can complement each other in an attempt to enhance the visitor experience and participation in museums.

The discussion that follows is about the relations of text-image and the work of art in museums as well as the role of technologies in the relationship between visitor and collection. The first chapter discusses critical approaches to the relation of text-image and work of art. The *aura* of artworks as defined by Walter Benjamin, as well as the shift of perception of art objects since the advent of mass production, are explored. The concept of *anchorage* from Roland Barthes and meaning-making through the relationship of image-text will be discussed as well as Umberto Eco's *levels of reading*. Chapter two discusses technology adoption in museums and the aura within a context of digital reality. An overview of early ways of communicating in museums, such as wall captions and labels and the initial technologies adopted in museums, such as audio and multimedia guides is also done. Based on those well-established communication practices, a reflection is made about new technologies in museums. Finally, chatbots are conceptualised and some of its usage in museums are exemplified. Chapter three brings some cases of breakthrough technologies being used in museums to enhance experience and learning and applies the knowledge acquired in the previous sections and the cases by suggesting an approach for chatbots in a given museum exhibition.

1. Chapter One: Critical approaches to text-image relations and the work of art

Before addressing the use of new technologies in museums, it is important to understand how it is a continuation of earlier practices related to the textual/discursive enframing of works of art. Therefore, we can draw on earlier critical reflection on art and text relations, in order to clarify our analysis and better determine what is genuinely new in museum interactivity and what is a continuation of earlier practices. Technology adoption in museums should be conceived as a tool to properly put together two contexts: the collection and the visitor. The discussion below is about text-image relations and the work of art.

1.1. The aura of the work of art

At the beginning of the nineteenth century, technological developments allowed the automatized creation of images through both photography and movie camera (Manovich, 2001). Due to the introduction of film and photography, a shift of perception was noticed not only related to art itself but to the way society was organised in the origins of the twentieth century (Benjamin, 1935). Mass production led to mass standardization, and such differences in terms of consumption and production profoundly changed society for the well-known capitalism model. Based on that, Walter Benjamin in *The Work of Art in the Age of Mechanical Reproduction* criticises the effects of modern age in the perception of artworks due to the mechanical reproduction that allowed the development of photography and, consequently, the film.

For Benjamin, mechanical reproduction resulted in the loss of artworks' aura. Aura is defined by Benjamin as the authority of the artwork, that is, its originality, authenticity, uniqueness, and presence in time and space. Despite artworks were always reproducible, 'the mechanical reproduction […], however, represented something new' (Benjamin, 1935, p. 2), while an original art piece has its authority preserved, the reproduced one has not. So, the aura is not preserved when the artwork is mechanically reproduced (Tate Modern, 2018).

> Even the most perfect reproduction of a work of art is lacking in one element: its presence in time and space, its unique existence at the place where it happens to be. This unique existence of the work of art determined the history to which it was subject throughout the time of its existence. This includes the changes which it may have suffered in physical condition over the years as well as the various changes in its ownership. The traces of the first can be revealed only by chemical or physical analyzes which it is impossible to perform on a reproduction; changes of ownership are subject to a tradition which must be traced from the situation of the original (Benjamin, 1935, p. 3).

Benjamin argues that authenticity disappears in the reproducible art object and, at the same time, it depreciates the uniqueness of the original (Robinson, 2013). Since Aura is directly related to authenticity, when the aura is lost, the authority is lost as well. Benjamin noticed that the decay in the aura perception could be traced to social changes, mass production and the wishes of mass audiences to acquire works of art bridged the gap between original and copy (Christensen, 2011).

At the same time that Benjamin criticises the loss of aura, he brings attention to a positive aspect, the potential for diverse interpretations that an artwork can have. Mechanical reproduction emancipated the work of art from its ritualistic function to exhibition value, photography and film being the best examples of art made for exhibition (Benjamin, 1935). Art could be then used also for politics (Benjamin, 1935), and have its meaning reconstructed, recomposed, and reused, contradicting the early ritualistic function (Robinson, 2013). Finally, according to the author, mechanical reproduction made also obligatory the use of captions, having 'an altogether different character than the title of a painting' (Benjamin, 1935, p. 8).

In movies, for example, Benjamin affirms that just like captions direct the meaning of a text, the sequence of pictures creates meaning for the viewer. Although, the author says that while a new way of appreciating art has been created, a new mode of distraction emerged as well. While the camera intervention guides the viewer's eyes in a way that is impossible for a painting, it is done in an autocratic manner. Instead of freedom to contemplate every aspect desired, the eye of the spectator is directed to specific parts of the screen. So, while a painting can be contemplated, the frame cannot. While painting requires concentration, the technique of movies was to the masses means of distraction (Benjamin, 1935). In this sense, the audience becomes actually alienated, and the work of art loses its revolutionary power (Robinson, 2013). That is why the author affirms that the relationship of masses to art has changed due to the means of reproduction.

1.2.   Text, Image and the Reader

The shift in artworks perception has also impacted into the dynamics in which people react and interact with art in museums (Benjamin, 1935). Christensen (2011) argues that signification of art objects in museums moved from the object's historical context towards the visitor's contemporary context.

> When the audience experiences the work of art detached and removed from its original time and place, its capability to be perceived and understood has dwindled. The audience will not be able to place it within the functional context that it originally belonged to, or as Benjamin suggests, it is detached from the domain of tradition (Christensen, 2011, p. 11).

Since the basic nature of museums relies on the process of interaction and museums are mediated spaces, the communication within such spaces supports the production of signs and messages. The communication process, either verbal and non-verbal is a relevant part of the interaction within museums since through it meanings are generated (Horta, 1992, p.8). Over the museum exhibitions, the signs '[…] will be defined by the use of different "Rhetorics" (Horta, 1992, p.8). Rhetoric means, according to Roland-Barthes, 'constructing and arranging signs in order to convince and to move the audience' (Barthes, 1988 p, 53 *apud* Horta, 1992, p.8).

Christensen (2011, p. 7) affirms that 'the authentic and auratic exhibited object in museums enter into a dialogue with surrounding "paratexts[1]" and the paratexts anchor and change the meaning of the exhibited object in the museum context'. According to Christensen (2011, p. 17), paratexts '[…] are texts that are placed around the main text and which add extra meaning to it' that can be of different types: peritexts, epitexts, autographic and allographic. As Christensen explains and exemplifies, peritexts, as the name suggests, are peripheral or secondary elements that surround the object, such as a book's title in its cover; epitexts go beyond the main text, that is, the hypotext, as a review of a book in a newspaper; autographic paratexts are texts generated by the producer of the main text, such as director's commentary on DVD; finally, allographic is a text produced by other than the main text producer, such as a review in a magazine of a film. The author affirms that signification is contracted through the connection of object, its condition, its original context, the way it is curated by the museum and finally the dialogue between visitor and museum, and since 'education and communication represent the foundation of the post-photographic museum' (Christensen, 2011, p. 15), the interest shifted from the object itself to the museum paratext.

The Paratext concept roots, according to Christensen, can be traced to the concept of anchorage from Roland Barthes. Anchorage is defined by Barthes as the complementary relationship between text and image (Barthes, 1977). Once images are polysemous, that is, an image can point to multiple meanings, the text, through a denotative anchorage, can direct the viewer to interpretation and sense of meaning (Barthes, 1977, p. 275). Therefore, the text fixes or reinforces the meaning of the observed object, and then both text and meaning can interact trough anchorage. Saying that, the meaning of a museum's object is related to the way it is displayed, curated and the way the dialogue with the visitor is established (Christensen, 2011).

According to Horta (1992), in Umberto Eco's view, meaning attribution is not defined based on things themselves, but actually through a mental work of sign production and

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[1] The concept of paratext used by Christensen (2011) has its origins in the literary studies, more specifically in the book *Pararext: Thresholds of Interpretation* from Gerard Gennette

interpretation. Since museums need to be open to as many people as possible, the benefit of creating texts that appeal to both experts and the public at large is obvious. The concepts of "double coding" and multiple "levels of reading" of Umberto Eco are relevant to understand how museums can create contents that address both the general and the specialist audiences at once.

Double coding, according to Eco (2006), is a term originated from postmodern architecture. Coined by Charles Jencks[2], double coding has the ability to speak with two levels of observers at once using high and popular codes for each of them: 'to other architects and a concerned minority who care about specifically architectural meanings, and to the public at large, or the local inhabitants, who care about other issues concerned with comfort, traditional building and a way of life' (Jencks, 1978 p. 6 *apud* Eco, 2006, p. 214). Eco (2006) affirms that double coding can be found in many different fields other than architecture, such as music, advertisements, and literature. Double coding in literature context, is related to the implicit metanarrative and the way a reader can notice or not references and ironies within the text. It means a text 'can be read in a naive way, without appreciating the intertextual references, or it can be read in the full awareness of them, or at least on the conviction that one has to go looking for them' (Eco, 2006, p. 219). For the author, reader, and author cooperate in the interpretation of a text, that can be read, as postulated by Eco, in two ways: naively or critically (Sallis, 1986). Eco also states that texts such as narratives tend to construct two modal readers: the first level reader or semantic reader and the second level reader, called semiotic or aesthetic reader. While the first-level wants to know what happens in the text, the second-level wants to know how it is been narrated. It is possible to recognise in his *Novel The name of the Rose* two different characters that are actually playing the role of the two types of readers (Sallis, 1986).

When discussing the role of the reader, Eco affirms that the reader can have an active role of interpretation, since the signs within the text can be infinitely interpretable, and consequently, texts can bring something new to the reader.

> The reader plays an active role in textual interpretation because signs are structured according to an inferential model. […] Texts can say more than one supposes, they can always say something new, precisely because signs are the starting point of a process of interpretation which leads to an infinite series of progressive consequences (Eco, 1981, p. 44).

Despite the text carries infinite interpretations and the reader is invited to interpret it in diverse ways, the invitation is not for indiscriminate participation since the author offers the reader a work to be completed (Primier, 2013).

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[2] Charles A. Jencks, *The Language of Post-Modern Architecture* (Wisbech: Balding and Mansell, 1976).

As the reader and the author cooperate in the discovery of meanings and significations in a text, the role of the observer and the artist in relation to an artwork is mediated by text. Museums have narratives by which a connection is built with the visitor as well as the understanding of the objects and the story that is being told. The delivery of the story is done typically by verbal and textual outputs (Vassos et al, 2016), and also photographic technologies appear in various forms of curation in museums. As pointed by Christensen, in exhibitions, the use of photography can be both digital or analogue, onsite or online, static or interactive-participatory, wherein, the text is present in 'a montage of printed or spoken verbal text and other graphic elements in a layout system' Christensen (2011, p. 12). The paratextual anchorage of an art piece is so powerful that it can completely change the way it is going to be interpreted and understand by the observer (Christensen, 2011). For example, Christensen (2011) illustrates a carved chair from the 17th century that was being exhibited at the Victoria and Albert Museum surrounded by paratexts that changed it signification to a forgery object.

It is in the interplay between main text, or hypotext, paratexts and the interaction with the device that meaning is created, and other common means of paratext communication in museums are audio guides (Christensen, 2011). The visitor's creation of meaning is related to the usage of digital exhibition technologies, that engage the audience creation of signification, what can highly increase the potential for viewer participation. Thereby, the usage of narratives across the application of digital technologies resulted in new modes of participation (Christensen, 2011).

To summarise, artworks possess an auratic characteristic, related to its authority, history, tradition, and uniqueness. Exhibitions communicate with visitors through signs that are constructed and arranged to convey meaning. The artworks are surrounded by paratexts that anchor its meaning based on the way the exhibition is curated. Double coding and levels of reading are a beneficial strategy for museums to establish a conversation with different audiences at once. The reader when assuming an active role of interpretation is able to interpret the text not only in the way the author desires but also is able in new ways. Finally, technology is a medium through which museums can anchorage meaning and enhance interpretation.

More than suggesting the usage of digital technologies based on the simplistic enthusiasm with its novelty, technology need to contribute to the educational process, that is, the experience of meaning creation and participation in museums. Based on the previous discussion, the next two chapters will outline technology adoption within museums as well the aura in the digital paradigm, museum communication and the role that new technologies can play to enhance the museum experience. Finally, chatbots within museum exhibitions is addressed.

2. Chapter Two: Contextualizing technology adoption in museums

Technologies are now affordable and accessible, helping broader technology adoption in people life's (Avedisian, 2015). What is unquestionable is that since computerization and hypermedia, the relationship between audiences and artworks has become multiplatform. Installations and digital interactive technologies are used to help with engagement and education processes of visitors with both art pieces and the exhibition as a whole (Christensen, 2011).

> The museum experience includes a negotiation between the visitor's own present world and the world of the exhibited objects. The amount of participation allowed by the curators can determine how strong this interplay or negotiation becomes, and also to what extent the exhibited object is treated as an autonomous entity. It is here that exhibition technologies can be a manifestation of the need for negotiation (Christensen, 2011, p. 26).

Technology usage as means of curation for museums is not new. The *Boydell Shakespeare Gallery*, that opened in London in the year of 1789, for example, reproduced the images displayed through the technique of stipple engraving to create a new relationship between artwork and audience (Christensen, 2011). Nowadays, interaction and participation have evolved in many ways, and it is enhanced with interactive digital technologies (Christensen, 2011).

The Internet and computer technologies changed the dynamics of society profoundly. Early media logics was based on mass standardization, whereas new media information society follows the logic of individual customization (Manovich, 2001). Furthermore, one faces an overabundance of all sorts of information, choices, and opinions. 'The logic of new media fits the logic of the post-industrial society, which values individuality over conformity' (Manovich, 2001, p.41). And the desire for individuality and customization can be noticed even in the cultural world, that is also influenced by the computer world, in a process of cultural reconceptualization (Manovich, 2001). Similarly, Kidd (2014) affirms that the way text and cultural artefacts are experienced is being remodelled mainly due to new technologies, and other aspects such as the usage of non-linear narratives and the search for immersive experiences.

Engaging narrative creates 'direct conversations between the visitors and the characters, places, and items of the exhibition can contribute to building an emotional connection and a deeper understanding of the artefacts and their stories' (Vassos *et. al*, 2016, p. 2). Although, as Christensen (2011) points out, it is necessary to critically place technology as a tool in the relationship of text-image.

According to Yijun (2017), there are different approaches that address technology adoption in museums. However, some of them focus only on the visitor experience and neglect

the effects of digitisation on art objects, namely the sociotechnical and the management studies. The techno-determinism of such approaches forget the fact that museum experience is not only for entertainment, but museums by nature are places of knowledge, culture, and learning (Yijun, 2017) rather than spectacle.

2.1.   The aura and the digital era

Manovich when comparing the differences between old and new media highlights some aspects such as digitalization, copy and interaction, that relates to the aura of art objects as well as the relationship visitor-artwork. Digitisation, for example, involves loss of information if compared to analogue representation, because of the fixed amount of information that can be contained; copy, with digitally encoded media, means that the image can be copied 'endlessly without degradation' (Manovich, 200, p.49); and interaction, a characteristic of media objects, and 'in the process of interaction the user can choose which elements to display or which paths to follow, thus generating a unique work. In this way, the user becomes the co-author of the work' (Manovich, 200, p.49). Interactivity, according to the author, is a characteristic of art, new media, however, pushed new cognitive and physical demands on the observer, turning some types of art also participatory:

> All classical, and even more so modern, art is "interactive" in a number of ways. Ellipses in
> literary narration, missing details of objects in visual art, and other representational "shortcuts"
> require the user to fill in missing information. Theater and painting also rely on techniques of
> staging and composition to orchestrate the viewer's attention over time, requiring her to focus on
> different parts of the display. With sculpture and architecture, the viewer has to move her whole
> body to experience the spatial structure. Modern media and art pushed each of these techniques
> further, placing new cognitive and physical demands on the viewer (Manovich, 2001, p. 56).

Manovich (2001) affirms that new media is also related to a new stage of society where the interest is not only accessing but reusing and creating new media objects, a characteristic intrinsically related to automation. So, if old media involved one creator manually compositing an artwork, new media is characterised by many different versions. But how does the discussion of Walter Benjamin about aura can be understood in the digital paradigm?

If the line between original and copy started to be blurred, also the distinction between real and simulation, for critic theorists such as Baudrillard, started to be damaged with mass consumption, and the proliferation of copies not only affected the artworks but reality (Yijun, 2017). In his work *Simulacra and Simulation*, Baudrillard discusses simulacra, where original and copy are no longer differentiated; and simulation, that is the mimic of something. Baudrillard (1994) describes three orders of simulacra, in the first, the copied object still

represents reality; in the second order, such as the case of photography, the distinction between original and copy is lost; and the third, the simulacra generates meanings by itself, masking the 'the absence of reality' (Yijun, 2017, p. 24). Finally, as postulated by Baudrillard, the real without origin, that is, with notion of reality abolished, becomes hyperreal, being absorbed by the masses without any reflection upon it (Yijun, 2017). By joining this view with Benjamin's, it can be noticed that when the notion of copy and original cannot be distinguished, the original loses its point of reference. In this sense, both Benjamin and Baudrillard perceive that the material object is threatened to lose its auratic, iconic and ritualistic qualities (Cameron, 2007).

Despite the concerns with copy and the decay of artworks (Benjamin, 1935), some believe that through copy the art object does not suffer from auratic decay. Walsh (2007) understands that photography fostered a new kind of art museum, changing the way that artworks were treated, displayed, and interpreted for the audiences. The author argues that artworks reproduction does not damage the original's aura, on the contrary, reproduction creates it. Walsh (2007) defends that mass production created the value of its opposite, the handmade object, and the more reproduced an artwork is, the more important it becomes. Similarly, Latour and Lowe (2001) believe that reproduction actually reveals the importance of the real artwork and take into consideration the quality of the reproduction (Yijun, 2017). According to Cameron (2007), with the advent of postmodernism and poststructuralism, objects and their meaning became more polysemous, and since digital media is a cultural construct, digital objects can be seen in new ways. Although technology can bridge a gap and keep closer art to those who cannot contemplate it in presence, Yijun (2007) considers that digitalization cannot replace material objects nor the environment of the museum (Yijun, 2017). As Walsh (2007) affirms, the digital world is leading museums to new directions as photography did in the past, and new technologies are the new art medium to interpret and publicise art. And as the medium to appreciate art changes, the question about artworks' decay of aura, however, remains in discussion in the academic field.

2.2.   From wall captions to beyond

To better discuss the relationship between technology and interactivity with art objects, it is necessary to understand the ways among time museums have been constructing the rhetoric between collection and visitor. Before audio guides, the way of communicating artworks was through labels and wall captions. Since the 70's, labels in museums have evolved, due to the

democratization of the modern museum and New Museology[3] (Fragomeni, 2010). Initially, labels were mainly produced by curators in a language that only specialised audiences would be able to properly comprehend it and were in its majority written in a one-to-many style, with few spaces to a visitor participation (Fragomeni, 2010). Additionally, before the 70's, other resources of text such as didactic panels had difficult readability and were text-heavy in a scientific language. Although, as time passed, its communication shifted for an attempt to make it more accessible, including the visitor, and aiming to an educational function (Fragomeni, 2010). From the 80's, museums started to increase efforts on educational and intellectual services in its institutional functions, and interpretative labels assumed a new role of communication in this scenario (Fragomeni, 2010). Serrell (2015) identifies different types of labels in museums, such as orientation, introduction, caption, wall texts, case label, free-standing, chat panels, and tombstone labels, all of them should work together in an integrated system. As time passed, labelling has developed methods and practices in order to create labels that enhance dialogue and meaning-making (Fragomeni, 2010). Label practices suggest that labels should function independently and must be in accordance to the main idea of the exhibition, following a cohesive plan that sets the exhibition tone (Serrell, 2015; Fragomeni, 2010). Nowadays, exhibit labels instead of simply identify museum objects, have the power to call audiences to action and excite visitors about the ideas being discussed. According to Fragomeni (2010), labels are designed in awareness of 'visitor's reading levels, educational background, cultural, religious and language barriers, and […] age' (p. 5), labels are brief and clear and synthetise and divide information in a more digestible manner. In addition, labels not only changed in format and length but are accompanied by photos, illustrations, panels and moving images. Despite labels have evolved over time, they are not perfect (Fragomeni, 2010), and they are not the only option of visitor communication in museums. In the early 1990s, museum devices changed to multi-functional media presenters. An example is The Tate Modern Multimedia Tour of 2002 that involved digital content options in audio, video and an interactive application. It can be noticed through time that due to the speed of technological evolution, the adoption of personalised systems did not necessarily result in best solutions for the heritage sector.

The museum and visitor conversation can happen through different media platforms, such as 'audio commentaries, film installations, live performances, […] collection catalogues, wall panels, visitor guides, and artefact labelling' (Vassos *et. al*, 2016, p. 2). Initially, technological approaches phasing in museums were based on personalised audio systems with

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[3] 'New Museology advocated that museums integrate the needs of more diverse social groups into their mandates' (Fragomeni, 2010, p. 3)

full control of the system framework, layout, and content structure. Nowadays, the audio guide is compared by Christensen (2011) to film narrations, where the main part of the narrative is made through voice-over technique and since in the context of the main museum narrative, it performs similarly to a script defining the eye movement of the visitor. The voice-over is an allographic paratext and since it is external to the main text of the object, it does not interfere in the autonomy of the art piece itself, it is only available in the context of the visitor (Christensen, 2011). The tour on the *Basilica de la Sagrada Familia* at Barcelona is an example where the audio guide gives the visitor the function of being a camera, as explained by Christensen (2011), where the 'physical and bodly management of the museum visitor's movements adds a form of signification that has a high potential for participation' (Christensen, 2011, p. 20).

Nowadays, the range of adoptions of technology in cultural exhibitions has expanded (Li and Liew, 2015). For example, mixed interactive systems include augmented reality (AR), mixed reality (MR) and tangible user interfaces (TUI) and such solutions show a shift from transmission only to other kinds of interaction and practices of visitation (Kidd, 2014).

What is being noticed is that, within the cultural sector, there are now many cases of mobile applications development (Wicks, 2015). The spread of mobile and messaging services such as Facebook Messenger, WhatsApp, and Telegram, boosted the adoption of solutions such as chatbots (Vassos *et. al*, 2016). There is also an increasing interest in techniques such as VR (Virtual Reality), AR, and QR (Quick Response) Code (Li and Liew, 2015). One example of interactive media being used in museums is the Tate Modern Museum project *After Dark* (2014) that used remotely controlled robots to allow users to have a night experience in the museum (Dunne, 2014). Another example is the Modigliani VR atelier, at the Tate Modern. The Tate Modern noticed, however, that some visitors were seeking to experience the technology rather than the art: 'people in the technology industries have come to see the [Modigliani] exhibition for the high-quality virtual reality experience rather than the art' (Financial Times, 2017).

Manovich (2001) alerted for the danger of interpreting interactivity in computer-based media literally, neglecting the 'psychological process of filling-in, hypothesis formation, recall, and identification, which are required for us to comprehend any text or image at all, are mistakenly identified with an objectively existing structure of interactive links' (p.57). Technology should be used to support the viewer in the mental process of contemplation of the work of art and not merely as another way to display it with some new features that do not aggregate for reflection. As it is noticed in Eco's notion of "*lettore modello*", reading is also a process where the reader based on previous experiences can understand beyond the simple text. In the same idea, Manovich (2001) postulates that before, one by looking at an image or reading a sentence of a story would

create private associations with other images, texts, poems, and memories. This 'mental processes of reflection, problem-solving, recall, and association' (Manovich, 2001, p. 61) should be what the combination of technologies and art seek to enhance.

The debate involving technologies and museums also concerns new issues related to ownership and conservation, since by rendering artworks in images museums are assuming the role of databases (Avedisian, 2015). Avedisian (2015), highlights that despite the main mission of an art institution is 'of collecting, preserving, and exhibiting works of cultural significance', techno-enthusiasm is transforming such places in 'visitor-focused playhouses, controlled by the hyper-current thrust towards ingenuity, socialization, and spectacle' and ignoring its implications on collections.

Chambers (2009) points out, that there are different points of view in terms of how a museum should communicate with its audience, in one hand, there are those who believe in a completely unmediated museum and on the other hand, those who try to explain every artwork in detail to visitors. According to the author, instead of calling the audiences for 'whatever interpretation' (p. 68), communication should foster the viewer's interpretative process. Since social interaction is part of people's experience in museums (Lehn, Heath and Hindmarsh, 2006), the use of conversational interfaces can be an approach seeking interactivity and creation of meaning within the heritage context. One kind of conversational interfaces are Chatbots, software interfaces that can interact with the user via a dialog. Klopfensten *et al*. (2017) argue that 'botaplications', a kind of bot interface paradigm, uses context, history and structured conversations to provide a user experience beyond text-only. To a better understanding, the next subsection will discuss chatbots.

2.3.   Chatbots

Chatbots or bots are computer programs that use Natural Language Processing (NPL) to mimic a conversation through voice user interfaces (VUI) or text-based interfaces methods with users (Boiano *et al.*, 2018; Pearl, 2016). Chatbots can integrate with conversation platforms, and according to Vassos *et al* (2016, p. 2), 'can […] communicate with people in an automated way, to answer questions, perform tasks online as a digital assistant, or just engage in conversation'. Despite chatbots exists for some decades, its wide adoption is recent. Chatbots are now increasing in interest and adoption by business, being their usage mainly related to purposes such as CRM, product sales, and customer service. Its success, among other reasons, is related to the widespread adoption of mobile platforms, messaging services, the integration of chatbot platforms with other services, and

the release of APIs for chatbots by Google, Microsoft, and Facebook. Additionally, new organizations specialised in chatbots development emerged, allowing organizations to easily implement a chatbot without coding, such as Chatfuel[4] and Landbot[5].

Chatbots are being seen as good options for improving user experience (Connolly, 2016). Klopfenstein *et al*. (2017) affirm that both bots and modern conversational assistants are perceived as more flexible because those technologies can interact with different applications. This application can also have UI (user interaction) elements, what can give the possibility of implementing innovative solutions in a conversational experience.

Not only business but institutions such as museums are also adopting chatbots in their communication strategies. Some examples are the Anne Frank House in Amsterdam, The National Art Museum of the Republic of Belarus, and The House Museums of Milan. The first museum launched a Messenger Chatbot in March 2017 with the aim of discovering Anne Frank story in different conversation paths as well as easy access information about the museum (Boiano *et al*., 2018). The aim of the museum was to engage with young audiences and allow them to listen to Anne Frank's voice through digital media in a personal way, allowing a new way of telling Anne Frank story. The bot in question is powered with AI (Artificial Intelligence), what allows it to learn with interactions, improving future experiences (Anne Frank House, 2017). The National Art Museum of the Republic of Belarus used a Messenger Chatbot as a chat-guide. The user can receive all the information related to a chosen exhibition as well as scan codes around the museum collection. For example, by writing the name of a painting, the user will instantly receive detailed information about it. The project also helped to enhance museum visits (Noduck, 2017). The House Museums of Milan in order to attract new audiences used a chatbot as a way to gamify and unify the visit of the four house museums in one single guide through a project called '*Di Casa in Casa'* (From House to House). An interactive game was developed to create itineraries among a group of four historical museums (Poldi Pezzoli Museum, Bagatti Valsecchi Museum, Necchi-Campiglio Villa, and Boschi Di Stefano House Museum). While interacting with a virtual character, young audiences could enjoy an educational and fun experience (Invisible Studio, 2017).

According to Boiano *et al*. (2018), the development of the Chatbot for The House Museums of Milan considered the fact that the institutions aimed to attract teenage audiences having in mind that such public has high levels of distractions and are highly engaged with social media. Based on the characteristics of the target audience, it was decided to consider

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[4] https://chatfuel.com/
[5] https://landbot.io/

gamification[6] as a way to keep teenagers engaged. The development process of the solution, as described by Boiano *et al.* (2018), considered future applications, such as self-guided tours and education. The chatbot was conceived in this project as a tool to solve the game established among the museums, letting the exploration of the museum as the focus and not the technology *per se* or the very interaction with the chatbot. The game dynamic involves hidden clues in each place, what inserts the bot in a narrative context that involves fighting a mysterious Renaissance magician, based on a real historical figure, and keep the visitor engaged with the collections (Boiano *et al.*, 2018). It was noticed that using chatbots for gamification can be a powerful tool for young audiences, what can create an enjoyable way to learn and interact with cultural heritage through non-linear narratives (Boiano *et al.*, 2018).

To summarise, the main ideas discussed in this chapter were related to the impact of technology adoption in the visitor learning experience. The medium through what museums communicate with visitors has evolved, paratexts are not only present in wall labels, but in apps and other interactive installations within exhibitions. The way museums dialogue with visitors changed both in its nature, now more inclusive, education-focused and participatory, and in terms of the mediums available. Label practices are a good approach for communicating with different technologies since it considers that the exhibition has a main narrative or idea that needs to be connected with every individual artwork, and at the same time, each artwork need to be communicated independently within the exhibition. Finally, since chatbots can run on different platforms and can be either voice and text-based, its potential to cultural heritage can also be noticed. The diverse uses described above demonstrate its versatility and potential to achieving the desired goals of museums in terms of communication and learning for all kinds of audiences. The next Chapter will discuss more deeply some cases of museums that adopted interactive technologies to enhance experience as well as how a chatbot could enhance interpretation of a current exhibition in the National Gallery of Ireland, in Dublin.

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[6] Gamification means that game design eelements are being used in other contexts than games (Groth, 2012)

3. Chapter Three: when interactive media meets art

Having outlined the main aspects of text-image relations and technology adoption in museums in chapters One and Two, this chapter will review exhibits and museums that have adopted interactive media to enhance visitor experience such as the Mario Praz Art-Bot of Casa Museo Mario Praz, The Pen at Cooper Hewitt Design Museum, the Modigliani VR Experience at Tate Modern, and Gallery One of the Cleveland Museum of Art. Based on the cases analysed and the discussion in the two previous chapters, a case study of how a chatbot could enhance the interpretation process of an exhibition will proceed. The case chosen is the exhibition *Emil Node: Colour is Life* at the National Gallery of Ireland. The aim is to suggest how the chatbot could enhance interpretation and experience of the different kinds audiences, both specialised and the non-specialised.

3.1.   Interactive media in museums

3.1.1.   The Mario Praz Art-Bot at Casa Museo Mario Praz

Mario Praz was an anglist, writer and critic of literature and art who collected art objects to furnish his house. His autobiography, made in the format of a novel dedicated to this home, presents detailed descriptions of his house and artworks called *La casa della Vita* relating the collected objects with his personal memories. Mario Praz's last home, a flat in Rome, is a dedicated museum about his life and collectable objects (Casa Museo Italia, 2018).

A museum surrounds its artefacts with narratives, most often in the form of static wall mounted texts. The Mario Praz Art-Bot was conceived as a way to offer engagement experiences in the House Museum in a response of the question 'What happens […] when the stories become a live conversation with artists and artifacts in an established and ubiquitous chat interface?' (Vassos *et al.*, 2016, p. 433). The chatbot, that impersonates Mario Praz, interact with visitors by giving information about the collection through short stories, as well as gamification (Vassos *et al.*, 2016).

The museum has a collection of more than 1200 art objects, all are connected to one another by analogy and story within the greater narrative of the museum. Based on this, the chatbot was conceived aiming to reveal information of the art collector through stories in a first-person narrative in its own conversational tone. The story that the bot tells is connected with the collection items, characters, locations and within the interaction, the bot challenges visitors to contemplate artefacts and to ask questions. 'The immediacy of a first-person narrative gives

visitors direct access to the intimate thoughts and feelings of the protagonist, promoting a closer relationship between visitor/guide and subject/character' (Vassos *et al*., 2016, p. 434).

The stories that are told during the visit are related to the most important pieces of art in each room, contextualised together in a small story that reveals information about how the object was collected and also about the relationship of Mario Praz with his intimate circle, for example, with his mother and wife (see Fig. 1) (Vassos *et al*., 2016). The chatbot approach involves responses that are triggered by keywords and are attached to certain plot-points. In each plot-point, the chatbot triggers the specific text, the keywords and a set of witty prompts in case the user does not use the keywords. Future developments involve expanding the project by integrating more sophisticated techniques in terms of interactive narratives and storytelling (Vassos *et al*., 2016).
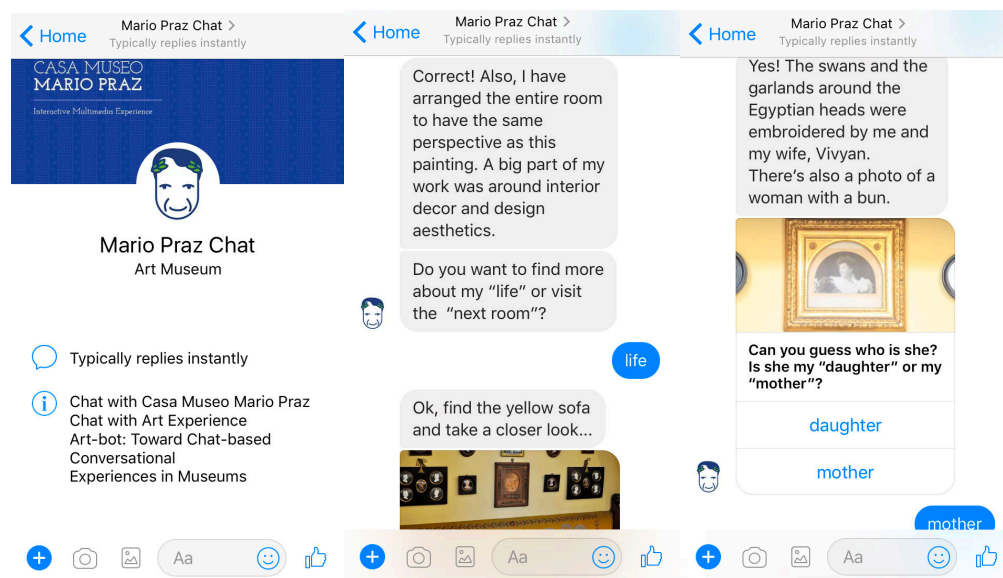

Figure 1: Interaction with Mario Praz Chatbot (Source Helvia, 2018)

3.1.2. The Pen, Cooper Hewitt, Smithsonian Design Museum

The Cooper Hewitt Museum, located in New York City is dedicated to all disciplines of design with, a permanent collection greater than 210,000 design objects that are fully digitised and available online. The museum passed by a recent renovation process with the exhibitions and spaces were reimagined resulting in what is called by the museum 'a new paradigm for design thinking and problem solving' (Cooper Hewitt, 2017). Amid this context, a device called The Pen was launched in 2015 with the aim to be used in the whole museum space and exhibitions.

The Pen is used while taking the tour at the museum and mimics a real pen in many ways. The visitors can save, collect, and interact with items displayed in the exhibition with the

device and through Near Field Communication (NFC) technology, the content selected can be transferred to interactive tables. The tool can help visitors in the exploration and learning process, as well as to find information (Fang, 2017). According to the *Cooper Hewitt Design Journal Fall* (2014, p.15), the concept of the project was 'to conceive of an electronic pen that would put the tools of designers into the hands of museum visitors'. The Pen aims to extend the museum experience beyond walls and engage the visitors with the objects displayed in the museum and the solution implemented took into consideration that it would encourage the discovery of content about the exhibition as well as enhance the exhibition, instead of being the focus of the experience (Cooper Hewitt Design Journal Fall, 2014). More than collect and catalogue objects, the visitors can interact with interactive tables and "make art themselves". The visitors can draw and play (Fig. 2) instead of simply sharing content, what keeps the visitor engaged with the place as well. The visitor can draw in interactive tables and search for objects with a similar pattern and create 3D models, among other options (Sadokierski, 2015).

> […] human-centered approach is at the heart of the Cooper Hewitt's visitor experience. It's evident in the Process Lab, a hands-on space where visitors can craft a lampshade of cellophane and chicken wire and watch how the materials shape the light, or sketch cartoon characters that embody emotions. In the Immersion Room visitors can draw their own wallpaper patterns and project digital versions onto the room's surfaces. Visitors also engage with the museum's collection in dynamic ways. Exhibitions can be eclectic, with digital creations displayed alongside traditional ornamentation (Gonzalez, 2016).

The pen was designed to be central to the visitor experience (Fig. 3) by inviting the visitor to assume the role of a designer, creating engagement with the collections without displacing the collection as the main focus of the museum. The museum's collected items can be explored after the visit through a custom URL that is printed on the visitor's ticket. As a result, it was noticed by the museum that more than one third of the visitors that used the pen visited the custom URL and some of them created permanent museum accounts (Chan, 2016).

Figure 2: Interactive tables (Financial Times, 2017)

Figure 3: The Pen visitor flow (Cooper Hewitt, 2018)

3.1.3. Modigliani VR: The Ochre Atelier

Modigliani's style and personality are explained through paintings, drawings, sculptures, as well as his iconic nudes and portraits, that were displayed and curated. Amadeo Modigliani (1884-1920) was an Italian Artist best known for his paintings that was born in Livorno and left Italy and moved to Paris in 1906 to develop his career and there died at the age of thirty-five (Tate Modern, 2017b). The Modigliani exhibition at Tate Modern Museum in London during November 2017 and April 2018 aimed to transport the visitor into a retrospective journey among the artist's works, style, life, the city context and its influence in his work, and his ideas.

The exhibition starts by placing the visitor in the first room called *Open to Change*. It explained the decision of Modigliani to move to Paris in the first decade of 1900 and his arrival full of excitement and possibilities. His famous self-portrait from 1915 where he is presented as a Pierrot is described by the museum as a figure open to interpretation, setting the tone of the exhibition and placing the visitor within the narrative. In addition to the artworks, the museums also created digital content and provided possibilities of interaction with the exhibition theme on their website. Among the 11 rooms of exhibition, room 10 contained an innovative project that introduced a VR experience within the exhibition, the *Modigliani VR: The Ochre Atelier* (Fig. 4) (Tate Modern, 2017a).

The VR project aimed to engage visitors with art through transporting them to Modigliani's final studio in Paris, when the artist returned to the city in 1919 after the war was over (Tate Modern, 2017b). Through a VR headset (Fig. 5), the visitor could explore different objects in the room as well as learn about the artist's life, his work, and the historical and social contexts where he lived in a journey of six to seven minutes long (Rigg, 2017). The virtual environment was designed with the aid of historians and art historians to ensure that the context and work was the most authentic as possible. While seeing his atelier through the VR glasses, the user can get insights from information icons that will start narrations about the artist from his close network of people to experts from Tate Modern (Rigg, 2017). After experiencing how was it like to be in Modigliani atelier in the last century, the final room was about his intimate circle as well as his family and finishes the narrative of the exhibition with this death by health problems as well as the death of his wife (Tate Modern, 2017b). It is possible to notice that the exhibition used the VR technology to complement the main narrative and enhance the understanding of the Paris of that period and its relevance within the art context, the very person of the artist, and the impact of Modigliani's work at that time and now.

Figure 3: Modigliani VR: The Ochre Atelier (Source: Tate Modern, 2017c)

Figure 4: Visitors in the Modigliani VR Experience (Source: Rigg, 2017)

3.1.4. The Cleveland Museum of art

With the aim to foster visitors' engagement with the permanent collection, the Cleveland Museum of Art transformed the space Gallery One as well as created an app to allow visitors navigate around the museum.

> It uses a state-of-the-art wayfinding system, eliminating the need for paper maps. In addition to its mapping capabilities, ArtLens includes over nine hours of multimedia content. This includes audio tour segments, videos, and additional facts, stories, and information. Visitors can dock their device at the Collection Wall, save the artworks they explore to their device, and create customizable, personalized tours of their favourite artworks. Visitors can use ArtLens before, during, and after their visit to CMA to expand their experience (Read, 2017).

The project that was launched in 2013 had, as a result, an increasing of 31% in individual attendance and 29% in families' attendance. The museum was able to collect data and perceive not only the increase in visitors but also the impact of technology on the museum experience. Although technology created engagement with the digital interaction, it was verified that visitors were not always able to make 'the connection between the artwork on the screen and the physical artworks on view in the gallery' (Alexander, Wienke and Tiongson, 2017). In order to

bridge what has been considered a conceptual and physical divide within the museum, in 2017 a new version of the Gallery One was launched and renamed ARTLENS Gallery (Alexander, Wienke, and Tiongson, 2017). The new version of the project shifted focus from digital interpretation to artwork and its curation, using digital interpretation to support visitors to create linkages and interpretations between artwork and digital. 'Our goal is to leverage all of the strengths of the scale and immersion of digital projection, combined with the physicality of gesture, the personalization of mobile devices, and ultimately the power of an unmediated experience with artworks' (Alexander, Wienke, and Tiongson, 2017).

The space is composed of multi-touch screens that invite to view and closely examine objects, offering interpretation and digital investigation of the objects being displayed (Figs. 6 and 7). The interaction, according to Alexander, Wienke, and Tiongson (2017), involves interpretation through storytelling, offering the possibility to discover artworks' original context and location as well as gamification to create engagement through questions and experiences. One example is the 'Build in Clay' (Fig. 8) installation that allows visitors to virtually create sculpture in clay. The visitor virtually does the actions of kneading, rolling, coiling, cutting, and assembling and the transformation can be seen in the screen (Alexander, Wienke and Tiongson, 2017). Another feature of the interactive space of the museum is to recommend missions to discover artworks within the museum as well as other recommendations based on facial recognition (Alexander, Wienke, and Tiongson, 2017).
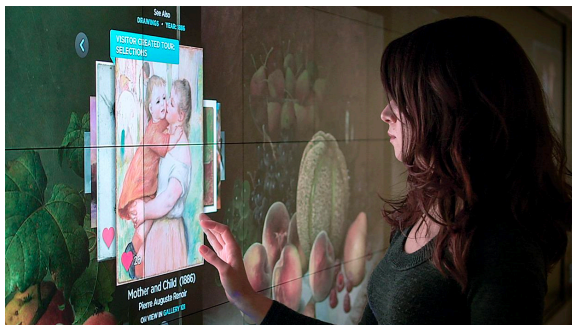

Figure 5: Cleveland Museum interaction (Source: Local Projects, n.a)

Figures 6: Cleveland Museum interaction (Source: Alexander, Wienke and Tiogson, 2017)

Figure 7 : Build in Clay (Source: Alexander, Wienke and Tiogson, 2017)

The innovative project of The Cleveland Museum of art has had positive results and is still being adjusted and re-evaluated to better find a way that technology can fit into the context of art and enhance the visitor's experience. However, it deals with technologies such as facial recognition that nowadays with the wider debate of privacy incurs certainly in an issue that needs to be carefully planned by heritage institutions around the world.

3.2.   Enhancing museum experience with a chatbot

As discussed above, there are aspects of artworks that need to be taken into consideration to situate the visitor and enhance the learning process and participation. Artworks possess an auratic characteristic, related to its authority, history, tradition, and uniqueness. Collections are surrounded by paratexts that anchor its meaning based on the way the exhibition is curated. Museums are seeking to establish more inclusive, education-focused and participatory dialogues with visitors, which encourage them to assume an active role of interpreter. As label practices suggest, collections are inserted into a main narrative or idea that relates every individual artwork and at the same time, allowing each artwork to be observed independently. Individual objects can be accessed and interpreted by themselves, placing objects within its contexts, such as social and historical aspects, author, and technique. The dialogue established should at the same time direct the visitor to the curatorial message and invite to further interpretation focusing on both general and expert audiences.

The reviewed museums and exhibitions adopted technology with the aim to create engagement with collections as well as encourage discovery, exploration, and interpretation. Some museums such as Mario Praz and the Cleveland Museum also adopted gamification to

enhance the visitor learning process. First-person narration was another element, the Mario Praz Art-Bot narration impersonated the main character of the museum, seeking for more intimacy with the historical person and his collection, while the Modgliani VR narration was made with perspectives of some Tate Modern experts and characters of Modigliani's close social circle, building knowledge about the artist with different perspectives.

The cases described above applied technology for aims such as gamification and storytelling, to create empathy with art and artists, to allow the visitor to assume the role of art creator, and to anchorage the exhibition curatorial message. If well-orchestrated, those aspects can enhance the auratic characteristics of artworks as well as allow double coding within the exhibition narrative. Therefore, this section will use the elements of first-person narration and different perspectives to enhance engagement and interpretation. Since the chatbot communication happens through the format of a conversation, the narrative is established with contents and questions related to diverse aspects of the exhibition, triggered by plot-points according to a set of sub-narratives to instigate the visitor to observe and interpret in a more dynamic manner.

In order to suggest an approach for a museum chatbot, an exhibition was chosen as a case study. The exhibition *Emil Nolde: Colour is Life* displayed at the National Gallery of Ireland during 14 February and 10 June 2018, is the biggest and first exhibition of Emil Nolde in Ireland since 1964. The exhibition was selected because it was currently happening during the research period, which allowed visiting the exhibition; also, there was a considerable amount of content available, such as an educational program involving talks and lectures about the artist and his paintings, pop-up performances, workshops, as well as school resources online, and a special catalogue that was produced in collaboration with the National Galleries of Scotland and the National Gallery; finally, because the exhibition was using traditional audio guide format only, this allowed it possible to rethink of the exhibition to include interactive media. Table 1 demonstrates a variety of perspectives and approaches to Nolde's work that were included in the educational program, what enriched the debate.

Table 1: Educational Program Emil Nolde: Colour is Life at National Gallery of Ireland

Date	Topic	Lecturer	Event
14/02/2018	Emil Nolde's Young Couple Lithograph	Valerie Alexander	Pop-up Talks
25/02/2018	Emil Nolde (1867-1956): An Introduction	Janet McLean (National Gallery of Ireland)	Sunday Lectures
02/03/2018	Emil Nolde: Heimat	Shane Morrissey	Pop-up Talks
11/03/2018	In and out of place: Nolde's landscapes as discourses on belonging	Frances Blythe	Sunday Lectures
13/03/2018	The Real Emil: who was Emil Nolde?	Shane Morrissy	Tuesday Talk and Tea
23/03/2018	Emil Nolde: Metropolis	Dr Sarah Wilson	Pop-up Talks
25/03/2018	Tracking figures in cloud formations: Emil Nolde as printmaker	Dr Christian Weikop	Sunday Lectures
06/04/2018	A conservator's view: the painting technique and materials of Emil Nolde	Ele Von Monschaw (National Gallery of Ireland)	Pop-up Talks
10/04/2018	Emil Nolde: the artist's garden	Janet McLean	Tuesday Talk and Tea
15/04/2018	In Conversation	Imogen Stuart and Donal Maguire	Sunday Lectures
20/04/2018	Emil Nolde: Conflict and Ecstasy	Mike Palmer	Pop-up Talks
11/05/2018	Emil Nolde: Travels 1913-1914	Michelle McDonagh	Pop-up Talks
01/06/2018	Emil Nolde: Nature and Fantasy	Carmel Coyle	Pop-up Talks

Emil Nolde (1867-1957) was a controversial artist born close to the German-Danish borders who lived during a period of social and art-historical change. The artist was born into a rural community and within a devout Protestant family, themes that are central to his work and help to understand his identity. Another relevant aspect about the artist is his political view since Nolde joined the National Socialist party in 1920. This is noticed in some of his paintings, such as the *Martyrdom* (1921), that has anti-Semitic depictions. The Nazis, however, turned against modern art and Nolde became a 'degenerate' artist banned from painting. Because of that, Nolde created his known watercolours on paper, called 'Unpainted Paintings' (National Gallery Ireland, 2018).

The exhibition narrative chronologically describes the artist and his works from the perspective of colours, an iconic characteristic of Nolde. Places, artist, art movements, and historical and social factors are connected with colours, techniques, and materials used by the artist. The exhibition layers of text are communicated through an introduction panel related to the whole exhibition; the room titles; labels that can be either for individual paintings or a group of them; and an audio guide. The audio guide places the visitor within the exhibition main idea

as well as explains each room theme and the paintings considered most important. The catalogue is the richest source of information and the curation can be better comprehended if audio guide or catalogue is used as a source of information. The talks, for those who participated, also enrich perspectives and incentive debate of ideas.

The exhibition perspective is obviously based on its title: *Colour is Life* and colour is related to places and life periods that Nolde experienced. The exhibition contains over than 120 works divided into paintings, drawings, watercolours and prints and displayed in five rooms (Fig. 9), each of them related to different themes expressing Nolde's interpretation of places and moments lived through colours and techniques: Idea of Home; the Metropolis; Conflict and Ecstasy; the South Seas and the Exotic; and Sea and Garden pictures (National Gallery of Ireland, 2018).
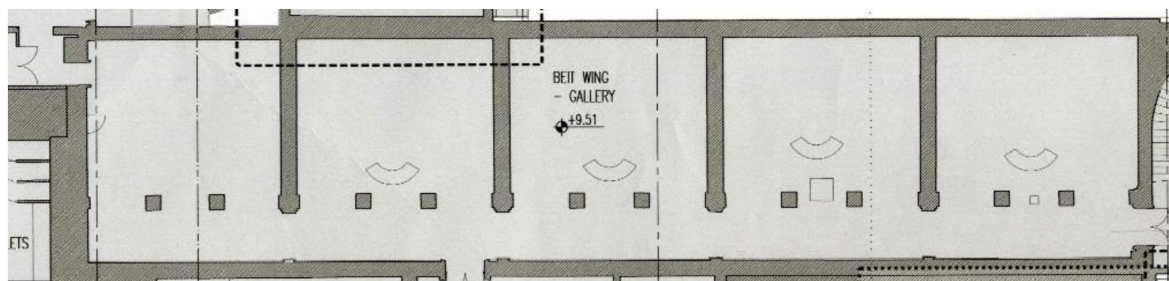

Figure 8: Exhibition architectural plan, Beit Wing, Rooms 6-10 (Source: National Gallery of Ireland, 2018)

It is possible to notice, through the lenses of the curational discourse, the painter's love from his land with many paintings about seascapes, and the country people. Other places he used to attend with his wife, such as cabarets and cafes in Berlin are also largely represented in his paintings. His trip to the South Seas (1913-1914), and his short participation in a woodblock printing group, for example, can be noticed as influencers in his work themes and technique experimentations. In addition, another topic wide explored by the artist is religion and the influence of his political view, that marked his entrance to the Socialist German Workers' Party, can be noticed in those paintings as well.

> This exhibition and accompanying catalogue attempt to present a broad, inclusive overview of Nolde's work, doing justice […] to his paintings, drawings and prints capturing the bustle of the tug boats and choppy waters of the port of Hamburg, the frenetic life of Berlin's cafes and cabarets, the trip to the South Seas, the militaristic build-up to the First World War and the ensuring revolution and his extraordinary religious paintings, with their strange mixture of spirituality and eroticism. […] we are showing a substantial group of his so-called 'unpainted pictures': small intensely coloured watercolours produced predominantly, but not exclusively, during the National Socialist period, when Nolde was declared 'degenerated' by the regime and forbidden to practice as a professional artist. […] Nolde continued to sympathise with the party

until the end of the war, but refused to change his artistic principles to gain favour from the authorities' (National Galleries Scotland, 2018, p. 8-9).

The exhibition audio guide is structured in a traditional guide narrative. A chatbot in this context could make the communication more fluid and interesting. The bot could have a personality, either representing someone from Nolde's life, Nolde himself, a fictional character, or the curators, what could mimic a dialogue with the visitor, answer questions, and provide further details about the paintings and the painter enclosed in a conversational format.

A chatbot, as well as other types of technology adopted, should have a goal for its implementation, and the idea of using some interactive medium fits with the aim of the exhibition: 'We look forward to bringing Nolde to the attention of a new generation of gallery visitors in Ireland and the UK' (National Galleries Scotland, 2018, p. 9). Some qualities of the exhibition that could be emulated into the chatbot are sub-narratives based on historical facts and the room themes that could be explored through storytelling. Double coding and multiple levels of reading could be explored within the narrative to instigate learning and exploration of Nolde's art, the time he lived, as well as raise questions and explore different perspectives of interpretation. At the same time, the reference to auratic aspects of the artworks could be enhanced through the narratives. Since reading a text, as postulated by Eco, is an act of interpretation that involves the reader previous experiences, the rhetoric involving text, image, and the observer could be anchored by the curatorial discourse, and at the same time, allow the visitor to create his inferences based on what was learned, what meanings the artwork convey, and interpret the information based on his background and context.

The chatbot could be integrated with the exhibition in three forms: (i) answering questions and giving further details about the individual artworks; (ii) integrating sub-narratives based on the education program; and (iii) exploring the exhibition in the format of a game, all of them in the format of a conversation. The first option would involve the visitor writing the name of the artwork to receive information or formulating a question that based on keywords would trigger answers. The second option involves the integration of the educational program within the exhibition, it would be a way to provide for those who could not attend the events' different perspectives involving Nolde's works, in the same idea of the experts' narration in the Modigliani VR experience. The visitor would choose between some tours available in the chatbot to experience the exhibition. For example, if the visitor decides to explore the talk '*The Real Emil: who was Emil Nolde?',* he would mimic a conversation with Shane Morrissy, who ministered the talk. In the same manner, if the visitor chooses the tour *Emil Nolde: the artist's garden,* the conversation would be with Janet McLean (see Fig. 10). The answer to the question 'who was

Emil Nolde?' do not need to have an ended answer, it can allow the visitor to come to his conclusions and new questions being guided through a journey of discovery of facts of his life and paintings. The 'unpainted pictures', for example, sub-narrative that could explore either the historical context of the time, the political views of the artist, and the technique of watercolours. The artist's garden is a theme in many of his paintings, and the colours used as well as the techniques can be linked to his house and with the influence of Van Gogh in his style. Finally, the third option would require observation skills of the visitor, the chatbot would ask to find a certain painting, identify and differentiate techniques used and certain details of the artworks that would unlock the rest of the narrative as well as trigger the next task. The bot would invite the visitor to identify places Nolde most liked or how he felt about some places based on the colours of the paintings. For example, the difference between the paintings in Berlin and those of his gardens. There are other intriguing aspects such as the paintings *Market People* (1908) and *Farmers* (1908), that are at the same time similar and divergent. The length of the text in any kind of interaction should be short, as is the current practice of museums in labels, otherwise, the visitor would expend more time reading than appreciating the artworks, but at the same time it needs to have the necessary detail to be informative and include double coding.
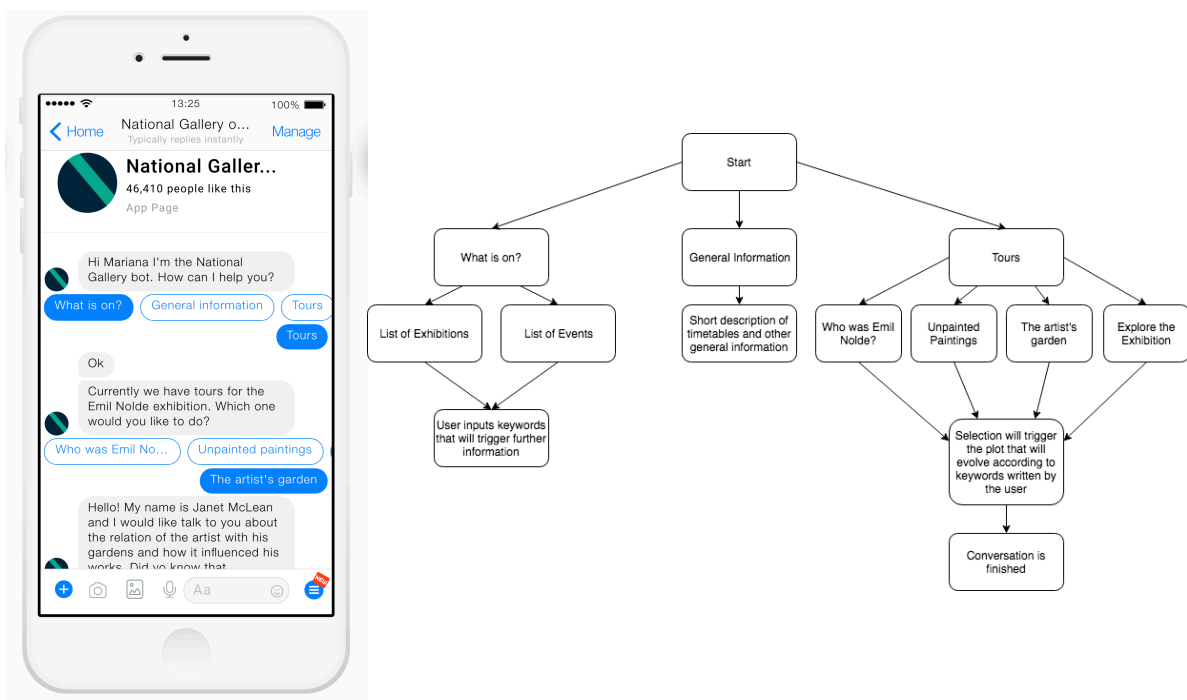

Figure 9: possible interface of the chatbot and simplified conversation flow

The artist's life and paintings, in the way the exhibition is curated, allow diverse entrances for double coding, from making references to Van Gogh, Gaugin, and to the Brücke group, as well as modernism, religion and national socialism in Germany. In addition, it allows

other types of reflection, questions, and interpretations. For example, the characteristic blue eyes in his Self-portrait (1917) could have some relation with the blue eyes in Free Spirit (1906) and Paradise Lost (1921) that are paintings related with Nolde's personal feelings? Also, what is the message behind the religious paintings with Jews characters? What does it mean nowadays where antisemitism still exists? A chatbot could instigate the visitor to figure out the significations behind paintings, in which period of Nolde's life a painting was painted, as well as the influence of art movements and places in his paintings subjects, his techniques, and colour pallets. The visitor would be able to reflect on the painter, the paintings, art techniques, and art history and a chatbot could make those references without excluding the general audiences and at the same time instigate them to learn more. The interaction could involve cross-disciplinary content such as art and history to be learned at the same time. In addition, since there is a considerable information about Nolde available, so the story behind his artworks and his personal life can be more easily and accurately told. At the same time, since Nolde and his art are also controversial, it is possible to instigate visitors to think and to create their own montage from the separated realities of time and space, fostering the process of meaning-creation.

Once conversational interfaces are still evolving and are not already able to fully reproduce a human conversation, keeping the focus on gamification and storytelling instead of the conversation itself can avoid visitor's frustration. Furthermore, the fact that the exhibition is placed inside five rooms allows the interaction with a chatbot to happen within a plausible amount of time avoiding a tiring experience. Finally, this work aim was to discuss chatbots as a medium to be used by museums while visitors experience art. Chatbots are not being suggested as a way to "reinvent the wheel" in museum communication, but actually to expand possibilities of meaning-making without displacing the collections from the centre of the exhibitions. Once mobile usage is widely adopted, and visitors attend museum with their smartphones, chatbots could allow them to immerse in the museum experience by enhancing the interpretation process of art but in a more entertained manner.

Conclusion

A shift of perception in the way art was perceived was noticed at the beginning of the 20th century. Nowadays, as society becomes more digital, art perception keeps changing as well as the desires of audiences in terms of the museum experience. The museum environment involves different types of audiences and new forms of participation, what bring also opportunities for technology adoption within exhibitions both to keep the interest of the public and to bridge the gap between visitors understanding and collections' information. However, as Kidd (2014) points out, little is known about its impact upon meaning-making.

When it comes to fine art museums, technology should not be the main focus of the exhibitions. The visitor needs to be able to distinguish between the artwork and its digital simulation, to have the original as the reference and having interaction as a way to reflect, interpret and create signification. As Manovich points out, museum experience involves the processes of reflection, problem-solving, recall, and association. In this manner, not only the auratic characteristics of an artwork should be enhanced through technology, but it should have as aim enhance interpretation and signification. In this manner, double coding within the exhibition's narratives would be beneficial to include both experts and general audiences.

It is in the interaction between exhibition and visitor that meaning is created within the museum experience. This research brought some cases of museums and exhibitions that adopted diverse interactive media to enhance the museum experience. Despite all the projects had the aim to create engagement and learning, there is enough information about the real impact upon visitors to create connections and interpretations. Conversational interfaces, such as chatbots, are interfaces that unlikely other ways of communicating with audiences can provide a dialogue with visitors, and because of that, the application of a chatbot in a museum exhibition was chosen. Based on concepts such as the aura, anchorage, double coding and levels of reading, a suggested chatbot approach for a museum exhibition was realised.

The limitation of this study relies on the fact that the chatbot was not implemented or tested. For further developments and to prove its effectivity in enhancing art experience, content and narrative should be properly created as well as the interface should be tested. Finally, the concepts discussed and the suggestion of the chatbot adoption in this work aimed to contribute to the debate about interactive media as a tool to create the rhetoric between collections and visitors and help to bridge the gap of signification and interpretation in museums.

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