Heliyon 9 (2023) e16369

Contents lists available at ScienceDirect

Heliyon

journal homepage: www.cell.com/heliyon

Research article

Pedagogical prospection of the metaverse through curatorship. Case study of the 1964 IBM pavilion as an example of curatorial pedagogy

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A B S T R A C T

In an effort to explore the potential of the metaverse in the field of curatorship, as a space of convergence between education and communication, this article presents a descriptive case study of the IBM Pavilion designed by Eames and Saarinen for the 1964 New York World Fair. As an exhibition project that anticipated the possibilities of computers through an immersive experience in a changing historical moment, it opens up for the present new scenarios for imagining how to approach the metaverse. Conclusions are drawn according to the initial theoretical framework with an interdisciplinary focus on the context of uncertainty in the emergence of the metaverse and its pedagogical possibilities through the development of crosscutting capabilities in citizens.

1. Introduction

Researchers from educational and curatorial fields come together in this study to reflect on the pedagogical mediation of curating as a prospection of how citizens will relate to the world in the new era of metaverse and augmented reality (AR henceforth).[1] Curating has great potential to show which future skills people will need to cope with reality. In addition to the necessary media literacy, young generations must develop other skills to critically interpret and relate to new assets as active agents and not as mere users [1,2]. Enhanced by the establishment and development of Non-Fungible-Token (NFT henceforth)[2] [3] and Digital Twins[3] [4,5], this new

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[1] "Roblox, Epic, Genies, and Zepeto use the term metaverse, while Facebook uses Live Maps (and now Meta), and Magic Leap prefers the Magic verse. Kevin Kelley called it the Mirror world in Wired and Nvidia uses the term Omniverse. Others prefer the term AR Cloud, Spatial Internet, or Spatial Web" (Hackl, 2021, n. p.).

[2] Vasan et al. (2022, p. 1) describe a Non-Fungible Token (NFT) as a permanent and certifiable online record that connects a digital artwork or a file, often called crypt art, to its owner: "Most NFTs are listed on an Ethereum monitored decentralized cryptocurrency platform that utilizes block chain technology […]. Each transaction pertaining to an NFT and the associated artwork is stored in a ledger via a Proof-of- Work mechanism, enabling easy and fail-proof transfer of digital assets, and verifiable ownership of art. Hence, NFTs offer a mechanism for artists to create digital works of art and validate their work as unique, eternal, and worth collecting, and offers collectors the ability to showcase their collections on digital platforms. […] The financial success of an NFT is partly determined by its visible features like style, design, content, attracting the interest of collectors with similar taste in art."

[3] Concept attributed to Gelernter in his book "Mirror Worlds" (1991) but developed by Grieves (Digital Twin Institute) in 2003. The concept transferred to the aerospace field in 2010 and later to other fields such as medicine. Although there are three different ways to specify the term, the best known refers to one that describes a physical Correspondence with an individual digital twin linked throughout its lifetime.

https://doi.org/10.1016/j.heliyon.2023.e16369
Received 4 October 2022; Received in revised form 21 April 2023; Accepted 14 May 2023
Available online 19 May 2023

reality calls for educators and curators to reflect on the consequences of an ecosystem whose mere vortex speed hinders a reassuring mindset for future generations.

1.1. A context of uncertainty for the arrival of the metaverse

A lot has been said and written about the metaverse in the last year, probably due to the launch of Meta, Zuckerberg's new joint platform. However, lately this term is being used indiscriminately to refer to any virtual reality. The etymology of the term *metaverse* is formed by the union of the prefix *meta* and the suffix *verse,* and is commonly used to describe a hybrid environment where virtually shared experience converges with the physical realm. In 1992, N. Stephenson coined the term *metaverse* in his novel *Snow Crash*. As described by Park & Kim [6] "metaverse implementation requires three components: i) hardware; ii) the development of the recognition and expression model that leverages the parallelism of the hardware; and (iii) the availability of content that people immerse in and participate in". Dwivedi et al. [7] further classify its definition into four types: environment, interface, interaction and social value. Although there is no single definition of metaverse and its meaning will evolve as technology evolves,[3] authors agree on the convergence between virtual and physical reality as a universal characteristic. These characteristics shape the metaverse while allowing users to experience reality through multisensory interactions [6–10].

The iteration of the Internet and digital environments towards the metaverse is inevitable, and predictions show it will be a solid trend [11]. The metaverse and its issues became most relevant after the presentation of Horizon Worlds in 2021 by Meta Platforms. This is ironic as it was also simultaneously one of the most scrutinizing times for Facebook [7,12,13]. Although this concept had been applied into many different contexts before, it was only at this moment when it became relevant worldwide.

The company scheduled a series of videos for the new Meta's YouTube channel to launch the new brand. The main video, made by *Droga5 Studio*, has been widely criticized for the superficiality of its explanation[4] [14]. For the director of the *Initiative for Digital Infrastructure* at the University of Massachusetts, Meta is just a way to distract us from a world that the company itself has helped to break [13], referring to all the psychological disorders that social networks are provoking [7,15–17].

The promotional video of Meta, in which some high school students are seen "entering" the painting of a landscape hanging on the wall of a museum (Henri Rousseau's *The Tiger and the Buffalo*), points out that Meta will be "the dimension of imagination" [18] and that "this is going to be fun" [19]. The promises of fun sent to the audience contrast with the dangers and risks denounced by experts for experiential perception: I) the superimposition of the virtual world on the real world; II) instant knowledge of people's identifying traits; III) political polarization through advertisements and content defined for each profile [11]. Perhaps, this last issue is the most far-reaching, given that Facebook has been in litigation over unethical data use [12].

In addition, with his new platform Meta, Zuckerberg has the capability to reach 6.2 billion people, which means he has access to browsing data, preferences, and trends for almost 80% of the global population [20]. Regarding the first of the above-mentioned risks about the blocking of reality, this new platform presents a relevant issue for the case study that concerns this research. "Some users feel unsafe if their view is 'locked' into an immersive virtual world, whereas augmented reality allows them to 'keep control', to see the real world around them. Such safety-related issues are important in collaborative mobile systems for use in classrooms" [21].

While the metaverse could enhance many living and learning experiences, a purely fun-focused and content-deprived approach can challenge, in contrast, the experience of commitment and sharing. "Imagine if you could be at the office without the commitment, you'll still have that sense of presence, share physical space, change interactions that make your day … all accessible from anywhere" [22]. Continuous availability to others offered in promotional messages such as the quoted statement can greatly damage the space for intimacy and sharing necessary for pupil involvement. School pupils learn to engage with the contents of knowledge by engaging with themselves and with others when they feel safe in a space for transparency and mutual recognition.

The metaverse provides a scenario about the future that opens the doors to reflection in the field of future studies, particularly on the consideration of the leading role that humans play in the creation of its possibilities. Citizen participation and critical construction can be deeply damaged if the role stays merely passive [23], as it is glimpsed in the video "This future will be made by all of us" [24]. It is only a matter of time before individuals relate to the metaverse only with the usage parameters set by Meta. Yet, in the face of an overflowing reality such as that of MUVE, there is a chance for pedagogical curatorship to provide the users with tools that facilitate learning in the state of distraction fostered by virtual reality [25].

1.2. Pedagogical possibilities of immersive curatorial experiences

As a pedagogical mediation, art curating offers experiential learning settings that are difficult to design and program in formal educational contexts. Considering art as experience [26], curators are providing the audience with new forms to understand the world through the sensory embodiment of existing reality [27–29]. Furthermore, within the framework of Future Studies, art design and interpretation hold pedagogical value as foreshadowing into the future by means of creativity and imagination [30]. Similar to the Socratic pedagogical method, by applying imagination to create concrete fictional scenarios, curators can make predictions about the potential impact of what may possibly happen in the future. Immersed into these fictional realities, users can experience possible

[4] In this podcast, Joe Rogan discusses with Tristan Harris and Daniel Schmachtenberger several issues, among them, the metaverse and Zuckerberg's version of it. Tristan Harris is a former Google design ethicist, co-founder and president of the Center for Humane Technology, and co-host of the Center for Humane Technology's "Your Undivided Attention" podcast with Aza Raskin. Daniel Schmachtenberger is a founding member of The Consilience Project, aimed at improving public sense making and dialogue.

futures and reflect on what they do or do not want to happen, enhancing present decision-making [31,32].

If the technological revolution displaced the traditional working methods in educational environments [33,34], as the global COVID-19 pandemic has succinctly shown, then the metaverse similarly confronts us with an uncertain pedagogical future that will indeed expand the immediate frame of reference [35]. As Gordon and Todorova [36] point out, images of the future are shaped by our own preferences, expectations, and prejudices. However, by integrating images of the real world with other alternatives proposed, curatorship can draw the curtain back on the consequences of imagined changes. When it comes to confronting new images, we usually turn to past memories. How we learn and understand new scenarios is strongly linked to our capacity to reconstruct them mentally. We do so by systematically gathering images and comparing them with a set of prior stored and known images [30,37].

According to Poulsen [38], prospective interpretation is based on historical, social, cultural, and individual narratives. Studies analyse, conceptualise, and develop alternative and desirable futures in which imagination becomes a creative skill for anticipating and understanding the changes to come [32,39]. Sometimes this is fostered by the didactics of iconographic images from cultural heritage [40], but also often distorted by media images [41]. In any case, past and present images complement the construction of an emergent future by revealing what might cause it and its consequences. Therefore, although imagining the future provokes uncertainty, it opens creative possibilities for its study and comprehension. In this regard, curatorial mediation purports to help citizens integrate images of the future into learning processes. In this light, one can think about alternative scenarios that also inform the present [42]. By translating the imagined into the physical representation, the audience can experience, feel, understand, and presently grasp what life could be like in the future. This has pedagogical implications when it comes to dealing with immersive curatorial experiences.

As a discipline, curatorship integrates several fields of knowledge and undoubtedly has a social dimension [43]. On the one hand, it contains a purely technical dimension related to the installation of exhibitions and events, while drawing on other subject matters [44]. Art history is the closest subject to curatorship, as it is frequently concerned with disseminating the works of different authors and periods [45]. Likewise, architecture has an important role through the study of space and its different proposals for curatorial use [46]. Moreover, communication works on the transmission of one or several messages through specific communicative channels [47]. Last but not least, pedagogy is involved in the complete curatorial process, since its main purpose lays on addressing the cultural object to the target audience considered as a human subject, which means that cultural curatorship promotes human development in its most essential form [48].

In the end, all the fields converge into the same objective of curating, which consists in using the exhibition as a medium that shapes the form in which the content is received, according to McLuhan: "it is the medium that shapes and controls the scale and form of human association and action" [49]. The metaverse comes from a scenario with a previous technological development where most media were, in the words of McLuhan [50], "cool media" [51]. Therefore, it is part of the virtual worlds, in which users need to actively complete information that may be missing [52]. In fact, these virtual worlds are particularly interactive, persistent, and embodied. Digital tools favor the creation of new educational contexts through simulation and interaction between physical and virtual worlds [5,53,54]. Multi-User Virtual Environments (MUVE) can be embedded everywhere facilitating the learning process, especially within the curatorial proposals. According to Sanz et al. [55], they enable learning objectives such as (I) developing greater spatial representation; (II) reenacting otherwise impossible learning experiences; (III) facilitating tasks that intrinsically increase motivation and engagement; (IV) transferring knowledge; and (V) fostering collaborative learning. However, societal changes require a new definition for these tools, such as the metaverse, from its previous use in Second Life platform [56] to the easily accessible and strongly immersive experience of the current one [6].

Some immersive virtual worlds can give users a sense of insecurity [9]. For instance, virtual reality glasses that take students to another time period and context. Others can make them feel in control of the surroundings, as for example the video mapping of lost fresco paintings at the program *Opened for Restoration* in Saint Mary's Cathedral of Vitoria, Spain [57]. This safety-issue is important when tapping into the possibilities of these new assets in both formal and informal educational spaces, no matter how much the possibility of integrating digital artifacts by exploring them collaboratively makes learning concrete and situated [21]. In fact, some pedagogical curating initiatives are already experimented under these parameters. The immersive multisensory traveling exhibitions inspired by the works of Van Gogh, Frida, Monet or Klimt [23] have set a precedent that continues with the imminent opening of the first permanent virtual reality museum in Madrid [58]. Participants can creatively engage with modified versions of artworks as digital technology adapts and responds to their preferences on walk-through displays. Thus, educational experiences are socially transformed through these new art exhibition models [23].

To explain the possibilities of the metaverse in the pedagogical mediation of curatorship, professionals frequently use the scenario approach. In this approach, scenarios function as tools to explore possible futures [38,59]. Considering that each tech company understands the metaverse differently, the possible scenarios are built based on "two key continua […] the *spectrum* of technologies and applications ranging from *augmentation* to *simulation*; and the *spectrum* ranging from *intimate (identity-focused)* to *external (world-focused)*. […] Combining the two critical uncertainties gives four key components of the metaverse future: Virtual Worlds, Mirror

Worlds, Augmented Reality and Lifelogging"[5] [10,35]. Furthermore, we could state that the metaverse contains overlapping elements at the same time of all these four scenarios. Two recent academic articles can be extrapolated here to support our discussion [60,61]. Both of them clearly state the same four keys of the Metaverse. This provides a strong foundation for the understanding of this new medium, further auguring to the claim that the metaverse comprises all four scenarios. Lee and Wei [60] go even further and give examples of each one: Virtual Worlds (VW e.g. Zepetto, Roblox)/Mirror Worlds (MW e.g. Google Earth)/AR (e.g. Pokemon GO)/Lifelogging (Ll e.g. Facebook, Apple Watch). Nevertheless, it should be noted that a divergent approach [6] states that the metaverse differs from AR or VR as it has more sustainable content and social meaning and does not necessarily use these AR/VR technologies [6].

After delving into how the metaverse and the use of the case scenario approach for future prospection is a powerful tool, we are more adept to understand its prescient relation to curatorship. Curators know that the question of perception and its internal dynamics lies at the core of their endeavour. Much literature was left in the 19th and the 20th centuries on the understanding of learning and perception. In fact, Benjamin provided us with insight into the discussion on attention and distraction that was symptomatic of the 19th century. He defined attention as a habit, meaning a haptic perception of reality. "Such reception cannot be understood in terms of concentrated attention […], produced not so much by way of attention as by way of habit (distraction)" [62], meaning it is not guided by the visual, but rather based on the experiential, where the core of perception takes place [63]. Thinkers like Hildebrand, Wölffin, Riegl, and Benjamin, defined, reversed, and challenged such diverse perceptual categories as near *vs* distant, tactile *vs* optical, and distraction *vs* attention.

If the use of immersive scenarios greatly challenges the core of perception, curatorship as a discipline could foster and develop its use with a pedagogical and communicative intention. Notwithstanding, we should also think about the consequences that the indiscriminate use of these immersive scenarios may have on individuals' relation with the world. With the new existential narrative of the metaverse and its Lifelogging feature, we will not only have access to a multiple reality, but also, our own reality will be at stake. Different issues like the way we understand our surroundings and ourselves, how we express and tell our own story, and interpretation of our interactions will be increasingly complex. Under a paradoxical sense of anonymity, as Sanz et al. [55] state, we will live dissociated through multi-channel complex realities. In line with the warnings and statements of Rushkoff [64] and Tarafdar et al. [65], the digital industry should develop innovations according to certain ethical codes and protocols based on societal well-being and human-centered reflection to prevent the mercantilist reduction of people to mere algorithms or consumers [23,35].

As a best practice of pedagogical prospection in art curating, the object of this paper focuses on the case study of the IBM Pavilion designed by Charles Eames in collaboration with Eero Saarinen's office for the 1964 New York World Fair. Their attempt to bring an experience of what the future could be like when computers were to be used in everyday life, becomes now a key historical reference. It can serve as an anticipation of the changes that the metaverse can introduce into our future days, while offering educators and curators the opportunity to better identify and address people's needs with this experience. An immersive art experience, such as the one explained next with the case study of the 1964 IBM Pavilion, seeks to make the viewer relate to the object in an unknown way.

2. The case study of the IBM pavilion (New York, 1964)

2.1. Method

Based on the previous theoretical framework, the following case study presents a descriptive analysis sustained on a variety of primary sources such as archived documents, architectural plans and interviews. The author(s) of this article visited the Yale Archives and the architectural office of Kevin Roche (2019†)[6] back in 2009. There were several interviews conducted with Mr. Roche, and it is only fair to highlight his generosity and thorough dedication to those long interviews. They represent a valuable first hand source of interpretation of both the ethos of the 1964 World Fair, and everything related with the IBM commission, design, and especially and foremost the curatorial strategy. Even though the focus of the research at that time was far from the metaverse *per se*, the revisit to all the material and first-hand research has presented itself as crucial for a reinterpretation with the parameters available in this paper.

Through the description and analysis of this case study, the aim is to generate hypotheses and pose some crucial questions about the pedagogical and curatorial approach that the metaverse could open in a near future. The case study methodology fits the parameters of future studies insofar as it opens the opportunity of studying possible scenarios [59,66]. Its applicability is convenient in a context of intersection between pedagogy and curatorship, in which the metaverse is a new phenomenon, which integrates the use of space and

[5] Virtual worlds are described by Smart et al. (2007, p. 6) as virtual and physical worlds where "issues of identity, trust and reputation, social roles, rules, and interaction remain at the forefront". By contrast, the same authors understood mirror worlds as "informationally-enhanced virtual models or *reflections* of the physical world." (p. 9). The characteristics of the metaverse come into play in augmented reality products as they "enhance the external physical world for the individual, through the use of location-aware systems and interfaces that process and layer networked information on top of our everyday perception of the world." (p. 12). Lastly, Smart et al. (2007) refer to the concept of lifelogging as they "record and report the intimate states and life histories of objects and users, in support of object and self-memory, observation, communication, and behavior modeling." (p. 14). Two more recent academic articles have been published and can be drawn here to support the discussion. Both of them clearly state the same four keys of the Metaverse: augmented reality, lifelogging, mirror worlds, and virtual worlds.

[6] Kevin Roche passed away in 2019. He won the Pritzker Prize (most prestigious prize in Architecture) in 1982 and was working hand in hand with Eero Saarinen and Charles Eames in the design and ideation of the IBM Pavilion. When Saarinen passed away in 1961, he alongside John Dinkeloo became the principles of Saarinens office. At that moment they were just on the inception of the design process of the Pavilion. For the next three years it was Roche alongside Eames the one in charge of the design and building of the IBM Pavilion to allocate Eames' curatorial project.

the learning transformation for the digital user. All of it requires attention from academia.

2.2. Description

If experiential engagement is one of the most powerful features of the metaverse as a medium, a good example of a curatorial project based on an intense experiential approach is case studied in the IBM Pavilion of the 1964 New York World Fair, designed by Charles Eames in collaboration with Eero Saarinen's office (Fig. 1). One of the Fair's main themes was the celebration of technological advances and the possibilities they opened for the future. The theme of the Fair was 'Peace through understanding. Man's achievement in a shrinking world and an expanding universe'. Future was one of the recurring themes in the pavilions; indeed, one of them was explicitly dedicated to the future under the name of *Futurama*.

The final project consisted mainly in an enormous oblong form leaning on a forest of steel *trees*. Symbolic of the rational order that underlies the apparent randomness of natural phenomena, most of the one-acre site was sheltered by a grove of 32-foot-high weathering steel trees bearing a cover of varied grey green transparent plastic. An ovoid white theater rested on the supporting *trees*. The building housed an exhibition consisting of a prominent and exceptional puppet show of the history and workings of computers. Visitor experience began by walking on a suspended passageway that overlooked a shallow pool and ended on a nearly vertical stand of 500-capacity, where people were congregated and hydraulically uplifted into the *egg* (Fig. 2). In this interior space, Eames sought to explain the complexities of computers through a kaleidoscopic presentation that included slides and film presentations projected simultaneously onto fourteen different screens (Fig. 3). There were several films projected: the IBM Fair Presentation Film I & II[7]; the IBM puppet shows,[8] and the most important one, THINK.[9] THINK displayed simultaneously on 22 separate screens shaped in circles, squares, triangles, and rectangles, and included a live host.

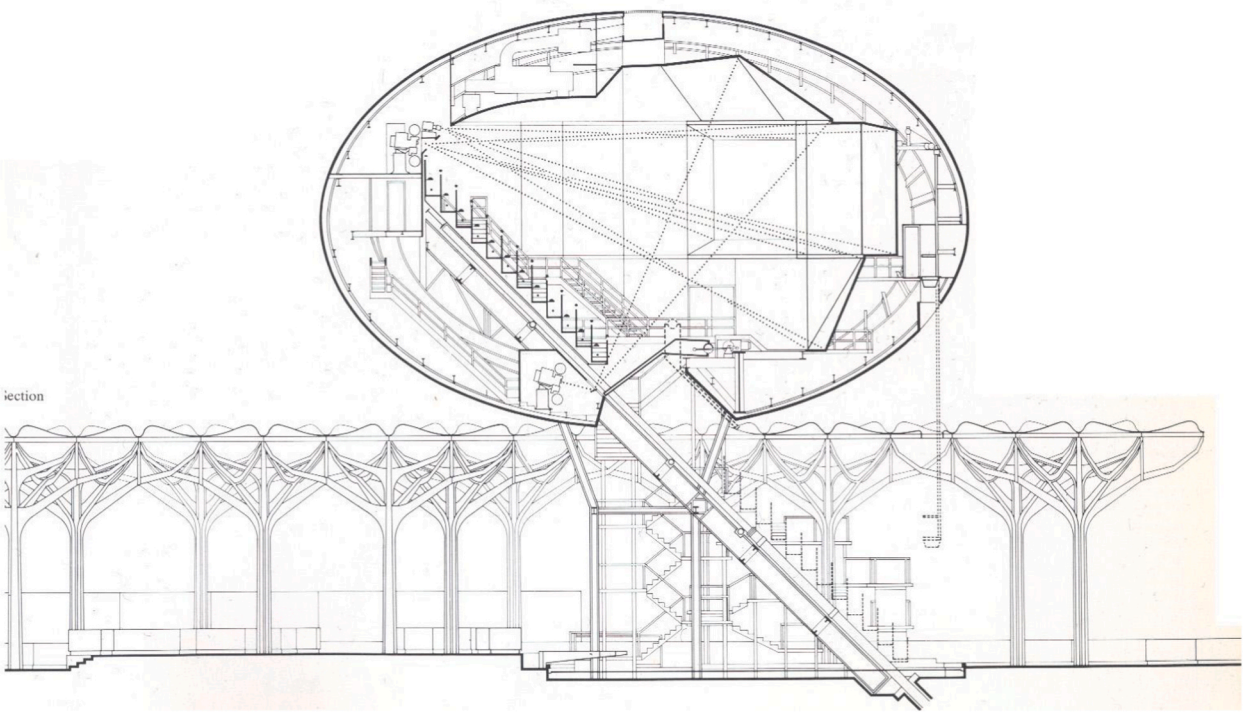

Fig. 1. Eames and Saarinen's detail drawings design. Source: Yale Archives, Box # 5, Job # 61016, IBM Pavilion NY World's Fair.

[7] While Film I presented design proposals for the IBM Pavilion at the World's Fair, Film II detailed revised modifications to original proposals.

[8] *IBM Puppet shows* (1965/9 min/Color) was a film version of two electronically controlled puppet shows on display at the IBM Pavilion at the New York World Fair. The one entitled *Sherlock Holmes in the 'Singular Case of the Plural Green Mustache'* Sherlock Holmes showed how Sherlock Holmes solved a crime by both traditional method and computer Boolean algebra based method. The second one entitled *Computer Day at Midvale* is about the celebration of the first computer installation in the town of Midvale, and the difficulties of a computer expert correcting the Major's speech.

[9] THINK (1964/13 min, 30 s/Color) was projected on 22 separate screens, shaped in circles, squares, triangles, and rectangles, by including a live host. A multi-screen presentation at the Ovoid Theater of the IBM Pavilion of the New York World Fair, displayed simultaneously, included live and still motion and animation with music by Elmer Bernstein. Its main goal was to show that the complex and the simple problems of our time are solved in the same way.

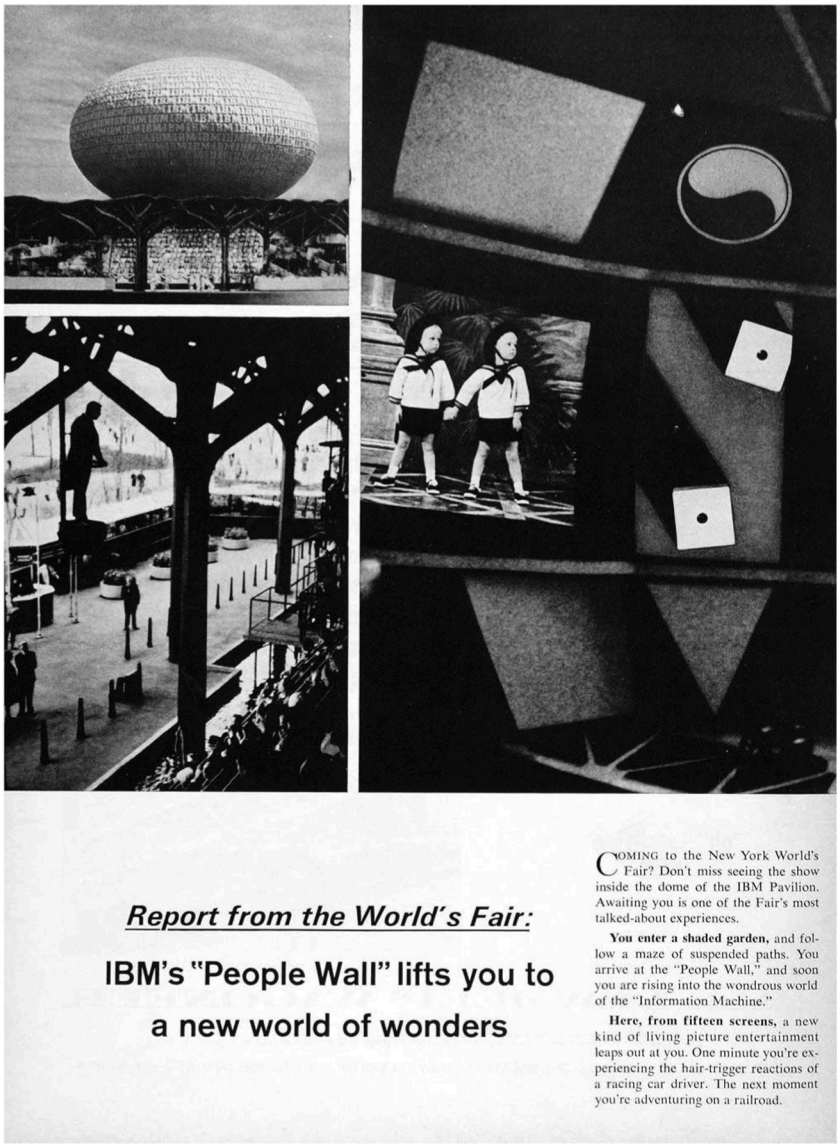

Fig. 2. Images from the 1964 IBM Pavilion. Source: Roche et al. (1964).

Among other multimedia curatorial projects accomplished by the Eames office, this exhibit was analyzed in the well known article 'Enclosed by Images' by Colomina [67]. Twenty years after its publication, it is of special interest to revisit her analysis in the light of the challenge that is now being unveiled. When speaking of the multi-screen technique used by the Eameses in this IBM exhibition, Colomina compares the strategy followed by them with the one carried out in Moscow five years earlier:

"Unlike the screens in Moscow, those in the IBM building are of different sizes and shapes. The eye has to jump around from image to image and can never fully catch up with all of them and their diverse contents. Fragments are presented to be momentarily linked together. The film is organized by the same logic of compression. Each momentary connection is replaced with another. The speed of the film is meant to be the speed of the mind" [68].

The film THINK (Figs. 4 and 5) aimed at showing that the complex problems of our times are solved in the same way as the simple problems: "The machine brings you information in much the same way as your mind gets it -in fragments and glimpses- sometimes relating to the same idea or incident. Like making toast in the morning" [69].

According to the interview with Robert Moses as the president of the NY World Fair, education was the main goal of the event to celebrate the unlimited potential of technology and science for human improvement with the following twin themes: *Man's Achievements in an expanding Universe* and *A Millennium of Progress* [70]. It was at the time in which the United States of America was at its peak of postwar hi-tech and economic bravery, trying hard to be the first country sending a man to the moon, keeping up with the latest technology advance (the computer) and facing the new information era. The message was of hopefulness and cheerfulness. Many of these displays were aimed at the public's education, especially for school-going-age children, as well as their parents. It is in this

Every second there's a new surprise in the dome of the IBM Pavilion. The shows are continuous.

Surprise follows surprise. You work on a pass-play with a football coach. You watch scientists break down seemingly unsolvable problems into simple steps for computer analysis.

You then follow the amusing turns of a woman's mind as she puzzles out the seating arrangement of a dinner party.

Gradually, a surprising fact becomes clear. *Computers are not so mysterious, after all. They help solve the most complex problems with simple principles of logic—the kind that guide you in making decisions every day.*

The "People Wall" returns to earth. You give the date of your birth to an experimental IBM computer. Watch it read the numbers you write, search its "memory," then print out for you a *New York Times* headline that ran on the very day you were born.

Next, you see how an IBM computer translates Russian science articles into simple but understandable English. It works from a 200,000-word dictionary *—the size of a phonograph record.*

There's much, much more. Three animated puppet shows, one of them starring Sherlock Holmes. You can use an IBM *Selectric* typewriter to send free postcards to friends.

Visit the "Probability Machine." It shows you how science uses "chance" to detect laws of order running through seeming chaos.

Take a stroll through Scholar's Walk, and follow man's curious attempts to build "mathematic machines." You'll see their evolution into a new family of incredibly fast IBM computers.

You'll leave the IBM Pavilion with a new understanding of computers, and the many amazing ways they are improving our daily life.

IBM®

Fig. 3. Images from the 1964 IBM Pavilion. Source: Roche et al. (1964).

context of education and technology that the present study highlights the significance of the IBM Pavilion and its exhibition.

IBM Pavilion made a difference in a particular way: through several exhibits, it tried to show how computers worked on the inside, which, ultimately, intended to convince the visitors that PCs were helpful. The average visitor could not buy or lease a computer; IBM knew it. However, they tried to prove that these gadgets were user-friendly, not a threat. Computers produced lists; they were useful shuffling data through stored information. They did not think, but most people had the opposite perception, and they envisioned them

Fig. 4. Images from THINK, IBM Pavilion, New York Art Fair, 1964. Source: Roche et al. (1964).

Fig. 5. Images from THINK, IBM Pavilion, New York Art Fair, 1964. Source: Roche et al. (1964).

as magic devices.

In this sense, it was supposed to be a demystification process in the explanation of how computers function. The educational idea of the Pavilion and its specific film THINK was to demystify computers: "they help solve the most complex problems with the simple principles of logic, similar to those we all use in making decisions every day" [71]. Even part of the content of the display was determinedly domestic. For instance, it compared forms of computation to everyday tasks or to a football coach. Nevertheless, this apparent content of ordinary life was not supported by the display technique that, in fact, was just the opposite of demystification, because it produced awe and terror, as described by Scully [72]: "At his [the host's] appearance the children of every performance scream for joy. In this punctual *Deus ex machina* the designers have hit a Dionysian button calling up emotions of awe, terror, recognition, and joy".

The building itself was staged as a spaceship, nothing to do with daily life. Different camera perspectives, scales, and the number of images per time characterized the film editing techniques. In other words, they seemed to explain and clarify the complexity of computers by an overwhelming system, not by simplification. Charles Eames resolved this apparent contradiction by drawing on his childhood learning experience of science. He discovered the magical or fictional aspect of the scientific experiments, beyond its rational explanation [73].

2.3. Analysis

The whole IBM Pavilion functioned like a machine. As it was mentioned above, following the rules of cybernetics, people were transported by a mechanical platform to the inner space of the ovoid [74], instead of just walking in, using the stairs, or entering an elevator. From the beginning, the experience was completely different to their day-to-day. While the Eameses had been employed as a design team to promote the understanding of science, their approach seems characterized by immersion, saturation, and information overload. As Colomina explains in her paper through the 'state of distraction' [62], this pedagogical manner has to do more with juxtaposition than a synthesis or reduction to a single expression. This methodology uses mystification as a didactical immersion, the

incorporation of the spectator into the mechanism of a machine. In this regard, they transferred Benjamin's conclusions to the field of children's learning.

The educational principles that drove the Eameses are clearly reflected in their films (e.g., *Powers of Ten*), exhibitions, toys (e.g., *Eames Elephant* and *House of Cards*), their home and even their furniture. The Eames incorporated their maxim *learning through first experience* [25] into their work. At the historical moment when the first computers were beginning to be developed, they pointed out that people, especially children, learn in a state of distraction. They applied this approach into their curatorial work by using television as a pedagogical multi-screening medium to explain the potential of computers. Through the atmospheric and spatial control of the spaces, they sought to ensure that attention is not so important to understand the multiplicity of data transmitted, but rather the attitude generated to interpret it.

In this sense, Colomina [67] refers to previous projects to explain the Eameses' position. What all these projects have in common is that education always played an important role in them. For instance, in Sample Lesson (1953), the main objective was to produce sensory overload by providing "many forms of 'distraction', instead of asking students to concentrate on a singular message. The audience drifts through a multimedia space that exceeds their capacity to absorb it" [75]. For Charles and Ray Eames, the most interesting issue was that students could develop a form of knowledge based on the connections between different (seemingly unconnected) realities, and they could only achieve this through 'high speed techniques'. In this way, the audience had to integrate the excess of information they received in a multidirectional way, as the Eameses suggested in an interview for *Vogue* [76]. Colomina points out the transcendence of their method: "The Eameses' innovative technique did not simply present the audience with a new way of seeing things. Rather, it gave form to a new mode of perception that was already in everybody's mind" [77]. From a curatorial point of view, and after McLuhan's [49] classification in cold or hot media, it would seem reasonable to state that the IBM Pavilion was a cool medium since the message delivered by the Eameses was only complete with the individuals' participation.

As previously mentioned, the superabundance of images provided a new way of perceiving, but it was also achieved by using spatial immersion as a particularly important resource in curatorship. The fact that the entire sight was occupied by images made it impossible for the eye to escape, as if it were Herbert Bayer's 'diagram of the field of vision' [78,79]. This is how a journalist explained the sensation of the moment: "information overload— an avalanche of related data that comes at a viewer too fast for him to cull and reject it … a 12-min blitz" [75]. Such a strategy involved the visitor almost completely, and at the same time provided individuals with a leading role in the action. The public constructed its own narrative as it tried to deal with something that was as fleeting as its own mental wandering. Hence, there could be as many stories as viewers were in the room.

Consequently, immersive architecture and immersive display became a hallmark of the Eameses' work, almost their ethos. The creation of a specific atmosphere enhanced the agency of the subject. In the case of IBM Pavilion, its pedagogical purposes aimed in a new direction, different to that of attentiveness or rationality; instead, the purpose was to foster learning through a state of distraction. The fragmented atmosphere offered references to which participants could hold on to construct their own story. In addition, the viewers acted as the organizers of the space, which was all loaded with different kinds of screens. In addition to what these were showing, they could arrange them as they wished; they decided what they wanted to see and interpret. In this way, since experiential learning usually leaves a distinct trace that generates significant learning, reality would display to them in a much more obvious way in the future.

A few years after Colomina's article, another paradigm shift occurred with the appearance of smartphones, but a new change is still around us. Not only have the levels of speed and access to information increased, but also a digital context of multi-screens and multi-channels is generated. If the change in speed between 1964 and 2001 was impressive, between 2001 and the present it has been exceedingly exponential. Therefore, the IBM Pavilion context may very well mirror the current situation, particularly since the main goal of the event was education to face the reality to be unfolded.

In summary, this was not a conventional or common pavilion, neither a well-suited environment for a demystification process of the unknown machine, nor a better way to give fulfillment to the main goal. "The objective in this pavilion was to show that methods used by computers in the solution of complicated problems are merely elaborations of simple human scale techniques'" [71]. As aforementioned, the Eameses' exhibition was just the opposite. The designers overturned the message by creating an *experience* with the use of curatorial tools. However, this Pavilion was an outstanding example of how to integrate architecture and exhibition design effectively, through the understanding and exchange of ideas between architects and curators. Among all the pavilions attempting to explain technology, IBM shone on its own: "of the more than forty corporation-sponsored pavilions located in the industrial area, none more effectively integrated architecture and exhibition design than the structurally daring IBM Pavilion, designed by Eero Saarinen & Associates and Charles Eames" [80].

3. Discussion

To this end, multiple questions arise. If the Eames office managed to give a conscious direction in a pedagogical way to the understanding of an overflowing reality -the development of computers-through curation, how can we now learn from that approach to lay hold of our current challenge? If the interaction with a multiple reality through smartphones remains unresolved from the pedagogical point of view, how can we get up to speed with the new paradigm that has already set off and needs a slow-mind and soothe approach? What does this paradigm shift summon from the education field? If McLuhan published *The medium is the message* in 1964, and he was encouraging us to understand the new medium to configure the message, how can we seize this new multi-media interface environment to convey a meaningful message to a society that could be diagnosed *en masse* with attention deficit disorder as stated by Colomina [75]?

In this context of uncertainty, curatorial studies need to understand more than ever how people anticipate and reflect upon the

future of metaverse by imagining and designing its immersive scenarios. By translating the imagined into physical representation, audiences can experience, feel, understand, and grasp not only what life will be like in the future, but also explore new possibilities in the present [23,81]. Through atmospheric and spatial control, curators can seek that attention is not so important to understand the multiplicity of data transmitted, but rather the attitude generated to interpret it. Depending on the concept of visitor handled by curators, possibilities can take two forms. On the one hand, visitors can be critical and conscious agents of their experience with the metaverse. On the other hand, visitors' interaction with the metaverse can remain as a mere leisure activity.

If we think on the pedagogical implications of this new medium, it is clear that there has been a digital transformation within schools in the recent decades [34] that could be exponentially developed with the appearance of the metaverse. However, it seems necessary that this transformation go hand in hand with the development of digital competences that favor the creativity of encountering, learning, and imagining new future scenarios [30]. Teachers often see themselves limited by their low technical or technological mastery of digital tools [21]. The challenge is to imagine which pedagogical principles teachers should be aware of when using them, so they can precede pupils' learning.

For an adequate mindset to face the incipient arrival of the metaverse, higher education institutions have echoed business' technological transformation[10]; also, they have tried to ensure that students acquire the necessary competences to solve problems, learn, evaluate, transform, and share information (ACT, n. d). The crosscutting of knowledge, evident on MUVE, metaverse, or other digital developments, needs a concrete pedagogical framework. However, this scenario will not be possible unless there is a transversal contribution from a particular set of professionals, whose hard skills are implemented in the creation of *phygital* learning environments. It will be crucial a co-creation process between teachers, technicians, and even curators to achieve the manufacture of pedagogical contents.

As the metaverse helps to activate the student's ability to imagine the non-existent future in the present, giving him or her the necessary whys and hows [30], it could be a good practice to enhance learning competences as crosscutting capabilities. Although this paradigm is not a new transformative pedagogy, as it gathers already studied issues (known as 21st century skills, soft skills, essential learning outcomes, or boundary-crossing skills), it does focus attention on the necessary skills to master technology in a rapidly changing global world, fostering lifelong learning as a result [82]. This is made possible by the underpinning structures to address the social and institutional challenges [83].

4. Study limitations and conclusion

The case study on the 1964 IBM Pavilion highlights perception and wellbeing as two priorities when considering the arrival of the metaverse. There is a threat in the inappropriate use of this new medium for learning, where perception habits could have a negative effect on the user's wellbeing.

Although the evidence presented here is limited due to the methodological characteristics of a case study, creative and educational praxis could be improved with the development of future research into (1) the production of a curatorial model based on educational principles to guide and foster people's interaction with the metaverse; (2) the design, implementation and assessment of cross cutting capabilities to strengthen the connection and personalization of the educational task through metaverse.

In 2018, Google launched *wellbeing. google* to promote healthy habits in families or schools, with thought-provoking reflections on the use and disconnection of digital assets when appropriate. Therefore, some institutions have launched research projects about mental health benefits in online cultural experiences [54] but there is still an effort to be made. Development is necessary in proper health promotion programs based on proven theoretical models. The literature on the subject is still limited, as the scoping review from Petrigna & Musumeci [35] shows. The authors refer to the need to understand the science behind digital engagement, in addition to the clear appetite it provokes in users. This suggests that psychologists, as well as pedagogues, will be crucial agents in shaping these new learning environments.

Finally, there is an urgent need to pose the right questions concerning continuous accessibility and dissemination in a highly emotional and multi-complex-digital reality [23]. In the field of education, where, according to Burbules [33], the barriers between formal and informal learning are increasingly blurred, there are still more questions than answers. The main goal of this article is to look positively towards the panorama opened by the metaverse, and to reflect on the role that both education and curatorial practices together can play in this equation.

Funding sources

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

[10] Universities such as IE Business School, ESADE, Universidad Europea, UNIR, or IESE offer postgraduate programs in digital transformation. These vary from online teaching (3/5) to face-to-face learning (2/5). In terms of duration from 13 months to 8 weeks. In a brief analysis of their content, there is no explicit reference to the development of the CCCs. Furthermore, much of the content deals with digital strategies, digital transformation leadership, theories, and new trends. Issues such as block chain, cybersecurity, cloud computing, and artificial intelligence are key elements in 3/5. Only 1/5 includes specific training on emotional intelligence in innovation management.

Author contribution statement

Javier Antón: Conceived and designed the experiments; Performed the experiments; Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.

Carmen Urpí; Teresa Reina; Carmen M. Basanta Vázquez: Performed the experiments; Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.

Funding statement

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Data availability statement

No data was used for the research described in the article.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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