ART AND TECHNOLOGY IN POLAND

FROM CYBERCOMMUNISM TO THE CULTURE OF MAKERS

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Media democratisation: Creative programming and the culture of makers

> Since the sciences have expanded so much that they have transformed the whole world in a laboratory, artists have per force become white coats among other white coats, namely, all of us engaged in the same collective experiments.[1]
>
> Bruno Latour

When laboratory borders were expanded to planetary dimensions, it turned out – as was aptly stated by Bruno Latour at the beginning of the 21st century – that we live in a world of constant experiment and research practices. These occur simultaneously in very different domains. They relate both to theoretical experiments and practical ones, performed in cultural, social, political and economic spheres, but also, as Latour indicated, they refer to ourselves. When today we think about the democratisation of the media, creative programming or the relatively new phenomenon which is the culture of makers, then a paper describing these tendencies must cover two basic and intertwined paths.

The first one reaches back to the 1960s, i.e. to the beginnings of the hacker culture and a broader phenomenon of cultural, political and economic hacktivism. It refers back to the cold war times when in the United States movements sprang up based on recovering media and technology from military and corporate circuits. At that time, the first partisan networks of information exchange and video-spheres started to emerge, which were developed on the bottom-up basis by various social groups. The generation brought up on the contents of the book entitled *Understanding Media* by Marshall McLuhan from the very beginning searched for new practices of creatively utilising digital tools. This approach to techno-cultural transformations within art and various activities from the borders of science and technology in one of its branches developed the hacker culture at the beginning of the 1990s. Artists involved in that movement as well as engineers and programmers, through their actions, performances and creative coding strategies, expressed their dis-

[1] Bruno Latour, *Olafur Eliasson: The Weather Project*, exhibition catalogue, London 2003.

satisfaction with the various political and social situations that were taking place locally and globally. They became an anti-system movement – conducting actions which revealed information hidden from public opinion. The importance of contemporary hacking mechanisms, which were in reality connected with transforming information into goods, was described by McKenzie Wark in 2004 in his famous book *Hacker Manifesto*.[2] As he described it, modern hacking is no longer limited to a specialist information technology and programming workshop – it extends over the entire sphere of media, politics and social activities.

The second path also has its roots in the cultural-social-scientific transformations of the 1960s, but it is a strategy of alternative methods of participating in culture, of building and introducing modifications into the mainstream. This is more about the constructivist approach which is designing new forms of dynamically developing network societies. At the same time, the idea of a network is not only perceived in the digital context – it describes the relationship between the participants of the culture of makers who exchange tools, knowledge and skills.[3] Besides, to a certain extent the culture of makers which started to quickly develop at the end of the 1990s, together with its whole infrastructure consisting of a network of studios, workshops, media-labs, fab-labs and hacker-spaces, is a certain form of breaking off the fascination with the virtual world which originated in the 1990s. On the one hand, creating physical objects facilitates feeling the material dimension of joint work, and, on the other hand, it anticipates the updated envisagement for techno-culture development, i.e. the Internet of Things. Because, in reality, objects designed and created in fab-labs are not only material world objects but they exist in the *augmented reality*, thus contaminating the features of a real and virtual reality. That is why it is so important from this perspective to connect the programming, engineering and designing competencies occurring in the process of joint team projects as realised by the makers. Many active movement members claim that it was the garage projects – started on a private scale in the 1960s – which finally led to the digital revolution,[4] of course making Steve Jobs and Bill Gates the icons of this process. The maker movement in itself has nowadays been the seed of the next industrial revolution.[5] It is the fact that cooperation strategies sourced by the movement's first developers led, on the one hand, to the creation of culture-breaking devices such as 3D printers and, on the other hand, they provided social support for making some technologies publicly available free-of-charge, e.g. Arduino. It is difficult to say unanimously whether the culture of makers is using subversion with respect to corporate technology culture, or perhaps it is rather its part which facilitates experimenting, prototyping more quickly and testing various solutions on

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[2] McKenzie Wark, *Hacker Manifesto*, Harvard 2004.

[3] On the influence of the network model on social life, see: Nicholas A. Christakis, James H. Fowles, *Connected: The Surprising Power of our Social Networks and How They Shape Our Lives*, New York 2011.

[4] See Walter Isaacson, *The Innovators: How a Group of Hackers, Geniuses, and Geeks Created the Digital Revolution*, New York 2014.

[5] Chris Anderson, *Makers: The New Industrial Revolution*, New York 2014.

a limited group of users. It is also true that all interesting phenomena in the global economic system which can offer something innovative are copied and commercialised by large players very quickly. So, the game is not only about the constant attempt to recover fragments of technological culture by independent artists but also about the constant escape from market mechanisms.

Let us return for a moment to the term of media democratisation. The term, which raises many theoretical conflicts in this text and in the whole project of the book entitled *Sztuka i technologia w Polsce. Od cyberkomunizmu do kultury makerów,* is not construed as a clearly positive phenomenon and to a certain extent is connected with the imperative of neo-liberal ideologies ordering the search for and usage of still new tools and forms of communication. So, democratisation is a certain consequence of global techno-capitalism, which had particular importance in the context of Poland after the change in 1989 and generated a very complicated combination of tendencies, relationship, politics and processes.

Coding reality

> Code is not purely abstract and mathematical; it has significant social, political, and aesthetic dimensions. The way in which code connects to culture, affecting it and being influenced by it, can be traced by examining the specifics of programs by reading the code itself attentively.[6]

The authors of a book published in 2011 entitled *Code/Space. Software and Everyday Life*, i.e. Rob Kitchin and Martin Dodge, proved the need to introduce into *software studies* a new category, that of code/space. Contemporary technologised and mediatised life spaces do not only have a physical dimension, and the issue of extended reality is no longer sufficient to define them. According to the researchers, the categories of code, software and space today create one joint dimension of a new geography. A combination of these two once separate categories is so strong that one cannot explain the phenomenon by using the definition of a connection or combination – they have just become one ratio of a code which is space and space which is a code. Kitchin and Dodge's analysis goes further than the previous considerations of Lev Manovich that were made in *Software Takes Command*, in which the author presented the fundamental impact of software on the operations of contemporary economy, productivity, policy, society, etc. In Manovich's view, these were still systems, which obviously could not be turned out painlessly, but they were defined as the techno-sphere which entwines reality. In the proposal of the two geographers Kitchin and Dodge, global change is based on the fact that in a techno-cultural reality a code is space, so it is not external to it or separate. The researchers even name a new cyber-geographic unit which they call code/space. This cannot be compared to the meta-

[6] Nick Montfort, Patsy Baudoin, John Bell, Ian Bogost, Jeremy Douglas, Mark C. Marino, Michael Mateas, Casey Reas, Mark Sample, Noah Vawter, *10 PRINT CHR$(205.5+RND(1)): GOTO 10*, London 2013, p. 3.

phor of computation in the cloud either – we are all aware that we have resigned from storing data on carriers which we physically hold, and although it would seem that they truly are a certain invisible "cloud," then still each bit of information is located somewhere in a specific part of a physical carrier which we just do not see. The code/space is another research proposal which tries to collect all phenomena of software existence in the contemporary globalised civilisation, i.e. from the amount of transferred data, through management systems, physical extended objects expanded in the Internet, to the administration systems and consumption mechanisms of contemporary societies. Therefore, in the techno-cultural reality we dwell in the code/space, in which everything that is physical or material is ontologically combined with what is virtual. The consequence of this situation is also the fact that both of these once binary terms start to interfere with each other, thus blurring the borders of their previous semantic areas. Just as Gilles Deleuze once declared, anything that is virtual does not object to that what is real, but only to that what is current. The virtual is fully real as virtual.[7] As Kitchin and Dodge claim, expanding Deleuze's thesis, the virtual is therefore an update in reality, and their co-existence creates new code/space dimensions.

In such a situation, artistic practices which reach for creative programming tools turn out not only to be adequate to the reality in which they occur, but also facilitate introducing critical levels already in the sphere of the tools themselves. For this reason, *creative coding* in many artistic events can be treated as the meta-language of media culture – analysing and redefining in general the coding situation as a communication strategy. In numerous cases the coders reach for the sphere of residual data circulating the network and creating a low-information hum. The so-called *capta*[8] are fragments of information (*data*) originating from the sum of potential data on a specific object. *Capta* distributed in the network create a *capta shadow*, i.e. fragmentary representations or shadows of data describing people, objects or procedures. It is this hum of data fragments which is subjected by many artists to artistic and research procedures – such as transcoding, visualisation or sonification. Focusing on data as the basic building material of the language of the arts introduces them to the sphere of newly perceived conceptualism.

One example of this type of practices is *Aleastock*, an interactive installation by Pawel Janicki from 2013. As Janicki says: "In a way, *Aleastock* is a parasite living in the body of capitalism." The core of the work is the visualisation and sonification of data collected from different levels of information describing the activity of stock exchange companies quoted at NASDAQ. Both the presence and motion of the spectators and the manipulation made by them with the use of smartphones and tablets are important for the general result. That is how the installation becomes a critical measurement tool for tracking the condition of the contemporary global economy, i.e. by using information which as a rule is hidden from broad public opinion.

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[7] See Gilles Deleuze, *Difference and Repetition*, transl. by P. Patton, New York 1994, pp. 168–220.

[8] For a definition of *capta* see: Rob Kitchin, Martin Dodge, *Code/Space. Sotware and Everyday Life*, Cambridge 2011, p. 261.

Marcin Ignac also deals with the visualisation of data. In *Every Day of My Life* (2012), by using creative coding Ignac, in the form of ascetic graphs, presented a visualisation of his own activity on his private computer in the years 2010-2012. A collection of colourful lines formed a set resembling a scientific measuring graph. Each line represented a separate day and each colour on the line was appropriated to other activities done on the computer. The graphical representation of the author's daily activity created something like a *capta shadow*, i.e. visualised, difficult to identify fragments of information being a collection of data on one object.

Another strategy of data visualisation has also recently been shown by Szymon Kaliski in his work *Biomimesis: Hyphae* (2013). This is an interactive installation which is activated by the presence and motion of spectators in space, and it takes up the problem of visualising biological algorithms. A mathematical model developed on the basis of an analysis of mould growth is transferred to a computer. The organism starts to grow, appearing initially in a random place, and then aiming in the direction of areas where the motion of spectators is detected. It is the activity of the spectators which accounts for the food of the virtual organism. If there is no person around the installation, the organism dies. These types of actions may be perceived as a form of *life coding*; if classical *life coding* in its basic form is connected with hacking DNA and all biological material, then in this case it is the life development procedure which becomes "hacked."

Data circulating the network is often so defragmented that it cannot be read as information – it just becomes something that the authors of *Code/Space* call metadata describing the subordinate values of information itself. In this context, using such types of actions in artistic performances is a form of operation made on the deeper structures of the cultural experiences of contemporary human beings. Such work processes the information atmosphere, which defines contemporaneity in a significant way and takes part in the creation of a widely distributed shadow of identity of facts, objects, persons, processes, events, etc. woven from data scattered in the digital world. On the one hand, the above examples somehow destroy superficial audio-visual structures in order to reach for the language in which they are expressed, i.e. the language of data with a view to "re-expressing" them but in entirely different, original outputs. This gesture is most often meant to either indicate the manipulation strategy at the very code level, which may influence an unaware user, or is revealed at one situation surface, i.e. at processes which are invisible, fragmental and scattered along various areas of techno-culture. As regards creative coding, we are dealing here with numerous phenomena and approaches as well as with understanding the procedures of data operation. In the code/space that surrounds us, digital art becomes a meta-system using meta-aesthetics, which tries to define anew what contemporary forms of artistic expression truly are. In a work using creative programming, coding does not only have the status of a tool which facilitates achieving the intended effects, but it penetrates the composition and ontological structures of works. Interfaces dominated by visual network structures, or *live coding* which allows spectators to see

directly the lines of a programmed code, are strategies aimed at revealing the multi-layer structures of contemporary space, in which in line with the code/space theory, data has turned into molecules of the surrounding atmosphere.

Prototyping reality

> MAKE
> Making is fundamental to what it means to be human. We must make, create, and express ourselves to feel whole. There is something unique about making physical things. These things are like little pieces of us and seem to embody portions of our souls.
>
> SHARE
> Sharing what you have made and what you know about making with others is the method by which a maker's feeling of wholeness is achieved. You cannot make and not share.
>
> ...
>
> PARTICIPATE
> Join the Maker Movement and reach out to those around you who are discovering the joy of making. Hold seminars, parties, events, maker days, fairs, expos, classes, and dinners with and for the other makers in your community.
>
> SUPPORT
> This is a movement, and it requires emotional, intellectual, financial, political, and institutional support. The best hope for improving the world is us, and we are responsible for making a better future.[9]

The maker movement is a relatively fresh phenomenon, although in its ideas it relates to artistic practices that started back in the 1960s and to the first generation of artists originating from the environment surrounding Stewart Brand and the "Whole Earth Catalog."[10] An unresolved issue is the answer to the question – is the maker movement a live continuation or rather a commercialised tendency. Each of these answers is partly correct. However, it is difficult not to notice that using the DIY (do-it-yourself) strategy in contemporary reality actually engulfs the tradition of social resistance. Self-making is a form of critical analysis, a strategy of cognition and of learning techno-culture. Through device hacking it is possible to analyse their functions, and not only the technical ones but also the socio-cultural ones. This follows from the possibility of getting to know a technical project and its applications in-depth. It is an entirely different experience to simply use something and then entirely different again to make it. By spoiling a ready project, remak-

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[9] Mark Hatch, *The Maker Movement Manifesto. Rules for Innovation in the New World of Crafters, Hackers, and Tinkerers*, New York 2014, [electronic publication] loc. 11–13.

[10] More in Agnieszka Jelewska, *Ekotopie. Ekspansja technokultury*, Poznań 2013.

ing it and adjusting it to one's own needs we in a sense get to know its coded idea and operation concept, which is embedded in it economically and even politically.

In recent years in Poland there have been many initiatives and locations which constitute the brand sign of the makers' culture. There is practically no larger town which would not have its own independent fab-labs, hacker-spaces or media-labs. New festivals have emerged on the map of fixed cultural events, and their purpose is to show and popularise these types of activities as well as the whole network of periodic workshop meetings during which the makers exchange their experiences. From the perspective of social-cultural changes in Poland, these tendencies are extremely interesting and seem to prove that technological culture and media democratisation are treated seriously. Self-making practices, which in the 1970s and 1980s in Poland could be associated, on the one hand, with entrepreneurship as a result of a lack of access to many products and, on the other hand, with Adam Slodowy's television programme, have now regained their social-making importance. This is no longer only about a hobbyist's fulfilment of a maker's passions or about making up for shortages in a home's infrastructure. Making has become creating and a form of participating in a specific movement and in the practical workshop itself. The set of skills does not only serve to accomplish a specific project but becomes a form of an alternative "drift" among objects of techno-culture. Creative utilisation of knowledge and skills and sharing artistic experiences all become at the same time signs of resistance against hyper-consumptionism. Prototyping is not only a method of the fast development of working models in small independent workshops here – it is a form of designing a new social relationship. Thanks to free licences to use technology, all of these actions may have the nature of not only micro-environments but create a global network of connected local communities.

> Open source hardware is truly huge. With a little bit of effort and training, you can make your own electronic things. And you don't need $100,000 of design software, manufacturing experience, or years of dedicated software training. If you don't want to develop using the Arduino platform, it's possible to hire people for a reasonable rate to do the work for you, and they don't need to support hundreds of thousands of dollars of infrastructure costs. Arduino-based prototypes are also easy to change. They are fully programmable. So if the first effort doesn't work, you just keep hacking at the code until the device does what you want it to do.[11]

Many media projects have come up in recent years in Poland. Among them, particularly interesting were, for example, operations of the group called panGenerator (Piotr Barszczewski, Krzysztof Cybulski, Krzysztof Goliński, Jakub Koźniewski). The *Dodecaudion* (2011-2012), created by panGenerator, is a hardware object which has the shape of a dodecahedron and which facilitates in controlling, among others, music and video software with hand motions in the air. The *Dodecaudion* allows artists to expand kinetic expression during electronic music performances or to build video structures live. Each wall of the

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[11] Hatch, op. cit., loc. 171–172.

controller is equipped with an infrared sensor responding to the movement of objects within its reach. Another of the team's project, *Tactilu* (2013), is a bracelet put on the wrist which is able to transfer the sense of touch between two remote users. The project was realised in co-operation with the Itaka Foundation, which deals with searching for lost and missing persons.

Designing controllers, instruments and sound mechanisms is one of the most developed tendencies among young artists. In 2013, Michał Szota presented his *Instalacja telefoniczna (Phone installation)*, a music controller built on the basis of telephone dials which were manufactured in Poland in the 1970s. Sound is made on this instrument by way of dialling numbers. Szota's use of old telephone dials from devices that are no longer produced is an example of one of the more important strategies of the new makers' culture. The economic life cycles of objects make technological tools much cheaper, besides, the growth of the techno-sphere is so fast that more and more technical devices become "obsolete" and only wait to find their new life in media projects. Technologies discarded by the market become an area which forms the basis for independent projects, for art which is not focused on effective development but on exploring the techno-sphere in searching for still empty or already deserted domains. In this context, on the one hand, such activities are of a pioneer nature, i.e. looking for innovation, and, on the other hand, they utilise everything that has been pushed outside the brackets of technological attractiveness.

The practical ability to construct, design, build, create and co-share is a method helping to create new social networks of relationships. In the projects above this is not only about the objects built, about things with interactive functions. An important purpose is communication and establishing a relationship with other users. The panGenerator group in their actions often refer to the term of critical design, recalling, among others, the works of Krzysztof Wodiczko, and although at first sight this may seem to be an exaggerated comparison, then still the core of critical social reality analysis is embedded in these projects. However, critical comments do not refer directly to painful historical experiences but to the digital-network structure of contemporary reality along with the repertoire of personal and social experiences that it produces.

While at the brink of another revolution, which will be brought into reality by the Internet of Things – we must realise that making physical objects will become more and more important. The network will in a short period of time not only have a virtual dimension but also a physical one. Each of its users – if only they hold adequate skills – will be able to connect any physical object to it. In this context the manifest of makers refers to artisanal traditions, to the Greek *techne*, simultaneously sourcing information from hacking strategies. In spite of the critics indicating that the makers do not have a clear approach to the commercial sphere of technological culture, the movement is focused on recovering and developing the network in the future; on building local connections which might to a certain extent be individually developed and controlled. Individual devices designed and made in small laboratories-workshops are a sort of technology that is imperfect but existing in the culture as an alternative to commercial technologies.

New collectivism

Creative coding and the practice of the makers are two important phenomena impacting the participation dimension of techno-culture. These are not only actions focused around the arts but also cover with their range political, economic and social spheres. In many cases these are phenomena which, as McKenzie Wark says, "a collective, collaborative practice of creating new forms that are not purely formal, but are proposals for forms of life."[12] In an interview given to Geno Moreno, the researcher emphasises the importance of collective practice with respect to shaping contemporary culture, in which designing is not only prototyping the social relationship but is also anti-social or anti-system; where whatever is human creates an assemblage with the non-human (e.g. devices and objects, but also hacked network fragments). What this means is that these practices create micro-spheres which are immersed in the global economic system and have a chance and opportunity to make new forms of participation through building new collective practices of recovering tools, materials, fragments of code and information. These are the kinds of practices that McKenzie Wark could refer to by saying that "they stop being auto reference games," and they take part in creating new assemblages between what is human and non-human, between culture and technology, but also between collective actions and the policy of supply and demand. Therefore, as Bruno Latour said, the world is becoming a gigantic laboratory in which every day different actors prototype and search for not only new solutions to problems facing humanity on a daily basis, but also for new connections and the catalysers of these transformations, while the participation practices referred to above become one of the most important strategies of conscious and effective game playing, both locally and globally. Nowadays nobody has the monopoly for solving the problems and crises of contemporary reality – that is why collective experiments are so important, as they involve not only makers, engineers, architects and researchers but also non-human actors (both technological tools as well as material and non-material objects).

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[12] *New Ancestors: A conversation with McKenzie Wark*, http://www.e-flux.com/journal/new-ancestors-a-conversation-with-mckenzie-wark/ [accessed: 10 August 2014].