Digital Heritage Consumption: The Case of the Metropolitan Museum of Art

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Abstract   Cultural consumption is increasingly moving into a digital realm where art and non-art spaces blur in an all-inclusive image-rich environment online. While cultural consumption studies remain limited to a defined cultural environment (e.g. the museum website), we will analyse the patterns of consumption of 119 paintings from the Metropolitan Museum of Art collection in an all-inclusive online environment, Wikipedia. We will find paintings in art as well as non-art related articles and compare visibility to the institutional physical and online exhibition, a purely art environment. We will find a greater share of digital cultural consumption takes place in non-art related articles, inferring accidental consumption, while fact-checking and the presence of articles about obscure paintings satisfy a utilitarian information use. We will argue that digital cultural consumption can expand the user base when positioned outside of the expected art context, enabling new forms of hedonic and utilitarian consumption. Our results suggest that the adoption of the online encyclopaedia by superstar museums reflects a new conceptualisation of authentic taste that includes digital consumption, highlighting the collection's information value.

Keywords   Cultural consumption. Digital paintings. Museums. Wikipedia.

Summary   1 Introduction. – 2 Cultural Consumption: Who Visits Museums and Why (Not)? – 2.1 Consumers of Wikipedia. – 2.2 Available Data on Digital Cultural Consumption. – 3 The Case of the Metropolitan Museum of Art Paintings on Wikipedia. – 4 Discussion. – 5 Conclusions.

1   Introduction

Museums are organisations with limited budgets and growing collections serving an increasingly digital consumer who expects collections to be remotely available. The International Telecommunications Union (ITU) released the 2017 global Information and Communication Technology (ICT) figures showing more than half of households have access to the internet, with mobile broadband dropping in price and growing in subscriptions to reach 4.3 billion users, with 70% of the young (15 to 24 years old) being online (ITU 2017). This increasingly digital context raises the need to identify the characteristics of the online consumer to evaluate the relevance of a cultural digital presence, which looks grim as audience diversity appears to only decrease online (Mihelj, Leguina, Downey 2019). It must be said that, while museums are investing on their websites, the use of social media, and a number of mobile applications to enhance visitor experience (Zins 2107), access to collections online continues to lag behind. Museums reported a third of their collections have been digitized yet less than 10% are published online (Nauta, Van den Heuvel, Teunisse 2017; Axiell 2017). This may explain the limited growth, and even decline, in the use of museum websites for accessing collections (Mihelj, Leguina, Downey 2019). Consumption of museum's services continues to be foremost a physical experience, to a specific small group of society. Museum visitors follow a specific socio-economic profile (e.g. Falk, Katz-Guerro 2015) and enjoy a relative ease to physically access institutions (Brook 2016; Evans 2016). Alternative channels to disseminate collections have been considered in an effort to broaden the visitor profile, increasingly including third party platforms such as Artstor, YourPaintings, Google Arts and Culture, and Wikipedia. Katz-Guerro (2004) calls for an inclusive approach to understanding cultural consumption, considering "a variety of alternative forms and styles that reflect different theoretical approaches and different facets of the life-world" (13). She identifies Internet use of cultural content as an understudied area of research. Our study responds to fill this gap.

In this paper, we will analyse the consumption of paintings when museums disseminate collections via Wikipedia, one of the 10 most visited websites globally for over a decade (Navarrete, Borowiecki 2016; Spoerri 2007b). We will focus on the paintings collection of the Metropolitan Museum of Art in New York (The Met), our case study, and analyse their use as illustrations in Wikipedia. We will manually code the topic of the articles where paintings are found to rank the frequency of use and views, to finally compare the visibility of the paintings within the institutional website and exhibition halls. Results will show a pattern of utilitarian consumption that respond to a clear information need, where paintings are used as visual documentation and authentic information sources, not only as art works.

Whereas onsite visitors are generally considered hedonic consumers, the online use of collections reflect a utilitarian approach to museum collections. The main contribution of this paper lies in identifying the variety in non-art contexts where consumption of collections takes place, illustrating Wikipedia articles. By the mere size of online consumers, it can be assumed that online visitors include museum non-visitors, broadening the consumer base. This suggests that museums that make their paintings available as illustrations of the online encyclopaedia exponentially increase the view to their collections by enabling consumption of paintings as art and as information, hence doubling potential utility.

The remaining of the paper is organised as follows. Section two contains the review of literature on cultural consumption, noting the digital variant and the studies on availability of cultural content, as well as literature available on Wikipedia consumers. Section three presents the methodology and data, while section four discusses the findings. We close with conclusions and policy implications.

2 Cultural Consumption: Who Visits Museums and Why (Not)?

Museums are institutions holding the most representative objects from our past. Objects are carefully selected, preserved, researched and exhibited in special buildings designed to protect and showcase collections. Collections are cultural goods, which are complex experience goods that may present addictive behaviour leading to greater utility (Frey, Meier 2006). That is, the more one visits museums the more enjoyable they become. Most studies take cultural consumption as the dependent variable to identify the relevant socio-economic characteristics that will lead to a museum visit. A European study by Falk and Katz-Guerro (2015) found that per capita household income, education, labour market status, and country of birth are important determinants to positively influence museum visits across countries. In an earlier study, Ganzeboom (1982) identified the information-processing capacity of individuals to be a key determinant in the choice of culture consumed. He argued that a certain complexity of cultural products leads to a rewarding experience for the consumer but to a certain point, as greater complexity does require greater human capital (skills and knowledge). That is, consumer utility is directly related to the individual's information-processing capacities. DiMaggio (1987) argued that cultural consumption is actually a form of currency to establish one's identity in any social encounter. In this way, individuals exchange information about their cultural taste and form social networks accordingly. Generally, the greater the cultural vocabulary, or diversity in taste, the higher the socioeconomic status.

Television serves to provide "a stock of common symbols for nearly everyone" which can then be exchanged in social encounters (443), represents a limited source of cultural content and has been associated with individuals having narrow social networks (e.g. low-income, blue-collar, unemployed, aged).

However, taste cannot only be accounted for as a dynamic for class differentiation. Instead, Meyer (2000) proposes institutions to be central players in contextualising the collective definition of taste, specifically along the rhetoric of refinement and the rhetoric of authenticity. Both concepts are inherited from a European aristocratic context, which serve to define and legitimise contemporary standards of taste. According to Meyer (2000), refinement defined the practice and mentality of the exclusive aristocracy and served to differentiate it from the lower classes, while authenticity was proposed to challenge a notion of taste that appeared to be based on inaccessibility and cost: "wherever taste is expensive, it is false" (Rousseau quoted in Meyer 2000, 42). Authenticity became hence the definition of true taste. In contemporary society, both notions of taste are complementary, albeit at times conflicting. Museums can serve to exemplify the role of the institution that defines a changing context of taste, for it is museums that define object value and meaning (Cameron 2007). In the case of photography as art form, artists were involved in the development of photography and adopted it as an art form early on, but it was the museum institution that established photography as authentic art form (Walsh 2007; Fyfe 2004). It is to be expected that museums follow a similar process to define digital reproductions of their collections, along digital art, as authentic. Museums hence form our notions of taste and shape our cultural consumption pattern (Gans 1974 in Katz-Guerro 2004; Meyer 2000; Beckert, Aspers 2011).

Cultural consumption is first and foremost limited by accessibility of available content. It has been estimated that less than 10% of museum objects are available for view (Frey 2000) which is understandable when considering the size of the collections in comparison to the available wall space to exhibit them. However, availability of content through digital exhibition is surprisingly similar. European museums reported having digitised about a third of their collections, of which less than a third is available on the Internet (Nauta, Van den Heuvel, Teunisse 2017). That means, less than 10% of their collections is available for digital consumption. Physical accessibility to the museum building was found by Brook (2016) as key determinant for consumption in her study on museum visitors in London. When physical accessibility to cultural services is improved, consumption increases, both of the expected higher socio-economic groups as well as the rest of the population (Brook 2016). This result rises the expectation that digital availability would increase consumption of all socio-economic groups. This does not appear to be the case, as consumers on-

line tend to reproduce the current museum visitor profile, and even enlarge the participation divide (Evrard, Krebs 2018; Mihelj, Leguina, Downey 2019, Finnis, Sebastian, Clemens 2011).

Besides accessibility of cultural services and availability of museum collections, both physical and digital, what are the barriers for greater cultural participation? A study on barriers to cultural participation in the United States shows that lack of time (55%) and lacking somebody to go with (22%) are important reasons for not visiting an art exhibit (NEA 2015). Europeans reported lack of time (37%), lack of interest (31%), and lack of information (25%), to be the important reasons for not visiting museums (EU 2017a). It can be argued that these are related, as lack of interest results from a lack of information since utility of cultural consumption is known to be linked to previous consumption, and we all know we make time for things that interests us. Jarnes (2015) proposes an alternative framework to understand new forms of emerging cultural capital, as cultural content gains new distribution forms and individuals consume across established social structures. He compares cultural and material consumption in Norway and identifies four consumption profiles: intellectual, luxurious, educational, and practical (see Table 1). Curiously, they all attend the symphonic orchestra yet the motive to visit, as well as the classification and evaluation of the performance, follows a different reasoning.

Table 1 Consumption profiles

Profile Characteristics	Intellectual	Luxurious	Educational	Practical
Education	MA and PhD, often in humanities.	BA not in humanities.	BA or lower.	Below BA.
Capital	High volume, mostly cultural. Work in public sector or non-profit.	High volume, mostly economic. Work in private sector.	Heterogenous, average wage. Work across public and private sectors.	Homogenous, low overall capital. Working class in private sector.
Cultural consumption	Art for art sake. Prefer new, experimental and challenging art.	Utilitarian, must relax and entertain. Prefer high end art.	Moralistic, must increase knowledge, present the truth.	Meaningful, must be comprehensible. Prefer documentaries and high tech.
Material consumption	Moderate and ascetic to abstinence.	Luxury for luxury sake, sensitive to brands.	Materialism is seen as squandering. Excessive consumption is immoral.	Pragmatic, inconspicuous, distrust posh.

Source: Based on Jarnes 2015.

These four singular profiles provide an alternative view into the potential interest and reasoning behind cultural consumption. Of particular interest are the educational and practical profiles proposed by Jarnes (2015), when analysing the visibility of paintings in an online encyclopaedia, as they are both interested in culture when it can educate, increase knowledge, and inform about a topic, with a touch of high tech but may not necessarily visit a museum. Seeking culture online is not always easy if consumers are required to perform a search because they may lack the cultural knowledge required to do so. Finding the Anatomy Lesson of Dr. Tulp by Rembrandt housed at the Mauritshuis requires knowing the title, the painter, or the museum where the painting is located. In a study of 50 websites from the cultural domain, Stiller (2012) highlighted the fact that consumers can benefit from serendipity and exploration to encounter cultural content online, which is often lacking in culture-related websites. Instead, general-purpose websites, such as the online encyclopaedia Wikipedia, are ideal points to encounter with cultural content through serendipity, exploration, or mere accident. In this way, readers of the article "Autopsy" would accidentally encounter the painting by Rembrandt.

In the meta-analysis by Wu and Lu (2013), a distinction was made between hedonic consumption (for pleasure or interest causing satisfaction), utilitarian consumption (goal-driven and dependent on environment), and dual-purposed (a combination of both). Many websites and services online were categorised as dual-purposed, as a specific information need was complemented by a certain degree of satisfaction. Intrinsic motivators were found more critical for hedonic and for dual-purposed use, highlighting the significance of pleasure and enjoyment in systems to access information. Considering the case of the Wikipedia website, the study by Navarrete and Borowiecki (2016) found greater views of articles containing a larger number of images from a diversity of sources. The authors link this observation to a signal of quality, suggesting utilitarian digital cultural consumption, while we argue that the presence of art images in encyclopaedic articles may play a different role depending on the context.

2.1 Consumers of Wikipedia

Wikipedia is the online encyclopaedia that was launched in 2001 as main project of the Wikimedia Foundation, currently including a number of other complementary projects. The website gives free access to crowdsourced content of articles in over 250 languages, positioning it as one of the top 10 websites worldwide according to Alexa online ranking. The English Wikipedia has 5.7 million articles and receives 4.5 million views per hour worldwide (`http://stats.wiki-`

media.org/EN). There are numerous studies on the motivation of unpaid contributors, the management of content, the patterns of reader consumers, as well as applications of content towards information retrieval and language processing systems. Science direct currently identifies over 12,000 articles about Wikipedia while Wikipedia itself lists over 70 books and book chapters, 4,000 conference papers, 1,500 articles, 52 doctoral thesis, and several other scientific output (http://wikipapers.referata.com/wiki/List_of_publications).

Wikipedia has been studied as an example of a knowledge commons (Hess, Ostrom 2006), with a substantial body of work around the organisation and motivation of editors (and bots) as well as the evaluation of the content (for an overview of literature see Julien 2012). Evaluating consumer (reader) satisfaction generally relies on article frequency of views, assisted by a number of available tools developed by the Wikimedia community (see https://stats.wikimedia.org/). One approach to the analysis of reader preference can be found in Spoerri (2007a, 2007b) who looked at the 100 most visited pages and their positioning over time. He developed a primary and secondary category system to organise the articles to examine, if indeed, the expected geography, history, and science encyclopaedia categories were the most visited pages. His results show nearly half of all views in the five-month period to represent the category of entertainment, and an unexpected 10% views to the category of sexuality, the latter constituting thirty percent of the most visited pages in the sample. Spoerri (2007b) further established the relation to the most popular queries submitted in search engines, where pages from Wikipedia were ranked in the top three results in Google, increasing popularity to Wikipedia. This trend in fact changed after 2012 when Google introduced the knowledge graph to include the basic data from Wikipedia at the top right box of the results page (fed by DBpedia, extracted structured data in Wikipedia), reducing traffic to Wikipedia articles (https://en.wikipedia.org/wiki/Knowledge_Graph).

An application of the same categorisation can be found in Reinoso et al. (2012), who excluded Religion, Holidays, and Drugs in their analysis of the most visited Wikipedia pages in the four largest languages, namely German, English, Spanish and French Wikipedia. Their results of the English Wikipedia support the findings by Spoerri (2007a, 2007b), where Entertainment received nearly half of the views and Sexuality received the expected ten percent of views. Because Wikipedia lacks a systematic category system to organise articles, we have adopted the categorisation system devised by Spoerri (2007b) for the analysis of extracted data, being the available categorisation of the online encyclopaedia articles found in related literature. Other authors who examined popularity are Ratkiewics et al. (2010a, 2010b). Their approach was to examine the popularity of Wikipedia articles in relation to queries in the Chilean web. Their

results point to a characterisation of a heavy-tail burst behaviour influenced by endogenous events, such as an Oscar nomination for an actor's page or election day for a candidate's page. Similarly, Mestyan, Yasseri and Kertesz (2013) used Wikipedia popularity to predict movie box office success.

Limited empirical evidence exists on the use of and access to museum collections in Wikipedia. One example includes the analysis of the visibility of collections from the National Ethnographic Tropenmuseum in Amsterdam (Navarrete, Borowiecki 2016). Results showed that online publication of collections resulted in a substantial increase in object visibility compared to onsite exhibition of objects, as well as difference in consumer preference for type object, favouring 3D objects onsite and 2D objects online. A more recent study analysed 8,000 paintings used in 10,000 articles in the English Wikipedia, following a similar categorisation of articles, where 33% of articles were art-related though receiving 12% of views, while 67% of articles containing a painting were non-art related and received 88% of views (Villaespesa, Navarrete 2019). The authors argued the legal framework of open data to be responsible for the use of and access to collections.

A survey to Swiss museums revealed awareness of the potential increase in access to collections when disseminating open images via the online encyclopaedia, to stimulate education and research. However, institutions lacked resources to embark in the process to publish collections as open data and were reluctant to allow the inevitable commercial use of collections (Estermann 2013). In contrast, costs to make collections available in Wikipedia were considered negligible by the Dutch Tropenmuseum, as all the images and metadata were already available and transfer was simple (Estermann 2013). Successful collaborations between museums and Wikipedia are many, including the Derby Museum in the United Kingdom that included QR codes with a link to a Wikipedia article where visitors could learn more about the topic.[1]

2.2 Available Data on Digital Cultural Consumption

Even though digital technology has been identified as a threat to further engender equality of access, as digital literacy and access to technologies form a new determinant for Internet-related consumption (Katz-Guerro 2004; Ateca-Amestoy, Castiglione 2016), little research has been done on the actual emerging consumption pattern

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[1] A list of 22 selected successful case studies can be found at https://outreach.wikimedia.org/wiki/GLAM/Case_studies/Archived.

of paintings online. There are indications that digital consumption is complementary to onsite visits to museums (Ateca-Amestoy, Castiglione 2014; Evrard, Krebs 2018; Mihelj, Leguina, Downey 2019), as well as for art sales (Hiscox 2017). There are a number of case studies on the development of new art and culture services for mobile use (EU 2017b). Data available on cultural consumption (EU 2013) generally focuses on the so-called high art forms, where roughly a third of European adults visit museum (37%) and half visit heritage sites (52%). Translating the question online proves to be challenging. Digital consumption of music may be easier to understand when comparing visits to live concerts (35%) or listening to music on radio or television (72%) to listening to radio online (42%), downloading or streaming music (31%), or buying CDs online (27%). Respondents of visiting museums instead report "visiting museum, library or other specialised websites to improve your knowledge" (24%), or a more general "searching for information on cultural products or events" (44%). The hedonic side of consumption does not appear to be represented for museum collections in the online survey variant even though museums are engaging in the dissemination of their collections via Facebook, Instagram or SnapChat in order to extend the dialogue beyond a museum's physical location (Weilenmann et al. 2013). Museum content can be consumed separated from a visit to the institution just as a song can be heard independently of the programming of a concert hall.

Understanding the social consumption patterns of views to museum objects remotely via the Internet has received little attention, perhaps due to three central methodological challenges: (1) categorising remote digital access of museum collections has yet to be considered a form of cultural consumption; if this was to happen, (2) agreement on a harmonised method to measure consumption (e.g. views, clicks) is required; in order to (3) build datasets to allow an analysis of consumer behaviour, regular updates and revisions of the scope of the medium (e.g. images, XR) and the distribution channels (e.g. Wikipedia) should be ensured. In this paper, we argue that cultural consumption does not have to take place explicitly within a cultural context, such as a museum or a museum website, but that it can also take place within an information context, as accidental cultural consumption (e.g. in Wikipedia), both as hedonic and utilitarian forms of consumption. We further propose viewing paintings used to illustrate Wikipedia articles as an alternative consumption of museum content. Such consumption is not comparable to a physical or virtual visit to a museum but, in fact, points to the information value of collections that serve as visual documents to the encyclopaedic articles. Consumption of museum collections would in turn gain an entire new share of the market to increase the user base, beyond the traditional museum visitor.

3 The Case of the Metropolitan Museum of Art Paintings on Wikipedia

The Metropolitan Museum of Art (The Met) was founded in 1870 and is located in New York City, where it received 7 million visitors in 2017, of which 30% were locals and 37% were internationals. The museum has an online collection of over 400 thousand objects, of which over 13 thousand are paintings (The Met 2017).[2] The general website of the museum receives 32 million yearly online visits while the collection online receives 7.2 million yearly visits. These 600 thousand monthly visits can be categorised as follows: professional researchers, students, personal interest information seekers, casual browsers, information seekers and visit planners (Villaespesa 2017). In 2017, the museum launched an open data policy and, at the time of writing, 216,636 objects (of which 8,691 paintings) have been made available online with high-resolution images under Creative Commons Zero (CC0). The museum collaborated with the Wikimedia Foundation and uploaded all 364 thousand images as part of the Open Access Initiative (The Met 2017). A review of the results one year after the launch of the Open Access strategy showed an increase in image downloads from the museum's website, a higher usage of object images on Wikipedia, and a 385% increase in page views of articles that included an image from the collection (Tallon 2018).
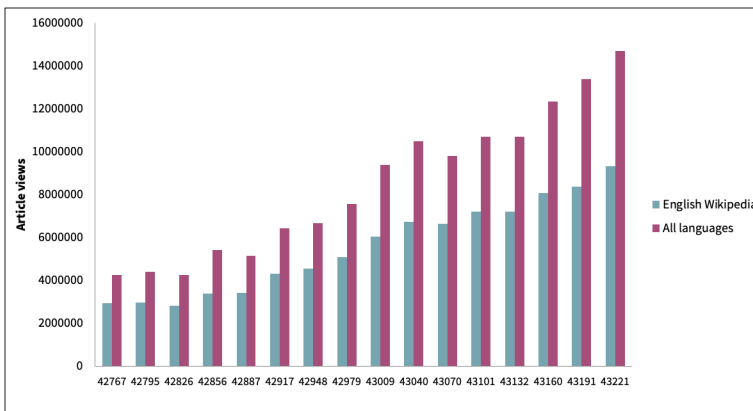

Figure 1 Number of Wikipedia articles views that include an image from The Met

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This study analyses a section of the collection, namely paintings, that have been used to illustrate articles in the English version of Wikipedia. The dataset corresponds to the month of May 2018 and has been gathered using the BaGLAMa2 tool,[3] which shows all the image metrics for the category "Images from the Metropolitan Museum of Art". These categories were made to facilitate the tracking of content use, often in collaboration with the museum institutions, but are not compulsory and hence not exhaustive. Our dataset comprises 119 paintings used in 169 Wikipedia articles receiving a total of 2,589,378 views in May 2018.

Table 2 The collection of the Metropolitan Museum of Art

	In museum	Open Access	In Wikimedia Commons	As illustration of articles	Number of articles
Total collection	461,591	216,636	364,359	NA	1262
Total paintings	13,269	8,691	NA	119	169

NA = Not available.

From the 364,359 object images the Metropolitan Museum of Art has shared in Wikimedia Commons for use in articles, we identified 119 painting images were actually used. We selected those articles that included a painting and that received more than 500 monthly views for further analysis, representing a total of 169. Those articles were manually coded using the categories found in the literature (Spoerri 2007a, 2007b). We added a category of Wikipedia that comprises all the pages created by the encyclopedia that are not necessarily articles (e.g. Home page, Featured article, User profile). These were removed from the analysis to focus on the articles and to reduce potential temporary variations in the average traffic. Results show a significant share of the paintings is used in art related encyclopedia articles, representing 57% of the sample, followed by geography (17%) and history (16%). As seen in Table 3, the views received by article class rank a bit different. It is not surprising to see the art-related articles receive the largest share of views (33%). What we found surprising is that history nearly ranked as high with 32% share of total views.

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3 The BaGLAMa2 tool was developed by Magnus Manske, to track the number of human views to Wikipedia articles from a specific commons category. The category representing the Metropolitan Museum of Art collection comprises 18 months (https://tools.wmflabs.org/glamtools/baglama2/index.html#gid=290&month=201807).

Table 3 Number of articles and number of views per category (N=169)

Primary category	Articles	%	Article views	%
Arts	96	57%	855,638	33%
Geography	29	17%	440,669	17%
History	27	16%	833,615	32%
Religion	11	7%	376,607	15%
Entertainment	3	2%	17,137	1%
Science	2	1%	55,784	2%
Sexuality	1	1%	9,926	0%
TOTAL	169		2,589,376	

When looking at the sub-categories (see Table 4), following those used in literature, we find that paintings often illustrate an article about the art piece itself, but can also serve as portraits (of artists, of historical and political figures, of mythological and religious characters). Paintings are also used to illustrate places. The share of views is noticeably larger for artists' biographies yet views to specific art pieces receive a relative low share of views. Views to articles about historic, political and mythological figures are relatively large in proportion to the number of articles.

Table 4 Number of articles and number of views per subcategory

Primary category	Secondary category	Records	%	Views	%
Arts	Artists	50	30%	585,838	23%
	Art	33	20%	111,365	4%
	Fashion	5	3%	36,417	1%
	Museums	5	3%	112,069	4%
	Literature	2	1%	1,159	0%
	Music	1	1%	8,790	0%
Geography	Culture	18	11%	233,118	9%
	Places	10	6%	206,494	8%
	Countries	1	1%	1,057	0%
History	Historical figures	10	6%	270,815	10%
	Events	3	2%	2,982	0%
	Political figures	2	1%	459,593	18%
	Wars	2	1%	1,542	0%
	Other	9	5%	88,282	3%
	Event	1	1%	10,401	0%

Religion	Mythology	6	4%	278,971	11%
	Religious depictions	2	1%	6,738	0%
	Religious terms	2	1%	37,412	1%
	Other	1	1%	53,486	2%
Entertainment	Sports	1	1%	8,131	0%
	Other	2	1%	9,006	0%
Science	Natural science	1	1%	33,299	1%
	Scientists	1	1%	22,485	1%
Sexuality	Other	1	1%	9,926	0%
	TOTAL	169		2,589,376	

Aggregating the share of articles and views that are directly related to the artist, the painting, or the museum, we find that paintings illustrate over half of the articles in our sample. All other categories have been grouped as non-art related and actually receive two thirds of all views to articles containing a painting from the Metropolitan Museum of Art.
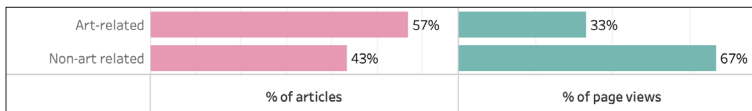
Figure 2 Share of articles and views in art and non-art related categories

Zooming into the most viewed articles we find that the portrait of George Washington and of Christopher Columbus are the most visible portraits in Wikipedia articles, together with the portrait of Vincent van Gogh. Besides the article about the museum, all other articles are the expected general encyclopedic entries.

Table 5 Top 20 most viewed Wikipedia articles including painting images from the Met

No.	Article	Category	Page views	No. paintings
1	George Washington	Non-art related	458,368	1
2	Vincent van Gogh	Art-related	290,658	1
3	Christopher Columbus	Non-art related	247,514	1
4	Metropolitan Museum of Art	Art-related	86,409	4
5	Oedipus complex	Non-art related	83,891	1
6	Sphinx	Non-art related	77,713	1

7	Saint Joseph	Non-art related	53,486	1
8	Amazons	Non-art related	50,834	1
9	Genoa	Non-art related	47,822	1
10	Paul Cézanne	Art-related	43,573	1
11	Scythians	Non-art related	43,225	1
12	Pandora	Non-art related	40,904	1
13	Wall Street	Non-art related	40,622	1
14	Greeks	Non-art related	33,588	1
15	Pet	Non-art related	33,299	1
16	Édouard Manet	Art-related	32,293	2
17	El Greco	Art-related	32,142	1
18	Five Points, Manhattan	Non-art related	31,957	1
19	Eve	Non-art related	29,672	1
20	Eugène Delacroix	Art-related	24,367	2

We further gather data from the Metropolitan Museum of Art website in August 2018. We identified the 119 paintings in our dataset and collected information about the display status, being currently exhibited or not. We found that 52 paintings (or 38.5%) were not on display, hence could not be viewed by visitors of the museum. These paintings, however, did receive nearly 800 views online in one month (see Table 6). The 65 paintings on view at the museum correspond to the better-known paintings, receiving 2.3 million online views in one month.

Table 6 Wikipedia views of paintings (currently exhibited and not on view)

	Not on view	**Exhibited**	**Total**
Number of paintings	47 (39.5%)	72 (60.5%)	119
Wikipedia views May 2018	736,298	1,942,628	2,589,376*
Number of articles*	60	127	

*Articles may include both paintings on view and exhibited. The number in this table shows the number of views to articles that included a painting in each category, hence views to 'not on view' and 'exhibited' cannot add to 100%.

Unsurprisingly, we find a visible long-tail of the usage of paintings in various articles. Twenty-six paintings were used in more than one article, among the most used paintings we find a portrait of El Greco and a portrait representing Christopher Columbus, currently not on view at the museum. The painting by Gustave Moreau entitled *Oedipus and the Sphinx* from 1864 is used in pages about the artist, the year, the sphinx, its collection William H. Herriman, but also on 'Oedipus complex' and 'Phallic stage', increasing its visibility considerably.

Table 7 Top ten most viewed painting images

No.	Painting	Views	N. articles	Exhibited
1	Emanuel Leutze (American, Schwäbisch Gmünd 1816-1868 Washington, D.C.) - Washington Crossing the Delaware - Google Art Project.jpg	458,970	2	Yes
2	Portrait of a Man, Said to be Christopher Columbus.jpg	369,066	9	No
3	Vincent van Gogh - Wheat Field with Cypresses - Google Art Project.jpg	295,771	3	Yes
4	Oedipus and the Sphinx MET DP-14201-023.jpg	179,274	5	Yes
5	El Greco - Portrait of a Man - WGA10554.jpg	146,687	9	Yes
6	Annunciation Triptych (Merode Altarpiece) MET DP273206.jpg	123,049	5	Yes
7	Rosa bonheur horse fair 1835 55.jpg	117,027	6	Yes
8	JoanOfArcLarge.jpeg	86,409	1	Yes
9	Majas on Balcony by follower of Francisco de Goya.jpg	86,409	1	No
10	Eugène Delacroix - Ovide chez les Scythes (1862).jpg	69,144	3	Yes

4 Discussion

In our case study of the Metropolitan Museum of Art, we find a comparable yearly visit rate between onsite and online visitors. The physical museum receives 7 million visits a year, of which 2 million are residents of a city of 8.5 million inhabitants, while the collection online receives a similar 7.2 million visitors a year, from a global population. The museum has further expanded its publication channels to include one of the most popular websites worldwide and in 2017 uploaded 360 thousand images of its collection to Wikimedia Commons. We have focused on the painting collection. In less than a year, 119 paintings have been used to illustrate 169 Wikipedia articles in English receiving over 2 million views per month. 47 of those paintings (or 40%) are not available for view at the museum because they are in storage, while online views continued to flow reaching nearly 750 thousand views per month. This is a significant increase in collection visibility.

Lacking socio-economic demographic data on the physical and online visitors of The Met, we rely on the behaviour of the online visits to Wikipedia articles including images of the painting collection, our dataset. We certainly observe greater consumption when a larger share of the collection is made accessible, as in the case of the 47 paintings not exhibited at the museum but available on Wikipedia,

Figures 3a-c Examples of painting images used in Wikipedia articles: a) *Portrait of the Imperial Bodyguard Zhanyinbao* by unidentified artist (1760). `https://en.wikipedia.org/wiki/Bodyguard`; b) *Oedipus and the Sphinx* by Gustave Moreau (1864). `https://en.wikipedia.org/wiki/Sphinx`; c) *Christopher Columbus* by Sebastiano del Piombo (1519). `https://en.wikipedia.org/wiki/Christopher_Columbus`

illustrating 60 articles receiving 736 thousand views, supporting the results of Brook (2006). Online consumption displays an exponential increase when collections are used in a Wikipedia article, not necessarily within an art context, which by the mere numbers represents a broadening of the consumer base, including those beyond the socio-economic profile of the museum visitor. In fact, digital consumption of paintings increases when art is seen as information. We find lower consumption to pages about the art piece and greater consumption to biographies of artists (29.6%), historical figures (5.9%), political figures (1.2%), and mythological figures (3.5%). Collections have an important information value as they fulfil an information function, that of illustrating important figures.

The literature on cultural consumption assumes a purely hedonic drive, or utilitarian to serve in class dynamics. Consumer behaviour in Wikipedia reveals a more complex picture where both hedonic and utilitarian drives overlap. One important distinction can be found between the consumer actively seeking cultural content, visiting pages related to arts and culture, and the consumer seeking non-arts and culture related content, visiting pages related to history, geography or religion. Both consumers find images of The Met, the former representing a third of the views. That means that two thirds of consumers in our sample are not actively seeking to view paintings from the museum yet in fact do so.

This has four important implications for understanding digital heritage consumption in Wikipedia. First, Wikipedia serves as highly accessible source of easy-to-understand content, lowering the threshold of required ability to process information. Consumers are not required to formulate an 'art' query but can land on an article illustrated with art. Following Ganzeboom (1982), this would result in increased consumption also of art-related topics and highly intellectual art pieces. The lower capital profiles identified by Jarnes (2015) can be expected to benefit the most from such accidental encounters, as paintings would increase knowledge, be meaningful and comprehensible, and present encyclopedic content. However, not all consumers are seeking 'art'. Wikipedia is made of hyperlinks allowing consumers to encounter cultural content even when lacking proper cultural capital to formulate the right search, by serendipity (Stiller 2012). The article 'Pet', for example, has numerous images including one painting from The Met's collection 'Young Lady with parrot', by Édouard Manet **[fig. 4]**. Similarly, the articles 'Fair' and 'Horse trade' includes the artwork 'The Horse Fair' by Rosa Bonheuron.

Second, a recent user study identified Wikipedia fact-checking to represent consumers with high socio-economic capital (Singer et al. 2017). Besides substantially lowering the barrier of time reported to visit a museum, the consumer sensitive to status and branding identified by Jarnes (2015) can easily benefit from having mobile access

Figure 4 Screenshot of the Wikipedia article 'Pet'
which contains a section called 'Pets in art'
(https://en.wikipedia.org/wiki/Pet#Pets_in_art)

Figure 5 Screenshot of a Wikipedia article
including a painting from The Met's collection
(https://en.wikipedia.org/wiki/Cider_in_the_United_States)

to information such as 'quick facts' during social encounters, enriching their social currency as proposed by DiMaggio (1987). In this way, fact-checking can be expected to particularly benefit status seekers who in turn gain rich cultural information. The article "Cider in the United States" including a painting by William Sidney Mount in figure 5 serves as example **[fig. 5]**.

Third, not very well know paintings can illustrate a variety of articles, as the Imperial Bodyguard portrayed above illustrating "Bodyguard" is also found in the articles "Dao (sword)", "Chinese archery", "Tungusic peoples", "Qing official headwear", and "Wu Quanyou". The range of topics would reach a variety of consumers, as identified by Jarnes (2015), so that each consumer profile may have the chance to encounter an art piece and to gain utility from encountering something new, from being entertained, from learning or from the easing of the access. The variety of topics available in the encyclopedia will certainly tap into the topical interest of a greater number of visitors, lowering an important barrier to museum visits.

Last, the fact that well-known established superstar museums, including the Metropolitan Museum of Art, are collaborating with Wikipedia points to a shift in the field. Museums are establishing a new tasteful form of cultural consumption (Meyer 2000), that of paintings in the online encyclopedia, by positioning authentic images for public online use. Paintings, and metadata about collections, are available with a CC0 (1.0) license inviting further reuse. Authenticity of cultural consumption can clearly be differentiated from authenticity of digital cultural consumption, where the later guarantees an authoritative source (a museum) that can serve as art and as information.

One may argue that viewing a painting in a Wikipedia article may not take more than a few seconds, if at all. Future research is needed to determine the actual viewing of paintings on such websites – current tools are still rudimentary. However, previous ethnographic research on museum visitors reveals that visitors may miss a significant part of collections, especially in large museums, and that viewing paintings may take one up to 40 seconds, while texts are hardly ever read (for an overview of the literature see Beer 1987). Museum visits are hence but an indication of a view to a painting in display, just like views to Wikipedia articles may indicate the rate of digital consumption. Because of the great pervasiveness of non-art related consumption of paintings (67%), we argue that paintings in Wikipedia can be expected to increase the visual vocabulary of visitors and serve to increase consumer utility during future museum visits. Regarding the art-related views (33%), we believe greater information about the painting, the artist, and even the hosting institution, may lead to greater interest to visit the collections. Though the open data movement and publication of museum collections is relatively new to observe clear social effects, this may prove to be an interesting line of future inquiry.

5   Conclusions

In an increasingly digital world, cultural consumption must be freed from museum websites. We looked at paintings from the Metropolitan Museum of Art available as illustrations of English articles in Wikipedia and analysed their visibility during the month of May 2018. We find that paintings are mostly viewed as illustrations of places (17%) followed by illustrations of important historical events and personalities (16%). When analysing the content of the articles, we find that paintings illustrate art-related content (67%) as well as non-art related content, the later receiving two thirds of total views of our dataset (2 million monthly views). Our results have four main implications to advance the understanding of digital cultural consumption. First, there are accidental consumers who benefit from serendipitous consumption to encounter paintings in an environment requiring low cultural capital and information processing abilities. Second, Wikipedia facilitates mobile fact-checking, which can enrich status seekers' conversation and lower the time barrier to cultural consumption. Third, paintings can be used in a variety of articles yielding utility to a variety of consumers, where the intellectual consumers may gain greater content from the layered visual information provided in a painting. And last, museums are participating in new forms of content distribution that expands tasteful consumption to include a digital realm, by providing authentic images for public use. In this sense, authentic digital cultural consumption may rely on a clear source (museum) as well as quality images in art as well as non-art environments.

Based on our results, we can safely say that digital dissemination of collections in Wikipedia will have an impact in future cultural consumption. Our case study receives 7 million physical visits per year while the paintings in Wikipedia received 2.5 million visits in one month. From the 7 billion inhabitants in the planet, we cannot expect everybody will be able to visit the museum in New York City (it will take one thousand years!). Wikipedia appears as a viable channel to disseminate collections to increase consumer reach, even when the object is in storage or when the museum is physically unreachable to all socio-economic groups (Brook 2016). Publication of collections within the institutional website may very well echo a museum consumer profile yet broadening the publication channels would increase consumer diversity. In Wikipedia, paintings serve as illustrations to art as well as non-art related topics, lowering the threshold to view art, favouring what Stiller (2012) suggests for consumers unable to formulate an art-related query. The use of digital authentic images, provided by museums as representations of their collections, can contribute to what Meyer (2000) identified as institutions contextualising the collective definition of taste. It is up to the muse-

um to approve the use of its collection to illustrate the online ency-
clopaedia and in so doing to transform the social perception of taste,
and our concept of cultural consumption. Viewing images of paint-
ings as illustrations of an online encyclopaedia is not comparable to
the viewing of a painting inside a museum, where the context is es-
sentially different. However, the attention spam per painting in mu-
seums, if the visitor views the painting at all, is generally well below
40 seconds and hardly includes reading text (Beer 1987). In the on-
line encyclopaedia, the focus to reading may predispose the consum-
er to view images differently. Future research is needed to better un-
derstand the interaction with the paintings in Wikipedia as well as
the awareness of consumers regarding the viewing of art.

Lines of future work in fact are many, since the online environ-
ment provides new forms of cultural consumption. Certainly, com-
paring the use of paintings in traditional paper-based encyclopedias
may signal whether there is a shift in the use of images and whether
this shift can be positioned in relation to the growth of our predomi-
nantly image-based communicating culture. The Wikipedia Founda-
tion environment is a fertile ground for observing the behaviour of
readers, editors, and content contributors (such as museums) but al-
so for gaining some form of harmonization in the data from various
sources, always welcomed by digital humanities researchers. For pol-
icy makers it would be interesting to measure the extent to which
such wider availability of images leads to different type of research.
Further, we only looked at the use of paintings in actual articles, but
the paintings are used for a number of other uses, including in user
profiles, portals, or other Wiki-related pages.

Our study serves as stepping stone in the understanding of dig-
ital cultural consumption beyond the art context, yet it cannot es-
cape a couple of major limitations. First of all, regarding the selec-
tion of the dataset. While other collections beyond paintings at The
Met and a larger span of analysis may provide a different relation
of art and non-art article usage, we believe the general result of art
paintings used in a variety of articles with greater views in non-art
related topics is recognisable by many museums. The adoption of
museum collections as encyclopaedic illustrations has a long histo-
ry, as can be seen from the name of the file of the most viewed paint-
ing in our dataset including the name of the source (Google Art Pro-
ject). The Met serves as perfect example of a well-known museum,
with healthy onsite and online consumer base, that decided to ex-
plore new markets. Having only views to articles resulted in a lim-
ited metric but nonetheless a rich indication of the potential infor-
mation value of museum content. In figure 6, an example of an item
from the collection illustrating the use of the pineapple fiber to make
luxury fabrics decorated with floral embroidery **[fig. 6]**. Thanks to the
increased adoption of digital technology at the exhibition galleries

Figure 6
Image of textile collection from the Metropolitan Museum of Art used in Wikipedia articles. https://en.wikipedia.org/wiki/Pineapple#/media/File:Kerchief_MET_25.132.8.jpg

and to the improved metrics online, also within Wikipedia, future research may look at the actual consumer journey onsite as well as online. A richer dataset may allow for further analysis, combining quantitative and qualitative insights, for instance to inquire about perception and practice of digital heritage consumption outside of an art-related context. As data improves, comparisons between online environments may shed light on the process of viewing an art piece, and the ways in which extended or mix reality can support the art experience remotely.

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Annex

Table A1 Top ten most viewed painting images (currently not on view)

No.	Painting image	Views	N. articles
1	Portrait of a Man, Said to be Christopher Columbus. jpg	369,066	9
2	Majas on Balcony by follower of Francisco de Goya. jpg	86,409	1
3	Departure of the Amazons MET DP318355.jpg	50,834	1
4	Portrait of the Imperial Bodyguard Zhanyinbao.jpg	36,567	5
5	Angel of the Divine Presence Bringing Eve to Adam (The Creation of Eve- "And She Shall be Called Woman) (recto); Sketch for the same (verso) MET DP805381.jpg	29,672	1
6	Girls Carrying a Canoe, Vaiala in Samoa MET ap1970.120.jpg	23,920	1
7	Baron Alexander von Humboldt (1769-1859) MET DP-1411-001.jpg	22,485	1
8	Atalanta and Meleager MET DP261342.jpg	22,218	1
9	Madame Félix Gallois MET DP359015.jpg	11,407	1
10	無款 清末 京劇一百人物像 冊 絹本-One hundred portraits of Peking opera characters MET DP280076.jpg	8,790	1