

Augmenting Experience, Virtualizing Nature – A Pragmatist Epistemology for the Digital World

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Abstract

While most of technology philosophy emphasizes the enormous changes (cheered or condemned) in human life brought along by the digital age, the case of experiencing augmented and virtual realities show that our basic psychological procedures stay the same. In this paper I shall argue that the naturalistic epistemology of John Dewey may give a plausible conceptual framework for this kind of interpretation, and that from this theoretical point of view ‘artificial’ experiences are no less natural, then ‘non-artificial’ ones. If we accept, following Dewey, that there are no boundaries between the human mind and the natural world, experience will be always completely natural independently from instruments transmitting it. Finally some considerations will be made about the special characteristics of experiences caused by augmented and virtual resources which may constitute the basics of a new digital epistemology.

The nature of human experience

In a presentation of the promising perspectives and technological challenges of digital augmentation Schmalstieg & Höllerer (2016) underline the importance of the field by repeating the widely accepted formulation that “it amplifies human perception and cognition in remarkable ways”. As they also tell us, these complex systems are built up in careful cooperation put through across several knowledge domains which must contain among others the topics of visual simulation and human-computer interaction.

As a matter of fact, these can be considered as traditional issues in *epistemology*, the philosophical discipline which could and should inform discussions of augmented and virtual realities. For example, relations between the perception of, and the interaction with our environment especially attracted the American pragmatist philosopher, John Dewey.

Dewey claimed his epistemological position to be a kind of *empirical naturalism*, or naturalistic empiricism, which takes human perception and cognition as natural psycho-physiological mechanisms of the physically existing natural world. All of us as natural beings are constantly immersed in the natural world, which means, that we cannot and should not try to detach the Cartesian mind and body from each other, because they are definitely and constantly woven together. One is always in interaction with his or her environment, and precisely these interactions we may call *experiences*. Coming from these encounters first mental states, then physical actions are produced in order to achieve a certain transformation or development in the environment. Mind, then, is nothing else then “an instrumental method of directing natural changes” (Godfrey-Smith 2014, p. 160).

This *instrumentalism* is crucial for Dewey's pragmatist epistemology, which he liked to call also *experimental idealism* in the sense that according to him ideas are instruments or tools for human beings in their struggle for coping with the world. In one of his major works, *Experience and Nature*, Dewey tells us that there is a completely symmetrical relationship between the components making the universe for us: „Nature's activities are not grounded in the physical any more than in the mental. What we call the 'physical' or 'material' is part of what goes on; what we call the 'mental' is another part." (Dewey 1925/1981, p. 6) All phenomena to appear in our observation are part of the individual's natural reality including other living beings and social institutions as well.

While the basic building blocks of this natural world are *events*, i.e. dynamic interactions without static essences, we as human beings are not conscious of events, but *objects*, which are *events with meanings*. As Dewey argues, perception always gets an additional value from cognition. Events make part of the physical world, and objects belong to our mental representations about them.

Now, the psychological procedures of meaning attribution are basically the same whatever these objects can be. "Ghosts, centaurs, tribal gods, Helen of Troy and Ophelia of Denmark are as much the meanings of events as are flesh and blood horses, Florence Nightingale and Madam Curie." (Dewey 1925/1981, p. 242) Which still does not mean, of course that all objects will show the same properties. On the contrary, it would be a great mistake to think that "because they are all meanings of events, they all are the same kind of meaning with respect to validity of reference." (Dewey 1925/1981, p. 242)

So while there will be important differences among the objects of observation, the procedure of getting acquainted with them will always be the same:

"The proposition that the perception of a horse is objectively valid and that of a centaur fanciful and mythical does not denote that one is a meaning of natural events and the other is not. It denotes that they are meanings referable to *different* natural events, and that confused and harmful consequences result from attributing them to the same events. The idea that the consciousness of a horse as now present and of a centaur differ *as* perceptions, or states of awareness, is an illustration of the harm wrought by introspective psychology, which, here as elsewhere, treats relationships of objects as if they were inherent qualities of an immediate subject-matter, ignoring the fact that causal relationships to unperceived things are involved." (Dewey 1925/1981, p. 242)

Thus the only distinction we shall make in regard of our experiences whether they can lead to more meaningful experiences, or they prove themselves to be a dead end in the ongoing process of experimenting with the world:

“To discover that a perception or an idea is cognitively invalid is to find that the consequences which follow from acting upon it entangle and confuse the other consequences which follow from the causes of the perception, instead of integrating and coordinating harmoniously with them.” (Dewey 1925/1981, p. 244)

Experiencing the virtual and the augmented

What follows from these considerations for the “amplification” of human perception and cognition by recent advances in digital technology?

In our interactions we constantly pursue positive feedbacks to our initiations driven by our beliefs, hopes, desires etc. When I am going to buy a certain article in a shop, my concerns will be only about finding the institutionalized channels for paying and delivering which can guarantee that my action of purchase will end up successful. I am going to search for the means may serve best my goals – independently from circumstance whether a certain instrument will be of a physical or a virtual or an augmented nature. And indeed, there are a lot of *virtual* events already today which we are happily ready to acknowledge as authentic pieces of our *real* world from online banking to e-sports championships.

So, following Dewey, if the result of a virtual shopping is the real object I actually needed, we shall judge the whole cognitive procedure leading to the desired development *epistemologically valid*:

“The union of past and future with the present manifest in every awareness of meanings is a mystery only when consciousness is gratuitously divided from nature, and when nature is denied temporal and historic quality. When consciousness is connected with nature, the mystery becomes a luminous revelation of the operative interpretation in nature of the efficient and the fulfilling.” (Dewey 1925/1981, p. 265)

Subsequently, *all experiences are natural as long as they occur for a natural mind independently of whether they are linked to natural objects or to artificial ones*. Perception and cognition cannot be separated therefore experiences gathered by the human observer about artificial objects will be no less natural than those about non-artificial ones. All phenomena of virtual and augmented realities can and shall be epistemologically interpreted in the same framework as of the natural world.

This line of argumentation can be further underpinned by the observation that against all enthusiasms for expansions of the human sensorial equipment, virtualizing and augmenting our experiences has its own limits. As Joshua Meyrowitz put it:

“[...] no matter how sophisticated our technologies are, no matter how much we attempt to multi-task, we cannot be in two places at the same time. The

localness of experience is a constant. And the significance of locality persists even in the face of massive social and technological changes.” (Meyrowitz 2005, p. 21)

That means that while we possibly loose ourselves in as many alternative realities as we want and as profound as we want, the natural body holding together all those experiences collected in the virtual and augmented environments will still always be stuck to a certain place and moment in the physical world. At the same time, the epistemological status of the human being immersed in various virtual and augmented realities becomes quite a complex one:

“Enduring localism, however, does not negate the reality of globalization. Nor does the essential localness of experience negate the significance of forms of communication that seep through walls and leap across vast distances. For although we always sense the world in a local place, the people and things that we sense are not exclusively local: Media of all kinds extend our perceptual field. And while all physical experience is local, we do not always make sense of local experience from a purely local perspective. Various media give us external perspectives from which to judge the local. We may be mentally outside, even as we are physically inside.” (Meyrowitz 2005, p. 22)

The assertion that there should be no difference in principle between experiences coming from a natural or an artificial environment also means that we should move beyond *the real / unreal dichotomy* in the understanding of the augmented and the virtual. Instead, all interactions (let them be human-human, human-machine, or even machine-machine) should be considered as processes being able to produce *real, i.e. natural experiences*. So they should be, and in everyday practice they definitely are, handled exactly like the old, non-artificial ones. Instead, what we shall name *non-real experience* is the kind which does not lead to any successful interaction due to a gap between the given representation and the potential actions occurring to the mind of the observer. Now obviously artificial phenomena produced by so-called virtual and augmented realities definitely aim to qualify as the former, since they wait from the user a feedback totally analogous to real-life interactions. In that way we may say that VR and AR environments become intrinsic and natural parts of the human being’s reality as far as he or she is ready to gain experiences from them.

Actually, this complexity seems to be addressed already by the conceptual model of Paul Milgram et al. (1995), where a spectrum is supposed to be stretched from *real environment* at one end to *virtual environment* at the other. In this so-called *reality-virtuality continuum* there is an infinite range of possible practical solutions from those where reality is started to be augmented into the realm of virtuality to those where virtuality is started to be

augmented into reality. All these can be called *mixed realities* – and most of today's civilizational settings will fall between the two extremes indeed.

The virtual and the augmented in action

In fact, there is nothing new about virtual representations in the course of human perception (cf. Golden 2007). Let us look at the history of optics. In the case of visual perception natural human experience is being constantly augmented for the last two thousand years by introducing ever new discoveries. The list of artefacts include *glasses* which can modify the deceptions of the natural eye, *telescopes* which can enhance the range of our visual perception and *microscopes* which can present more details. All these operate by creating and manipulating *virtual* images of the natural environment – but after careful experiments and refinements there remains no question whether we shall take these representations transmitted by them for granted, i.e. completely *real*. As we notoriously say, what the right glasses or lenses do is *to correct* the perceptive anomalies of near-sightedness, far-sightedness etc.

Virtual depictions thus are accepted as parts of reality in everyday life and in scientific inquiry as well. I will consider a pair of glasses a good one or a bad one depending on its functionality: whether the virtual image produced by it helps me in executing my intended actions, or not. When the instrument does not serve properly, a discrepancy will emerge between my mental representations and my interactions with the physical world. The same is valid for scientific depictions. The reality of images delivered by the telescope or the microscope about realms of the world unreachable for us by using our natural sense-organs will be accepted if they successfully fit into our theories and practices about the micro- and macrostructures of the universe. Within a certain observational paradigm we will have no doubts about those virtual images conveyed by the instruments, that what we see through them are the *correct depictions* of a virus or a black hole.

Now in the cases of virtual and augmented realities the situation is the same. There are a lot of examples from flying simulators through eagle-eye systems in sports coverage to interactive games such as *Pokémon Go* or *Harry Potter: Wizards Unite* where we consider without any hesitation the pieces of virtual and augmented environments as a special modality of what we call our *reality*.

Lev Manovich (2006) defined his notion of *augmented space* as the physical space overlaid with dynamically changing information, most likely in multimedia form and often localized for each user. That means, that for Manovich augmented space is not only, and even not primarily about technology, but about the change of human experience. However, as he also calls our attention to it, once again there is not much originality in the basic concept of augmenting spatial layers with an informational one. It has been practiced all throughout history from pyramids and cathedrals to cinemas and shopping malls. According to Manovich the only differences will come from the special characteristics of

the respective media technology in use, where that of our digital age will be called by him *dynamic multimedia*.

After presenting a series of cutting edge examples on how urban spaces are virtualized and augmented at the same time, Vella & Sabatino (2019) conclude that:

“Today, just like yesterday, we do not live in a sort of Cartesian space, fully measurable through scientific parameters, but in emotional and narrative spaces. From photography, with static images for static spectators, to cinema, with moving images for static spectators, to the new body of medial images, travelling through a myriad of screens, changing our relationship with the city and our urban experience. In contrast with high-definition ones, low-definition city narratives built through collaborative processes that involve inhabitants and visitors, turn users/spectators into performers, that don’t just attend the premade show, but collect and reshape pre-existent images and materials, creating their own meanings. Thus, users are city visitors and both traditional and AR/VR devices users at the same time. In doing so, they participate in building the narrative structure and plot of the urban experience.” (Vella & Sabatino 2019, pp. 158–159)

We may learn this lesson from various genres from human culture and civilization. One of the oldest is that of *maps*. If we go into history, in ancient and medieval depictions of cities we will find already layers of additional meanings making use of letters, colors, measures etc. This information can be *graphical* (the forms of the mountains, the island, the buildings, the boats), or *verbal* (the names of the city and of the river, the year of depiction), or even about such peculiarities as the fashion of the region by featuring a noble couple with their typical clothes, as in the image of Innsbruck below.

If we take a look at present day depictions of the city and surroundings on the Internet, we will find a whole range of mixed realities from photorealistic representations to computer graphics. The proportions of different ingredients within the mixtures depend obviously on the purpose they are meant to fulfil. We can choose a depiction appropriate for our aims: whether we would like to have a geometrically correct map of the street system or we prefer the one with special indications of possible points of interests, maybe even with miniature icons of monuments. Maps of ski regions may present mere technical information about the routes, but can also be supplemented by symbols of various services for tourists or even some nice accessories resembling snow.



Fig. 1: Oenipons, sive Enipontius vulgo Insspruck, Tirolensis Comitatus Urbs Amplissima, MDLXXV

Applications of virtual and augmented realities (e.g. Google Street View) will give exactly the same opportunities to choose between the photorealistic or the graphic virtual picture of a given segment, or to also have all the additional information on shops and bars from other users (both owners and customers) etc. This may be stated from early technological experiments (see e.g. Feiner et al. 1997) to late theoretical summaries (see e.g. Yovcheva et al. 2013) as well.

So, as we may say in the spirit of Dewey, “a map, too, is an instrument of transformation” (Godfrey-Smith 2014, p. 12), not only a simple representation of the world as it is given. All our depictions, taking advantages from the media technology of their respective age, will always form a uniquely useful tool for the human mind getting into interaction with the physical world.

Towards a digital epistemology

A new epistemology for the complex ecosystem of mixed realities in our age shall probably arrive to a conceptual scheme mixed as well. Traditional frameworks for natural experiences should be preserved on the one hand, while impacts of emerging AR/VR technologies shall be included on the other.

In this regard, the most important characteristics of the new augmented and virtual experience may be the following:

- information and experiences constantly updated (*dynamic*)
- several types of sensory means transmitting experience (*multiplatform*)
- several types of information transmitted simultaneously (*multimedia*)
- information retrieval synchronized with temporality of the physical world (*real-time*)
- information retrieval synchronized with spatial dimensions of the physical world (*real-space*)
- several layers of information processing simultaneously (*multitask*)
- exchanging information with several sources (*multiuser*)
- discrete pieces of the virtual or the virtualized natural linked to each other (*hypermedia*)

These features together give perception and cognition a fundamentally *mediatized* and *social* character. In the spurs of Merlin Donald (1991), describing the information units of human culture, John Sutton (2010) differentiates between *exograms* and *engrams*, where the former “have greater capacity, are more easily transmissible across media and context, and can be retrieved and manipulated by a greater variety of means” (Sutton 2010, p. 190). In that line, he suggests, there is a great potential in interpreting the *extended mind* as „the propagation of deformed and reformatted representations, and which dissolves individuals into peculiar loci of coordination and coalescence among multiple structured media” (Sutton 2010, p. 213)

Cowley & Vallée-Tourangeau (2015), in their attempt at moving cognitive science into a more empirical direction differing from both former functionalist and enactivist approaches, make the remark that “doing things with artefacts draws on both biological and cultural principles” (Cowley & Vallée-Tourangeau 2015, p. 255). If we consider that skills embody beliefs, roles and social practices, *thinking* will become an action taking place within a space populated by other people and objects. Thus a general approach to human cognition shall make no difference between ‘real’ and ‘virtually augmented’ realities:

“Though people can think alone, they also do so when looking at Xrays, drawing geometrical shapes or, indeed, talking with others. In all cases, brain-side activity is inseparable from world-side events. Drawing on human artifice, thinking is co-constituted by speech, movement and gesture. People distribute control as they link routines, make instant judgments and coordinate as they act.” (Cowley & Vallée-Tourangeau 2015, p. 256)

According to Manovich, augmented spaces will become also *monitored spaces*, as additional layers of information often come directly from other users of the same system, which means that we absorb information via our devices produced by others perceived via their devices. What we get as a result is the physical space transformed to a ‘*data dense*’ kind, which means that the given place will be linked to a virtual layer which will be filled up with hyperlinks to information delivered from a different place. We may even say that “various augmentation and monitoring technologies add new dimensions to a 3-D physical space, making it multidimensional” (Manovich 2006, p. 223).

In their visionary book, Burckhardt & Höfer (2015) suggest that over the fundamental binary logic of our electronic devices a whole new metaphysics for the digital era can be built up using the categories of *absence (0)* and *presence (1)*. I think we can make use of this idea in a way for constructing a pragmatic epistemology of the digital age: if there is an event experienced through perception and cognition of a natural mind, then there is an object, and if not, then not.

What all AR/VR practices are about is that they aim to supplement the physical reality somehow, in a sense *to make the non-present present*. This augmentation of present natural experience will amount to the virtual representations of normally non-present objects which are either/or

- past
- distant
- hidden
- imaginary

and in that way it will transform the *absent* into a *present*. By linking these realms of potential events to the one of actual physical environment they enhance and enrich our lives with producing new layers of human experiences leading hopefully to new meaningful interactions.

References

- Burckhardt, Martin & Höfer, Dirk (2015): *Alles und Nichts. Ein Pandämonium der digitalen Weltvernichtung*. Berlin: Matthes & Seitz; *All and Nothing. A Digital Apocalypse*. Transl. by Erik Butler, Cambridge, MA: The MIT Press (2017).
- Cowley, Stephen J. & Vallée-Tourangeau, Frédéric (2013): Systemic Cognition: Human Artifice in Life and Language. In: Cowley, Stephen J. & Vallée-Tourangeau, Frédéric (eds.) (2013): *Cognition Beyond the Brain: Computation, Interactivity and Human Artifice*, London: Springer, pp. 255–273.
- Dewey, John (1925/1981): *Experience and Nature*. Carbondale and Edwardsville: Southern Illinois University Press.

- Donald, Merlin (1991): *Origins of the Modern Mind*. Cambridge, MA: Harvard University Press.
- Feiner, Steven; MacIntyre, Blair; Höllerer, Tobias & Webster, Anthony (1997): A Touring Machine: Prototyping 3D Mobile Augmented Reality Systems for Exploring the Urban Environment. *Personal Technologies*, 1 (4), pp. 208–217.
- Godfrey-Smith, Peter (2014): John Dewey's *Experience and Nature*. *Topoi*, 33 (1), pp. 285–291.
- Golden, Daniel L. (2007): Perception Mobilized. In: Kristóf Nyíri (ed.): *Mobile Studies: Paradigms and Perspectives*. Vienna: Passagen Verlag, 81–90.
- Manovich, Lev (2006): The Poetics of Augmented Space. *Visual Communication*, 5 (2), pp. 219–240.
- Meyrowitz, Joshua (2005): The Rise of Glocality: New Senses of Place and Identity in the Global Village. In: Kristóf Nyíri (ed.): *A Sense of Place: The Global and the Local in Mobile Communication*. Vienna: Passagen Verlag, pp. 21–30.
- Milgram, Paul; Takemura, Haruo; Utsumi, Akira & Kishino, Fumio (1995): Augmented reality: a class of displays on the reality-virtuality continuum. *Proc. SPIE 2351, Telemanipulator and Telepresence Technologies*, pp. 282–292.
- Schmalstieg, Dieter & Höllerer, Tobias (2016): *Augmented Reality: Principles and Practice*, Addison-Wesley Professional, <http://www.informit.com/articles/article.aspx?p=2516729>
- Sutton, John (2010): Exograms and interdisciplinarity: history, the extended mind, and the civilizing process. In Menary, Richard (ed.): *The Extended Mind*. Cambridge, MA: The MIT Press, pp. 189–225.
- Yovcheva, Zornitza; Buhalis, Dimitrios & Gatzidis, Christos (2013): Engineering Augmented Tourism Experiences. In: Lorenzo Cantoni & Zheng Xiang (eds.): *Information and Communication Technologies in Tourism 2013: Proceedings of the International Conference in Innsbruck, Austria, January 22–25, 2013*. Berlin, Heidelberg: Springer, pp. 24–35.
- Vella, Rita Lisa & Sabatino, Anna Chiara (2019): The New Body of Medial Images in the Urban Space: Audio-Visual Narratives, Virtual and Augmented Reality. In: András Benedek & Kristóf Nyíri (eds.): *Learning and Technology in Historical Perspective*. Budapest: Hungarian Academy of Sciences & Budapest University of Technology and Economics, pp. 149–159.