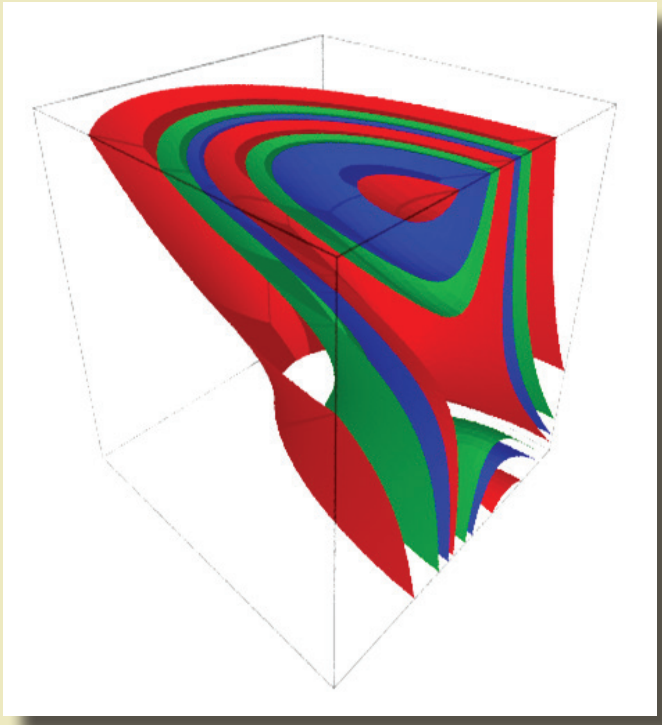
POLITECHNIKA LUBELSKA

Visual Thinking – Visual Culture – Visual Pedagogy

edited by
Halina Rarot
Mariusz Śniadkowski



MONOGRAFIE

Lublin 2015

Visual Thinking – Visual Culture – Visual Pedagogy

Monografie – Politechnika Lubelska

Politechnika Lubelska
Wydział Podstaw Techniki
ul. Nadbystrzycka 38
20-618 Lublin

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Politechnika Lubelska
Lublin 2014

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Illustration on the cover: Marcin Kostur, Łukasz Machura

Technical editor: Mariusz Śniadkowski

Publication approved by the Rector of Lublin University of Technology

ISBN: 978-83-7947-105-8

Publisher: Lublin University of Technology
ul. Nadbystrzycka 38D, 20-618 Lublin, Poland
Realization: Lublin University of Technology Library
ul. Nadbystrzycka 36A, 20-618 Lublin, Poland
tel. (81) 538-46-59, email: wydawca@pollub.pl
www.biblioteka.pollub.pl
Printed by : TOP Agencja Reklamowa Agnieszka Łuczak
www.agencjatop.pl

The digital version is available at the Digital Library of Lublin University of Technology: www.bc.pollub.pl
Impression: 60 copies

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Introduction

Visual Culture is one of the most important concepts of modern day culture of post-modernity, although it is used by the researchers in two ways: the determination of the increasingly powerful social and cultural phenomenon, also known as "screen culture" as well as to determine the academic field of study[1], common to cultural studies, art history, critical theory, philosophical anthropology, visual sociology, metrologies, media studies, gender theory, neo psychoanalysis, and finally pedagogy. The objects of such varied research fields are broad images of different concepts (up to a digital image and test its definition).

The following set of statements resulting from the interdisciplinary scientific reflection on the phenomenon of visual culture is a contribution to the ongoing academic discussion. It is presented, from the perspective of cultural philosopher Halina Rarot, a brief outline on the theoretical beginning of visual culture, and the European antagonism between conceptual thinking and pictorial thinking. It turns out that the knowledge of imaging, thinking with the image has not exhausted its cognitive abilities and can keep pace today destructive knowledge, support them or even replace, contrary enlightened and scientistic thinking, according to which "the image is a medium subhuman, wild, stupid animal, child, women, the masses."[2] But this is possible only if we recognize that modern digital images are the mapping of the human thought procey These are the presentation (not reflect any being, but construct it), and not representation, based on the classic mimesis. Virtual reality is not then an extension of the sense of sight, but doubles the discursive knowledge.

If we concentrate on the role of the modern application of images, we notice, for Roksolana Szwaj, that they can activate our scientific creativity. The creative process is conceived as a branched system of possible actions requiring the production of new images, which are then converted into the concept, the courts, the strategies and tactics of discursive thinking. Technical moving images, as Jakub Jernajczyk notes may allow the registration and the presentation of dynamic

[1] A. Zeidler-Janiszewska, *O tzw. zwrocie ikonicznym we współczesnej humanistyce. Kilka uwag wstępnych*, (in:) "Dyskurs", vol. 4, Wrocław 2006, p.151-152.

[2] W. J. T. Mitchell, *Picture theory*, The University of Chicago Press, Chicago 1994, p.13.

phenomena, studied by modern science details. Modern digital media in this field provide unprecedented opportunities. In the study other forms of influence on the recipient of modern dynamic image-screens are analyzed and the threat posed by the so created the twentieth century "screen culture". Jerzy Smoleń, analyzes media reports, describes the phenomenon of electro smog and its psychosocial effects. However, the most valuable is that he verifies with students, selected, reports, undermining their scientific credibility. Hazards from the "screen culture" are especially dangerous for religious faith, which in European culture came from, "stemmed from hearing". There is the question of a new approach to the changing forms of religious life and spirituality, and the usefulness of visual analysis in their sociological study, especially in the fastest growing communication medium such as the Internet (Agnieszka Zduniak).

These different challenges and threats bring in the idea of creating a new pedagogy, adequate for visual culture, or pedagogy of image (Barbara Kiereś). The rapid development of information technology and communication and visual, the omnipresence of "image", as well as media content are required, as emphasized by Andrzej Łuczyński, a significant impact on the personality of a young man on his character and attitude towards the world and other people. Educational activities should therefore encourage young people to reflective thinking and learning about the mechanisms of visual perception, so that they can actually experience visual experience.

The task of visual education of youth and visual pedagogy is so far carried out by media education, and this is a sub discipline of general pedagogy. Media education is seen, as noted by Adam Maj, as supporting the development of students within the context and the content of the media, as well as teaching media literacy. Media education also aims to achieve by means of media capabilities to the interpretation of cultural and creates their own cultural experience. Because of the broad understanding of culture (its manifestations ethical, philosophical, anthropological and spiritual) it can be stated that media education is to prepare potential customers both a critical and selective adoption of content present in the communications media, the production of the recipients of practical competence, communicative, information, intellectual and ethical. About the practical beginnings of visual education that is not only teaching media used by teachers, but also preparing to educate students through visual arts, or to shape them into the plane of reason, emotion, and will with the help of images (visual education) as Mariusz Śniadkowski writes. Visual Education may also eventually be hoping for an integrated approach, a new synthesis between knowledge of nature, technology and humanities, the need for which Ukrainian researchers Irina and Yuri Kozłowscy write.

Halina Rarot

dr hab. Halina Rarot

The Visual Culture and Visual Thinking

Abstract

This article is a simple introduction to the issue of the visual culture. It affects also the antagonism between conceptual thinking and visual thinking. The article makes a statement of different concepts of the image (including the technical image). We analyzed the impact of forms of modern screens and threatened by the culture of the screen on the recipient.

Key words: Visual Culture, imaging cognition, conceptual knowledge, natural images and technical images, evocative role of image – screens.

I. Introduction. Explanation of terms

Visual Culture is one of the most important concepts of contemporary postmodern culture, in addition to intertextuality, double coding, irony, pastiche, games, poetry multivalent, fragmentary, assembly principles texts, virtualization awareness (consciousness clips), ironic pluralism or, in the end, the fight with traditional values. While postmodern culture is a set of ideas which grew on the ground of computer civilization and consumerist post capitalism.

The concept of the visual culture is used by researchers in two ways: the determination of the increasingly powerful social and cultural phenomenon, also known as "screen culture", as well as to determine the academic field of research[1], also common to cultural studies, art history, critical theory, philosophical anthropology, gender theory or neo psychoanalysis. The object linking these diverse research fields are the images. It is true that following such an inaccurate definition of the visual culture can be looking for the origins of visuality; reach a distant prehistory of humanity, that is the famous cave paintings of deer in the cave of Lascaux, painted by our Paleolithic ancestors. However, as a consequence, it is difficult for us to speak correctly about the visual arts of pre-Christian Europe and, much later, the visual culture of the Renaissance. Therefore, ultimately, the earlier eras are said to have one or another imaging culture (the culture of the image), while the latest trends – as belonging to visual culture.

[1] Por. A.Zeidler-Janiszewska, *O tzw. zwrocie ikonicznym we współczesnej humanistyce. Kilka uwag wstępnych*, in: "Dyskurs", t. 4, Wrocław 2006, p. 151-152.

The actual beginning of visual culture associated, theoretically, with the "visual revolution" (pictorial turn) in the humanities, which occurred in the early 1990's, after the fall of the "linguistic turn" (focused on linguistic descriptions of the world, and verbal way of communicating information in mass communication). Theorists of the "*pictorial turn*", "return of visual" (W.J.Tomas Mitchell, *The Pictorial Turn;* 1992, Ferdinand Fellmann, *Symbolischer Pragmatismus*; 1991), also called "the return of the iconic" (Gottfried Boehm, *Was ist ein Bild*?; 1994), creating a new scientific field, called Visual Culture Studies, refer now to the philosophers who have already dealt with the sensory perception of the world, especially the visual perception (M. Merlau- Ponty, *Phenomenology of perception*, J.P.Sartre, *Being and nothingness* (1943), Jacques Derrida, *Specters of Marx, (*1993) Jacques Lacan, *Anamorphosis*) and the culture man dealing with the media (eg. P.Bourdieu, *On television,* 2009; *Art. In the Age of Biopolitics from artwork to art dokumentation;*2002*)*,another work Paula Vilirio: *The Vision Machine* (1988), *Światło pośrednie* (1994), *The Information Bomb* (2006).

On the socio-economic and technological plane the visual culture is associated with the emergence of media information in a visual form, ranging from cameras in the nineteenth century. For the last thirty years, we have had to deal with significant technological advances in the visual transfer of information: television news, private computers, Internet, TV commercials. We are entering a world of wide acceptance of the visual information, as well as their development and modeling. Visual information becomes a component of socio-political practices and commercial activity. Technological advances mean that there are more technical innovations. A few years ago, the concept of "screen culture" defined the essence of the technical existence of the visual culture. Currently, we are looking for opportunities to overcome the flatness of the screen, after having specific boundaries for greater approximation to the individual recipient. The result of this searching is a multi-screen, thanks to the action taking place simultaneously in different places, the recipient can see right through different geometric planes of the screen. It is no wonder that other synonyms determine the visual culture is the "culture of new media" or "information culture" (L.Manovich). This multiplicity of its expressions, finally joins one of the most comprehensive definition of visual culture, formulated by the British researchers: "visual culture recognizes all adopted in the process of socialization ways of thinking, acting, feeling, in the context of the visual dimension of reality. [...] The concept of visual culture as text some items (drawings, paintings, photographs, films, fashion and Interior etc.), which are regarded as objects for viewing, and technologies [...] used to create these objects"[2]. Overall, we

[2] E. Baldwin, B. Longhurst, S. McCracken, M. Ogborn, G. Smith, *Wstęp do kulturoznawstwa*, transl. M. Kaczyński, J. Łozinski, T. Rosiński, Poznań 2007, p. 416; oraz M. Drabek, *Kultura wizualna, czyli jaka*?, in: "Kultura popularna", no 1/2009, p. 36.

can make the following chronology of the development of European culture[3], taking into account human cognitive development and the role of cognition images:

a / before the constructivist period primitive explore the world through images (and thinking based on it, or visual thinking);

b / period of classical and modern knowledge of the world through symbols of analytical thinking and texts containing these symbols;

c / time exploring the world through images produced by cameras technical specifications (appropriate period of visual culture) and combining it with symbolic thinking. –

II. Types of images

What does the above-mentioned learning about the world through images mean? What was worse than symbolic thinking that supplanted them for good as think the positivism logical representatives of European culture? What is in the general picture? Analysis of texts in the field of iconology shows that the concept of the image has many meanings in the European culture. The classic, archetypal distinction focusing on the picture, "a shown picture", what is (already) absent (a kind of an artificial body which enables the dead to live on) and "image-assimilation" (mirror). You can talk about the image in terms of its origins: natural image together with its negation with the technical picture. The former is created by human hand (within painting, sculpture); the latter arises through technical tools (photography, video, and computer graphics). You may also notice another distinction, taking into account the ontology of the image, and sharing images on the mental image and the image of the media. The mental image is subjective, it is formed in the human imagination, then stored in the memory, the media image is objectified and used in human communication (television picture, web, advertising)[4]. It resonates with a more precise and occurring only in English distinction between on *the picture and image:* external, tangible media images and the images as internal, intangible, theoretical entities, constituted in the process of perception.[5] You can also finally move away from their strict classification, because the question of the images is actually asking for a multiplicity of the images. You should then talk

[3] J. Dziewit, *Od obrazu w kulturze po kulturę obrazu,* in: A. Pisarek (ed.), *Wizjer. Obraz w kulturze, kultura obrazu*, chapt. I, Bytom 2012.

[4] Representatives of visual sociology believe that you can see some other examples of visual media objects: buildings, clothing, human bodies, bedrooms, bathrooms. See: W. Kawecki, *Od kultury wizualnej do teologii wizualnej*, in: "Kultura-Media-Teologia", no 1/2010, p. 24-33.

[5] K. Chmielecki, *Teoria obrazu (Picture Theory) Williama J. Tomasa Mitchella, http://www.academia.edu/3840155/Kultura_wizualna_wyklady*.

about the paintings', how does Gottfried Boehm it work *Was ist ein Bild*?, "painted, conceived, dreamed (in one term), with paintings, metaphors, gestures (in the perspective of another) and mirror, echo, mimicry (in yet another)"[6]. In the end, you can, following T.Mitchell, say about the image that is "rather a postlinguistic, postsemiotic rediscovery of the picture as a course, bodies, and figurality"[7].

Fot. *Juntos Studio: Filip & Anna Bielak*

In this multiplicity of refining an important feature of all the images is the fact that they govern other laws than the laws directing the statement of the language, because they often go beyond language[8].

[6] A. Zeidler-Janiszewska, *O tzw. zwrocie ikonicznym we współczesnej humanistyce*, op. cit., p. 152.

[7] W.J.T. Mitchell, *Picture theory*, The University of Chicago Press, Chicago 1994, p. 16.

[8] W. Kawecki, *Od kultury wizualnej do teologii wizualnej*," op. cit., p. 24-33.

Source: http://wiggelylovesmusic.deviantart.com/

III. Understanding through images vs. conceptual knowledge

How is learning about the world shown through images? Let us consider the case of a natural picture that hasso exactly been known for its theorists (including the philosopher-hermeneutics H.G.Gadamera). Well, such a world of learning and imaging thinking refers to the concrete, not abstract imaginary objects. As it is written about today by Polish researchers: Andrzej Grzegorczyk and Maciej Kociuba, "the word in this type of knowledge serves the ‚open memory and imagination ", as well as the induction of specific associations. It is not important what words we use, as long as we – in the consciousness of the person to whom we speak – evoke a picture that similar to that experienced by us. The imaging knowledge is to rely on playing in the imagination and manipulating them. Partly it has to be done outside the realm of language. There are permissible, even contradictory formulations, since their task is not a description of reality (the main goal of discourse referring to concepts), but calling a specific vision, evoking specific cycle of imagination. It is believed that imaging thinking manifests a special efficiency when you want to trigger certain emotions in others and encourage them to be active[9]. "In turn, the conceptual knowledge "reflects the reality of the

[9] M. Kociuba, *Antropologia poznania obrazowego. Rola obrazu i dyskursu w poznawczym ujmowaniu świata*, Wyd. UMCS, Lublin, 2010, p. 17.

systems of sentences, which are coherent and consistent whole. The main goal of this cognitive activity is to be an adequate description of the world in which cares about the wisdom of expression and selflessly committed to the truth"[10].

Typical scientific position – it is a sharp contrasting of images concepts.This focus was expressed differently, T.Mitchell presents it as follows : "language is the essential human attribute: man is the "speaking animal". The image is the medium of the subhuman, the sawage, the "dumb" animal, the child, the woman, the masses"[11]. Most often, in a fairly balanced, emphasizing, that only in European culture and is a very early made the transition from "thinking imaging to discursive thinking", from Eikon to the Logos, thus enabling the rise of science[12]. M. Kociuba bothered to find sources of this transition and found a surprising context. It turns out that the same principle of moving away from static imaging of thinking proper to the Greeks received, among others, and quite generally, Semitic, dynamic understanding of the world, which really existed what is in motion[13]. A contribution also brought, according to Kociuba, Western Christianity that depreciate imaging thinking pictorial images on the inferior place: that is, for those who do not know Latin, or logic. The researcher stresses, however, that in European culture this crossing actually took place only in the nineteenth century, the situation has spread scientism and positivism, whereby "the knowledge of the imaging manifestations is eliminated from the discourse as an expression of irrationality"[14]. Earlier periods in European culture has been seen as a subject still reign vividly-conceptual continuum.

Andrzej Grzegorczyk, in spite of a long European tradition of a positive evaluation of conceptual thinking at the expense of the imaging thinking, recognizes, however, that the imaging thinking is also somewhat abstract, which negates the need for this radical separation of the two orders of knowledge[15]. What is this abstractness learning through images? M. Kociuba walking this line of thinking shows it on the example of the epics of Homer, in which the visualization of a single execution obtains a universal dimension, beyond individuality: "In Homer there is a concrete picture of the killing, and also refers to death as such ultimately aims to death at all, goes back to the concept of death ... without losing strength, concreteness of the

[10] Ibidem.

[11] W.J.T. Mitchell, *Picture theory*, The University of Chicago Press, Chicago 1994, p. 24.

[12] M. Kociuba, *Antropologia poznania obrazowego. Rola obrazu i dyskursu w poznawczym ujmowaniu świata*, op. cit., p. 7.

[13] Ibidem, p. 14.

[14] Ibidem, p. 16.

[15] A. Grzegorczyk, *Racjonalizm kultury europejskiej*, in: M. Subotowicz, G. Nowak, M. Kociuba (ed.), *Racjonalizm i irracjonalizm w nauce i życiu społecznym*, Wyd. UMCS, Lublin 1994, p. 54-58; M. Kociuba, *Antropologia poznania obrazowego. Rola obrazu i dyskursu w poznawczym ujmowaniu świata*, op. cit., p. 16-17.

individual nature of the image, move to the dimension of abstract and general"[16]. Similarly, it is with the other abstract ideas: love, immortality, courage, beauty, unity, and multiplicity, retain their individual, tangible and suggestive context[17].

M. Kociuba sees some other advantages depreciate the imaging thinking: images may stimulate the activity of the practical, as it produces certain dispositions in man to act, in addition to the imaging thinking "is a holistic character and holism has a dynamism dimension, a dimension that is a kind of energy core all codes cognitive"[18]. You should recognize, as the philosopher notices, a fact which depreciates the hegemony of conceptual cognition. Well, it is a discursive thought and it can slip in subjectivity, in recognition of own design for a complete reality. Appreciating the knowledge of imaging, rehabilitation of its presence in the continuum image-conceptual safeguards before that constructivist discourse of subjectivity. Such a sharp separation of the imaging thinking and the knowledge of discursive lead – as Kociuba notes – to redraw and pathology. It formed two camps: supporters and proponents of rational knowledge of cognition responsible for the art, mysticism. Proponents of these divisions show these cognitive perspective as a totally independent and autonomous, while "the specific acts, in their manifestations appear to be a close and mutually necessary"[19].

The emergence of a new phenomenon in contemporary culture, which is technical images, raises new questions: whether Europeans go back to the stage of thinking of primitive, unmediated even by symbols, typical operational and logical thinking? Do they return to the naive realism? Can these fears be premature because there is no certainty that the technical picture is similar to the image of the natural, or whether there are significant differences between them? Answers to these questions may be different. If we stand on the position of logical neopositivism, then suspicion on the withdrawal of the Europeans to the stage of primitive thinking will continue to be strong. Supporters of combining two orders of knowledge, or even dominance of the imaging thinking will be on the ground blamed to the " rhizomatic thinking" that is, the decentralization of the current discourse (in the terminology of J. Deleuze and F.Guattari). It is known that the process of receiving artifacts of visual culture, the culture of the screen does not require intellectual tension and hesitation in arranging the received content, as it is limited to impulsive and irregular response. As a result, this created quite scattered and superficial view of the world. The study is based on abstract thinking, constantly creating general models; therefore, they continue to support the reading of written texts. Reading develops the abstract thinking, practicing concentration

[16] M. Kociuba, *Antropologia poznania obrazowego. Rola obrazu i dyskursu w poznawczym ujmowaniu świata*, op. cit., p. 77.

[17] Ibidem, p. 115.

[18] Ibidem, p. 17.

[19] Ibidem, p. 21.

and ability to formulate a general idea of the subject. Man, who is not-reading, as the A.N. Gulimowa notices, loses the ease of creating associations, emotional subtlety acceptance, and the ability to create. As a result, he begins to recognize virtual television production variant for actually existing reality and does not notice when the conversion takes place from the deep experience in the superficial and emotional reactions[20]. He does not see that the contemporary culture of the screen is only artificial, mythological reality and not a transparent window on the world. Similar is the position of visuality of western theorists (e.g. Rosalind Krauss), who are very critical of the impact of images produced by the new media. This effect degrades the recipient's sense of reality. The only way they used to demythologization is the treatment of technical images as constructed texts[21].

As far as the comparison of natural images with associated technical, neo-positivist oriented culture man perceives in the later, even greater cognitive falsification of reality than that which occurred in the natural images. As the researchers write, Vilém Flusser and Jakub Dziewitt, "as long as in the case of the normal images we known from the very beginning that they are at most maps, as in the case of technical images very often, we believe that we see reality. For example photos are for us not only a representation of the world, but also acknowledgment of its reality. Looking at the picture, we see the creation of the artist: looking at the picture, we can see a saved while, we think that the photographs are windows (sometimes leading to the past, but still a reality), and yet these are the only screens"[22].

When, in turn, we stand on the position of the complementarity of the functioning continuum image-conceptual, then the image, both natural and technical will be completed, and taking part of the creative cognitive dynamics of discursive knowledge. It is not yet clear how this will be achieved in the case of technical images. There is no single theory of that image. I guess that was Gabriele Werner accept the theory of the image, by which "digital images can be understood only as an analog presentation of a small number of data. Separating the data or the amount of data from the iconic transformation mean that you should – reaching far beyond computer graphics and therefore more radically – to ask about the possibility of mapping and image referentiality, thus avoiding the naive notion of representation"[23].

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[20] A. N. Gulimowa, *Ekrannaja kultura kak forma suszczestwowanija sowriemiennoj mifołogii*, in: "Znanije, Ponimanije, Umienije", no 1/2011, p. 254.

[21] A. Zeidler-Janiszewska, *O tzw. zwrocie ikonicznym we współczesnej humanistyce. Kilka uwag wstępnych,* op. cit., p. 154.

[22] J. Dziewit, *Od obrazu w kulturze po kulturę obrazu,* in: A. Pisarek (ed.), *Wizjer. Obraz w kulturze, kultura obrazu*, unit. I, Bytom 2012.

[23] G. Werner, *Nie każdy zwrot ku obrazowemu oznacza to samo. O koncepcjach Gottfrieda Boehma i W.J.T. Mitchella oraz nieoczekiwanym spotkaniu z teorią mediów Friedricha Kittlera na polu (braku) teorii obrazu,* in: P. Brożyński, M. Jędrzejczyk (ed.), *Obraz/ciało*, Kraków 2013, p. 11-32.

We can also acknowledge that digital images are the representation of the thought process. They are then a presentation (they do not reflect any being, but construct it), and not representation, based on mimesis. Virtual reality is not then an extension of the sense of sight, but doubles the discursive knowledge. Digital images are, in this embodiment the Mitchell's image, unlike analog pictures[24]. Probably, similar to the metaphor – natural mental image – providing plenty of food for thought, the technical picture will also "give food for thought", focused on the attention and enabled discourse. The uncertainties are many; one of them is unnecessary, according A. Zeidler-Janiszewska emphasis on the study of media images as if they were in a void, without the sounds, smells, voices, tactile sensations, which are their context, that "significantly, over time specifies or modifies our perception of images – and those objectified in the outside world, and those that have a mental status"[25].

However, it seems that more appreciated than his questionable cognitive function will be here to enjoy evocative image of the role of technical, that is calling us to action in practice.

IV. Impacts and technical power of the technical images

There is another question to be decided: whether it actually displays as a technical exposure of images, have the images on the screens so significant impact on the reality of the twenty-first century, so in a consequence we were called "public display" (Lev Manovich)? If in the sample response we refer to this feature evocative images of technical, then we will force to confirm the impact of screens on our views and practical attitudes. The screens are still omnipresent: in medicine, photography, cosmetics, on highways, in advertising, even in religious life. If we want to look more closely at the impact protection according to its visual sociologist Marek Krajewski[26], we can see up to 7 arguments for the existence of the influence: 1/ the number of images (images work on us because they are produced in large quantities and in different areas of social life), 2/ the amount of time we devote to the images (watch them in a long time, collect, make their case for travel, we realize in the production of goods through constantly watched ads), 3/ the political consequences (the technical images are the catalyst for many policy responses: riots, demonstrations), 4/ follow with noticeable patterns of life of people represented in the images (models, movie stars, athletes), 5/ with a very strong, almost automatic response by letter to the images contained in the ads, 6/ with obvious social changes, that caused

[24] K. Chmielecki, *Teoria obrazu (Picture Theory) Williama J. Tomasa Mitchella, http://www.academia.edu/3840155/Kultura_wizualna_-_wyklady*

[25] A. Zeidler-Janiszewska, *O tak zwanym zwrocie ikonicznym..*, op. cit., p. 157.

[26] M. Krajewski, *Czy obrazy na nas działają. Zapomniane pytanie socjologii wizualnej,* http://krajewskimarek.blox.pl/html

the production, reproduction and dissemination of technical images (the formation of a new model of society, known as "public displays", "the pictorially society", 7/ from the multiplicity of studies, which aim to clarify the interaction screens.

There is another kind of impact on the recipient of the technical images, which is not mentioned by M. Krajewski. It is the new way to build a personal identity. This socialization impact screens on us, of the visual culture is very profound: "visualization formulates its own special world of institutional matrices, in which there is a man who is moving away from traditional social institutions: religion, ideology, education, family, etc. These visual structures are inoculated in the real society and replace real "chores interaction", thanks to the trust form or another matrix, one or the other species etc."[27].

You can ask the last question: What is the impact force of the technical images on us, under whose influence we make changes in our identity, we want to travel to exotic places or consume such and not other products? The answer to this question is not difficult: the strength of the technical images lies in the fact that it refers primarily to our sense of satisfaction, feelings of pleasure. This can be seen even on the example of advertising: promotion of food products that refer only to our benefit, or the advisability of action, will not enjoy our attention in comparison with that appeal primarily to our need for pleasure[28]. You can see these trends throughout the postmodern culture, which departs from the long and grand narratives (novels, philosophical treatises, the great political ideas) for the short forms in terms of volume, focusing on "here and now", requiring little effort recipient of meaning, deciphering the meaning of the easily forgotten. This can be seen in the extension of the concept of text. In the first place, today there are texts built on the basis of visual vectors, played in the movies, on television, on the computer. It is no wonder that there is an example of the visual dominance of the cinema with its various properties. Underlying in the reception of the cinema text is just our pleasure. A typical Hollywood film is an action movie with clearly outlined characters of the heroes and the objectives of their activities, with lots of special effects. Characters' thoughts and feelings are superficial. The exterior is also provoked with visual special effects. As a result, we focus on the external activities of the characters, and avoid reflexivity. Until now, there was talk about the receipt of the image, about the impact of the image on the recipient. It is good to change the way of the overview on the issues and take the perspective of the creator of the technical images. At once there is the experience of a paradox experienced by artists: the technical images force or encourage audience to action (which is actually consuming), but their creators lose the opportunity to influence their formation. If a painter of the image was entirely the author of his

[27] I.A. Malkowskaja, *Wizualnaja kultura: problemy samoidentycznosti*", in: "Znanije, Ponimanije, Umienije", no 4/2008, p. 45-49.

[28] A.W. Jemieljanow, *Wizualnaja kultura i prostranstwo udowolstwija*//lib.vkarp.com

work, the photographer or the graphic artist is forced to rely on the possibility of his technical apparatus becoming only the officer (appealing for one or another of his lever mechanism). The electronic imaging technology, therefore disconnects, as noted critically in Jonathan Crary's technical paintings in his book *Techniken des Betrachtens,* vision out of the human[29].

V. Threats from "the culture of the screen"

In addition to the analysis of methods and under the influence of postmodern images on the recipient's, it is worth noting also the risks of this page. The risks arising from the rapid dissemination of visual culture are typically formulated in terms of the defense of elite culture (serious, discursive, and abstract) as the postmodern culture of the screen begins to identify with mass culture, traditionally perceived as superficial and commercial.[30] They can lead the defense of elite culture to formulate a pessimistic theory, according to which the mass media and new media visual culture propose to produce *homo terrenus*, a man tied to the land, to a comfortable earthly life, a person who does not longs for a better dimension of reality (in other words-classical Hedonist). For the representatives of the American school the culture and personality (eg E.Sapira), according to which the culture exists only in the human personalities, the media also shorten the life of high culture, because what occurs inside the unit, is also the culture. The unit is a carrier of culture here, a microcosm[31], subject to the pressures of excess sounds and images, all receiving a fleeting, transient (even universal significance of high culture). In another turn, conservative and already trivialized look at the condition of culture, which can be derived from the thoughts of philosophers Ortega y Gasset and Nicholas Berdyaev, the media reaches the consumers with similar, homogenized content gradually breaking down different hierarchical social structures, and the world of creators and consumers of high culture is the aristocratic and hierarchical. Media also prevent critical to distinguish between information which is a necessary reflection of well-educated intellect and lack of urgency of the recipient.

Educators and psychiatrists argue, however, that the mass media and new media have become a tool for preservation, especially in children and adolescents, axiological materialism, aggression and other antisocial behavior. Media offering

[29] G**.** Werner, *Nie każdy zwrot ku obrazowemu oznacza to samo…,* op. cit.*,* p. 11-32.

[30] H. Rarot, *Mass media – kultura w ujęciu horyzontalnym i wertykalnym,* devoted to a collective work in the Polish language, which is edited by Lech Zdybel will be released in Ed. UMCS Lublin.

[31] W.W. Mironow, *Kultura w przestrzeni komunikacji globalnej*, transl. H. Rarot, in: H. Rarot i J. Mizińska (ed.), *Rosja wielki nieznajomy*, "Colloquia Communia", no 2(77)/2004 (77), Toruń 2004, p. 64.

simplified models of the culture – as the scholars believe weaken – the human mind, prevent even the education of young people dazzle content-free universal philosophical messages and meanings (traditional learners criticism and skepticism). Also prevent its specific appeal of religious education, which among many of its functions also meets an important educative role of socialization. Other, faster discernible negative effects stemming primarily from dependence television entertainment that can be recognized in a wide range of physical and mental illnesses – are headache, indigestion and insomnia. As the results of relevant empirical studies of American sociologist Robert Putnam summarize, dependence on television is as devastating to the health of television viewers around the world as "financial concerns and outclassed"[32]. In turn, the doctors who observe the effects of the inability to use the Internet by the youth , see posture and spine diseases, deterioration of eyesight, limiting physical activity and thereby reducing the efficiency of the organism.

Psychologists are diagnosed the addiction to the computer, computer games or access to the Internet, leading to isolation from the environment and neglect their duties, or in the end-to loss of contact with reality. Philosophers conclude another negative impact of the media on the reality. It is the disappearance of authentic social and public life, loss of social contacts (formal and informal), the decline in the number of associations and their members, limiting civic activity. This is not a phenomenon which does not matter, because the decrease in the activity of the community has negative consequences in different areas of life: in the economy, in politics, in religion, even in the health and happiness of the individual. With this decline of community index involves a decrease in the level and ability to think critically and the public life has always been based on the existence of conscious individuals dispose skill of critical thinking, subjecting governing the critical evaluation.

In turn, theologians are watching this kind of fact, according to which representatives of religious institutions are even obliged to care for the media; otherwise they lose their previous influence and impact on the effectiveness of the faithful. Some sociologists are very critical of the mass media and new information technologies (new media). If you concentrate on the most influential and opinion-out characters in this field, Manuel Castell, the author of the *Network Society*, it will have to face in theory, with its claim, according to which the new technology used in many areas of social, economic and political at the same time contribute the marginalization of those groups that have limited access to them or cannot use them. Thus, the use of the Internet can go hand in hand, according to Castells the

[32] R. Putnam, *Samotna gra w kręgle. Upadek i odrodzenie wspólnot lokalnych w Stanach Zjednoczonych*, transl. P. Sadura, S. Szymański, Wyd. Akademickie i Profesjonalne, Warszawa 2008, p. 401.

deepening digital divide caused by unequal access to ICT. Whereby the digital divide becomes, in his opinion, the cause of a new fundamental split in the existing social inequalities, even neo-colonialism of the twenty-first century[33].

VI. Conclusion

To quote two relevant sentences J.W.Mitchella *"the pictorial return is not the answer to everything. It is just a way to ask the question"* can complete the above statement. there is a great deal of questions to aks: there is no one theory of the image; no one recognized the essence of the technical picture that arranges reflection on visual culture. Even with a contemporary influence of the technical images, we can speak at least two ways: pessimistic or optimistic. Pessimistic fears of autonomy and hegemony of technological development can, however, alleviate the position of the eminent French mediologist Regis Debray, who notes a social pattern, occurring for a long time in different parts of the world. According to her, each community's mentality retrieves and accepts those technical innovations, which are the most appropriate for them[34] and that little destabilize balance in the process of biological and social survival.

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[33] M.F. Gawrycki, *Społeczne aspekty rewolucji informatycznej*, in: A. Bąkiewicz, U. Żuławska (ed.), *Rozwój w dobie globalizacji*, PWN, Warszawa 2010, p. 572.

[34] R. Debray, *Wprowadzenie do mediologii*, transl. A. Kapciak, Oficyna Naukowa, Warszawa 2010, p.108.

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Abstrakt w języku polskim

Artykuł jest ogólnym wprowadzeniem w ponowoczesne zagadnienie kultury wizualnej, pojętej jako najistotniejszy element kultury postmodernistycznej. Dotyka w nim też europejskiego antagonizmu między myśleniem pojęciowym a myśleniem obrazowym i rozważa racje filozofów kultury (m.in. Macieja Kociuby) opowiadających się za podejściem synkretycznym, preferującym ideę kontinuum obrazowo-pojęciowego (znoszącego ten antagonizm). Dokonuje się tutaj również zestawienia różnych ikonologicznych koncepcji obrazu (w tym obrazu technicznego). Analizowane są wreszcie formy oddziaływania na odbiorcę współczesnych obrazów-ekranów oraz zagrożenia płynące ze strony "kultury ekranu".

Prof. dr hab. Roksolyana Szwaj

Developing Vivid Thought as a Step to Creativity

Abstract

Application of creative pedagogy in educational process contributes to the development of vivid thought and search activity. Creative process as a ramified system of possible actions requires production of new images, which later get transformed into notions, judgments, strategies and tactics for solving creative tasks. *Image* which plays the role of impressing may stimulate creativity as a derivative of excitement refracted through the motivation structure.

Key words: creativity, image, impressing, methods of creative pedagogy.

I

Traditionally, studying is connected with formation of patterns (schemes, images) appropriate for certain objects, i.e. with accumulation of knowledge stored in a certain way. Each of the formed images is an element of the general world image which functions as an integral, multilayer system of one's concepts about the world, other people, oneself, and one's actions.

According to O. Leontyev, images of the objects from the surrounding world are produced by the inner – both conscious and unconscious – thinking activity. Without this activity we would not perceive the objective world. At the same time, however, we would not conceptualize this world be it not opening to us in its sensually given objectivity. This indicates the significance of emotional and sensual attitude to the world[1].

Impressing (as imprints in the memory made by some strong and deep sensations from the impact of outer environment in certain "critical" moments of life) for a longer period of time, and sometimes even for the rest of life determines the basic motives and goals in human activity. Anything can turn into impression – a minor phrase, a piece of music, an interesting story, an outburst of imagination, a figure of imagination which touched the innermost heartstrings and since then

[1] A. Leont'ev, *Dejatel'nost' i soznanie* (*Activity and Consciousness*) / A.N. Leont'ev, Voprosy filosofii. – 1972. – № 12. – p. 132 – 40.

never let them go, and since then accompanies a person for a lifetime helping him/her to overcome everything and to achieve unprecedented results which others shall define as a talent or genius.

Image which plays the role of impressing may stimulate creativity as a derivative of excitement refracted through the motivation structure.

II

Let us look at the functional aspects of image perception:

1. Image is an excitement trigger and basis for formation of impressing.
2. Image is a result of imagination which provides for the development of the right hemisphere and triggers multiple-context thoughts. The main function of imagination is its participation in creativity process. Right-hemispheric activities, establishing multivalent connections, together with vivid thought, contribute to recovery of enquiry and research activities. In this sense vivid thought becomes one of the most significant criteria of creative activity. Right-hemispheric, i.e. spatial and figurative mode of thinking is simultaneous (concurrent and synthetic). It provides a momentary snapshot of numerous qualities of multivalence. It is the latter (i.e. multivalence) that lays foundation for any creativity. Vividness plays a significant psycho hygienic role in studies, upbringing, and life in general. This way one can build up personal meanings of the objective world which at the beginning is not open in its sensually given objectivity. A previous idea makes it possible to adapt a new one.
3. Image is a result of accumulating sensual (objective) experience which results in creation of data base for taking standard actions and decisions. Images of previous actions become patterns not only for a standard decision but also for taking a non-standard one in the future. Images which have been connected by our consciousness with a particular way of behaviour in certain life situations need to be transferred onto a similar or new situation, thus inciting to cognitive interest. Such ways of bevahiour determine general search routes for solving any task. Images of life experience, previous standard actions and decisions accumulated and processed by the brain may reduce to the state of contraction. A dynamic process of interaction between the inner stimuli and outer factors takes place, and this process influences human behaviour and produces intuition. Ya. Ponomariov has distinguished two types of intuition: the first one is connected with search, creativity, the other one – with the use of a ready decision applicable in a new situation[2]. The second type of intuition, according to Ya. Ponomariov, is inherent in any human being.

[2] Ja.A. Ponomarev, *Psihologija tvorchestva* (*Psychology of Creativity*) / Ja.A. Ponomarev, – M. : Nauka, 1976. – p. 303.

A set of images from life experience or products of imagination may take the shape of prompts and intuitive catalyzers which stimulate vivid thought. Besides, creation of positive images blocks manifestations of destructive behaviour, contributes to accumulation of sensual experience which may become the basis for impressing and formation of certain behaviour schemes, including the creative one.

III

The significance of accumulation of images, their further transformation into a conceptual plan (hypothesis) and then into a strategy of solving a problem is one of the key ideas presented in V. Moliako's monograph[3]. The author distinguishes two stages in the process of forming a design of a conceptual plan: emergance of the initial images and concepts, and maturing the moment when the designer decides to carry on with the search in a certain direction on the basis of his/her conceptual plan-hypothesis[4]. In other words, image-concept is viewed as a dynamic process. The development of initial image-concept into image-idea takes place with the help of methods based on comparison, synthesis, analysis, abstraction, concretization and classification, namely they are: analogy, transference, combination, division, displacement, recombination, etc.

There are numerous cases in the world science when the essence of complicated scientific problems was presented by their authors with the use of imagery and vividness. Arnold Sommerfeld, a German physicist, when outlining the essence of scientific problems in the preface to his monograph "Atombau und Spektrallinien" (1919), states: "What we hear today in the noise of spectre lines is a real music of spheres sounding in atom, consonance of integral ratios, order and harmony, ever increasing despite all the diversity" [5]. He continues then on the quantum theory: "It is that mysterious organ with which the nature plays spectral music and whose rhythm rules the structure of atom nucleus" [6].

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[3] *Psykholohichne doslidzhennia tvorchoho potentsialu osobystosti* (*Psychological Research of Personality Creative Potential*) [monohrafiia / nauk. ker. Moliako V. O.]. – K.: Pedahohichna dumka, 2008.

[4] *Psykholohichne doslidzhennia tvorchoho potentsialu osobystosti* (*Psychological Research of Personality Creative Potential*),… p. 41.

[5] *Zhizn' nauki // Antologija vstuplenij k klassike estestvoznanija* (*Anthology of Introductions to the Classics of Natural Sciences*). – M. : Nauka, 1973, p. 547.

[6] *Zhizn' nauki // Antologija vstuplenij k klassike estestvoznanija* (*Anthology of Introductions to the Classics of Natural Sciences*), p. 547.

IV

And what do we have in reality with the development of vivid thought?

The main type of thinking for a primary school student is visualization and imagery, both tightly connected with emotional sphere. The content of educational disciplines, methods of teaching, however, train and develop mainly the left hemisphere ignoring at least half of the child's potential. In the majority of textbooks information is presented in a logical, consequent and abstract way. One can witness mathematization and algorithmization of material in the process of studying the humanities. The general emotional mode of presenting information has considerably dropped down; the language is getting dry; the amount of bright vivid examples reduced; rhythms – linguistic and musical – capable of intensifying emotional and involuntary memory, are used all too rare.

This can be considered a system mistake for the more efforts it took to study in the mode of prevailing logical and semiotic thought the more efforts will be required later to overcome its limitations.

A possible way out of such a situation can be found in the application of creative pedagogy. The methods of creative pedagogy include various ways of stimulating, supporting and developing creative aptitudes, vivid thinking skills, as well as of emotionally motivated faculties in human activity. Those are the methods of creative potential based on theoretical and practical knowledge about the nature of creative processes and capacities, holistic perception of creativity as a lifestyle, as well as of the outer circumstances contributing to creative activity. If classified according to the criterion of goal achievement, methods of creative pedagogy can be divided into two groups:

- those aimed at solving a particular problem (creative solution of a problem);
- those aimed at the development of creativity in a particular personality (student) or group of students due to stimulating appropriate processes and overcoming present obstacles to creativity. In this case, unlike the previous one, they will not be a "means" but the aim of influence.

Among the methods of creative pedagogy are: methods of stimulating cognitive interest and problem-oriented thinking; methods of applying divergent thinking; methods of applying analogy, association and metaphor; methods based on the use of sensual (objective) experience.

If one establishes a goal of fostering creative personalities (s)he should organize the studying activity of a pupil (student) in such a way as to develop the functions of his/her right hemisphere. The teacher should be able to recognize non-verbal signals of his students, be aware of his/her own thought style and the thought style of his students, differentiate his/her interactions with them according to this awareness.

When dealing with right-hemisphere students, the teacher should pivot on the social significance of that or another type of activity since they are driven by a strong need for self-realization. The motives inciting to study in this case are connected with formation of personality, with aspiration for study, with desire to understand human relationships, to comprehend one's situation in the world. They are typically oriented to receive high evaluation and praise. Right-hemisphere students are hugely interested in the esthetic side of subjects. To form the motivation for studying activity in case with left-hemisphere students one should pivot on cognitive motives. They like the very process of acquiring information and are characterized by a high need for constant intellectual activity. Social motive in this case lies in the opportunity to continue studies. Being a scholar is considered as a means of developing one's thinking capacities. There is a clear manifestation of need for intellectual and volitional self-perfection. Right-hemisphere students are in a state of on-going stress if their teacher is demanding from them to work with out-of-context material. On the contrary, they achieve success at the classes when the same tasks are given within contextual framework (algebraic plotting used for calculating everyday expenses, new words introduced in the process of reading or telling, chemical balance equation derived from lab experiments). Left-hemisphere students seldom have big problems at classes since many things take place out of context. However, they would struggle with a written composition or certain types of individual work. They may not notice the whole in its parts or lack the capacities to deduce rules. Besides, a left-hemisphere teacher is better at evaluating the children of his/her type while right- and equal-hemisphere teachers give positive evaluation to the children of their type. In classes with prevailing number of right-hemisphere children, beyond the impact of teacher's teaching advantages, any kind of activity turns into a synthetic one. In this case left-hemisphere children appear to be in a risk group.

Picture: left and right brain

V

Based on the concept of synthetic intuitionism[7], let us formulate a set of generalizing theses indicating the necessity of forming a system of conceptualized images in students' minds during the teaching process:

- teacher works with students in order to accumulate different range images of the objective world, forms their sensual base and in this sensual objectivity discovers them for the students; student has a discourse not with the other person but with reality, or, to be more precise, with images of this reality; the events, objects, words, figures etc. perceived by a person are transformed not into a limited circle of knowledge expressed by a limited vocabulary but into a store of images provided to that person by environment;
- thinking real images enables a person to analyze the most complicated facets of reality, comprehend them, manifest one's attitude to them, juxtapose them against one's moral and ethical ideals; what happens can be rendered as "grasping" the so called "leading thread", something that enables synthesis of poetic type, gives the wealth of content, vulnerability and openness of the language, reference to symbolic exaltations, etc.
- synthetic intuitionism reaches objectification of its discourse into a certain appearance. The mechanism of vivid memory is quite specific. Imagination preserves an image translatable into any language. It does so by using a certain semiotic system. This bears a necessity to translate the sensual and the intuitive into a verbal expression called for developing one's linguistic and intellectual unconstraint.

VI

Thus, application of creative pedagogy in educational process contributes to the development of vivid thought and search activity. Creative process as a ramified system of possible actions requires production of new images which later get transformed into notions, judgments, strategies and tactics for solving creative tasks. Images, various visual objects and their combinations serve pupils (students) as certain patterns for comparison, determine individual peculiarities of perception and understanding, impact the structure of their thinking. Creatively gifted pupils (students) can operate spatial images and, therefore, are better at digesting information.

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[7] A. Goralskyi, *Teoriia tvorchosti* (*Theory of Creativity*)/ A. Goralskyi. – Lviv: Kameniar, Warszawa: Universitas rediviva, 2002. – p. 144.

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Abstrakt w j. polskim

Zastosowanie kreatywnej pedagogiki w procesie edukacji przyczynia się do rozwoju żywej myśli i działalności twórczej. Proces twórczy jako rozgałęziony system możliwych działań wymaga wytwarzania nowych obrazów, które później są przekształcane w pojęcia, sądy, strategie i taktyki rozwiązywania zadań twórczych. Obraz, który odgrywa rolę ekspresywną może stymulować ludzką kreatywność jako pochodną natchnienia ujętego w strukturę motywacji.

dr Jernajczyk Jakub

Thinking in Images: The Role of Digital Media in Popularizing Science

Abstract

This article focuses on the cognitive function of the image and the role the visual imagination plays in education and the popularization of science. We will look at the possibilities offered in this field created by the modern, moving and programmable digital media. They provide a highly effective, but still not fully utilized tool in popularizing the complex issues of science. The article discusses examples of both the visualizations of didactic character as well as artistic works which relate to the classic problems of mathematics, physics and philosophy in a creative way.

Keywords: moving image, visual imagination, digital media, visualization, science, art, cognition**.**

1. Introduction

According to the German psychologist and art theoretician Rudolf Arnheim, creative thinking is always of a perceptual nature[1]. The image plays a particularly important role in our understanding. This applies to both the common knowledge and scientific knowledge. Science has, from its very beginnings, been supported by visualization. Historically, the visualization took the form of drawings for the most part. It was not until the turn of the nineteenth and twentieth century, that the moving image appeared, which allowed for recording and subsequently the presentation of dynamic phenomena. Contemporary digital media provides unprecedented opportunities in this field for both the analysis and the visualization of scientific problems. In this article we will look at a few examples of dynamic images, pertaining to the sciences and philosophy. We will start with a classic issue, dating back to the beginnings of the queen of sciences – mathematics.

[1] R. Arnheim, *Visual Thinking*, University of California Press, 2004.

2. Visual mathematics

In geometry, a drawing not only plays an auxiliary role – it is often the core and a direct tool in scientific considerations. A perfect example of this are purely visual, not requiring algebraic operations, ancient proofs of the Pythagorean Theorem. Surely the most famous one is the one presented in the first book of Euclid's Elements[2]. Here, however, we will be looking at another example of extremely clear reasoning, which can be traced back to one of the oldest Chinese mathematical texts – *Zhou Bi Suan Jing*[3]. The squares shown in the figure below (Fig. 1) have equal areas; they only differ in the internal arrangement of the four identical right-angled triangles.

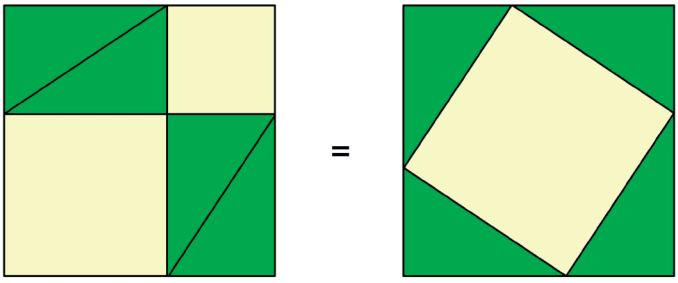

Fig. 1. *Change of the internal arrangement of triangles.*

Since in each of the large squares there are four identical triangles, it is clear that what is there besides them must also be equal. On the left side there are two yellow squares, on the right side there is one larger, rotated, yellow square. If in the sides of right-angled triangles we distinguish side *a* and *b* on the left and side *c* on the right side, we can see that the yellow squares are, respectively, a^2, b^2 and c^2 (Fig. 2).

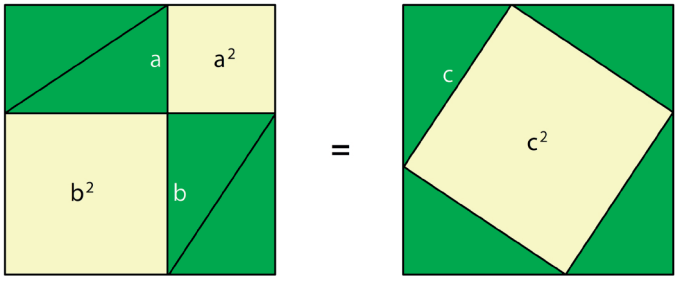

Fig. 2. *Squares constructed on the sides of right-angled triangles.*

[2] O. Byrne, *The first six books of the Elements of Euclid*, W. Pickering, London 1847.

[3] P. Hemenway, *The Secret Code: The Mysterious Formula that Rules Art, Nature, and Science*, Evergreen GmbH, Köln 2008.

And actually, this is the end of the proof, for clarity however let's remove the four green triangles on each side. Thanks to this we will only have squares remaining: a^2 and b^2 on the left and c^2 on the right (Fig. 3). Now we can see clearly that $a^2 + b^2 = c^2$.

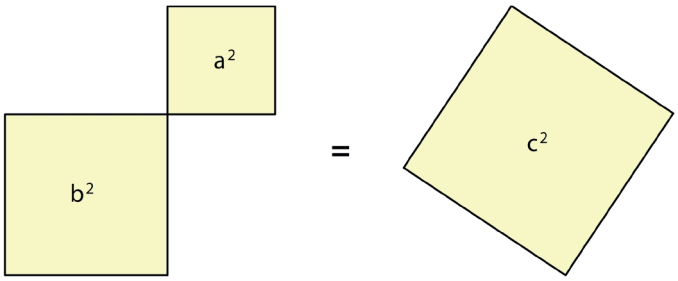

Fig. 3. *Graphic representation of the equation* $a^2 + b^2 = c^2$.

The above reasoning is not only the visualization of the Pythagorean Theorem. This is its fully correct proof. It is worth pointing out that in order to understand this proof, we do not need to refer to the algebraic record. In this day and age, we are used to symbolic signs, but the ancient mathematicians were able to carry out their analyses in a purely visual manner – solely based on drawings.

Digital Media facilitates the reinforcement of that visual message. With the help of a simple animation of the arrangement of triangles it can be shown how the left side of the equation (Fig. 1) is transformed into the right side. A dynamic image makes this clear visualization become even clearer and it sinks deeper into the recipient's memory. The strength of the message can also be reinforced by introducing a simple interactive feature, thanks to which the recipient can see the correctness of the famous theorem by moving the elements of the geometrical arrangement by him or herself.

3. Critical Thinking

An important feature which characterizes men of science, regardless of the discipline they represent, is a critical approach to the analyzed problems and phenomena. The next example shows what an important role in the process of critical thinking visual imagination can play. An example of this is illustrated by the words of the American philosopher William James who lived at the turn of the nineteenth and the twentieth century: "We carve out groups of stars in the heavens; and call them constellations, and the stars patiently suffer us to do so, — though if they knew what we were doing, some of them might feel much surprised at the partners

we had given them"[4]. Although James' description is already vivid and clear, using a moving image can convey this thought even more explicitly; it allows for its direct visualization. In the first frame (Fig.4.a), we can see a model of a starry sky, with a set constellation that resembles a symbolic shape (the constellation of a smiley face). If now, thanks to a three-dimensional animation, we were to set ourselves free from our geocentric point of view and were to look at the same system from a different perspective – from a different spot in the universe, it would turn out that the previously set shape is not visible anymore and that the stars previously marked by us have practically nothing in common with one another (Fig.4.b).

a) b)

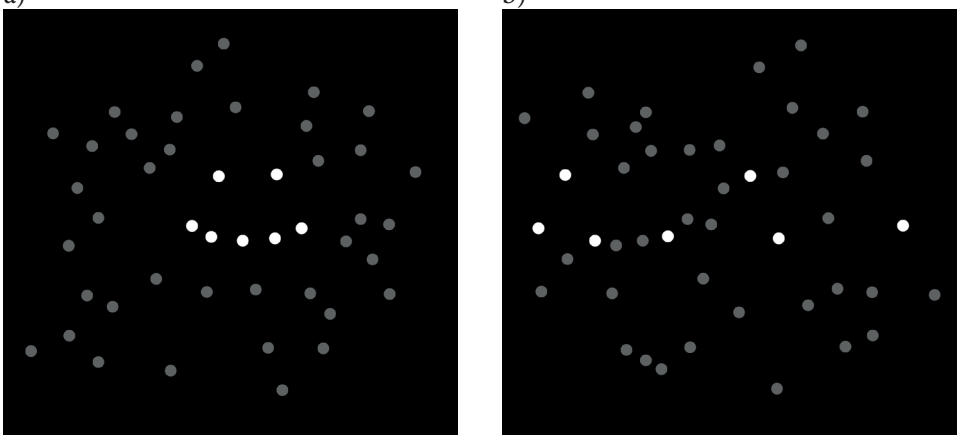

Fig. 4. *The same system of points viewed from two different locations in space.*

This illustration allows for a crushing critique of the popular fortune telling practices, that are based on an interpretation of symbolic stellar arrangements. Obviously this does not mean that being interested in star constellations is wrong or aimless. On the contrary, distinguishing the relatively stable, easily recognizable points in the sky has played a key part in the history of mankind. Among other things, it enabled distant journeys, especially sea expeditions, thanks to which the rapid development of civilization followed. This example then shows that something that is practical and useful at a certain time is not always true. That was the fate that, *inter alia*, the physics of Aristotle shared. For centuries it constituted a canon of knowledge, which described most commonly observed phenomena to a satisfactory degree. With time, however, some scratches and fractures began to show on this ideal. Whereas today we know that, from a scientific point of view, nearly every aspect of this description has turned out to be wrong[5].

[4] W. James, *Pragmatism, a new name for some old ways of thinking*, Longmans, Green, and co., New York 1907, p. 252.

[5] B. Russell, *A History of Western Philosophy And Its Connection with Political and Social Circumstances from the Earliest Times to the Present Day*, Routledge, London 1995.

4. Hidden beneath phenomena

Another moving image refers directly to the problems of Aristotelian physics. But before we take a closer look at these references, I suggest we solve a visual puzzle. On the black screen a white point is visible which recurrently moves along a section (Fig. 5).

Fig. 5. *A point moving along a section recurrently*

Although at first glance, the situation seems to be trivial and not worthy of attention, touching the screen brightens the background, thanks to which the true nature of its movement is revealed. It turns out that the point moving in a straight line is located in the circumference of a circle which rolls inside a circle which is double in diameter (Fig.6). There is therefore a direct transformation of the circular motion into a rectilinear motion, which seems to be counterintuitive.

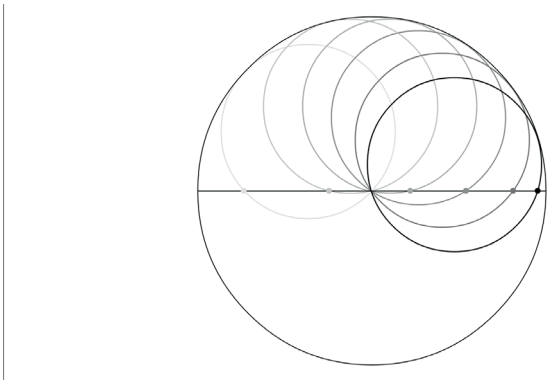

Fig. 6. *Hypocycloid*

The curve drawn through a point in the circle's circumference that rolls without slipping inside a larger circle is a *Hypocycloid*[6]. It may take various forms, but only in that one case, when the internal circle is twice as short in diameter as the exterior circle, it is reduced to a section – the diameter of the external circle.

This particular form of *hypocycloid* has played an important role in the history of science. Aristotle argued that each phase of movement must take some time, so the movement cannot take place in a non-extendable moment in time[7]. In consequence, the qualitative change in the nature of any movement had to be described as a superposition of two different movements, connected with an additional, temporary, transition phase. This caused a number of problems in the description of commonly observed physical phenomena, for example, such as the trajectory of the projectile[8]. When searching for general explanations, Galileo came across a variant of the hypocycloid discussed above in the writing of Copernicus. While imagining the geometric model in its dynamic form, he noted that the change of the direction of movement of the point must happen in one non-extendable moment in time because it is closely related to the uniform motion of a rolling circle. There must therefore be no issue of distinguishing phases. The nature of motion does not change; only its direction does. That simple, purely visual analysis allowed Galileo to eventually overthrow the incorrect Aristotelian description of motion which had functioned for centuries. Thus, an important step was taken on the road to modern science.

In addition to the references to the history of physics which have been mentioned here, *hypocycloid* animation can also assist in the didactics of mathematics. In an intriguing way, it introduces the problem of *kinematic curves* – curves drawn by the movement of geometric figures.

This example can also serve as a starting point for reflections of a philosophical nature[9]. The disclosure of a complex geometric structure hiding behind the seemingly trivial image (white point moving on a black background), facilitates drawing attention to a few significant epistemological issues. It does often turn out, that the seemingly obvious events are in fact much more complex in nature, and the important thing is hidden beneath the phenomena. The objective of scientific cognition is reaching that particular disclosure of what is hidden. Newly

[6] I.N. Bronsztejn, K.A. Siemiendiajew, G. Musiol, H. Mühlig, N*owoczesne kompendium matematyki*, transl. A. Szczech, M. Gorzecki, PWN, Warszawa 2012.

[7] Aristotle, *Physica,* Works. Translated into English under the editorship of W.D. Ross, vol. 2, Oxford Clarendon Press, Oxford 1930.

[8] J. Mioduszewski J., *Ciągłość. Szkice z historii matematyki*, Wydawnictwa Szkolne i Pedagogiczne, Warszawa 1996.

[9] At this point I would like to sincerely thank Dr. Bartłomiej Skowron for his comments and prompts which he provided me with during our many discussions on the philosophical interpretations of the projects presented in this article.

acquired knowledge not only increases the amount of information we have, it also significantly changes the way we look at reality, because "what a man sees depends both upon what he looks at and also upon what his previous visual-conceptual experience has taught him to see"[10].

5. The limitations of perception and cognition

What a man sees also has its absolute limitations, resulting from the structure of perceptual apparatus. As noted by Bertrand Russell "a motion is *perceived*, not merely *inferred*, when it is sufficiently swift for many positions to be sensible at one time"[11]. Changes that are too slow we cannot observe directly. We do not feel for example the movement of the hour hand of a clock. Only after some time, by comparing with the image in our memory, we can conclude that there has been a shift. On the other hand, a change that is too rapid causes the merging of moving objects into a seemingly stable whole. That is because a person is not able to distinguish the stimuli appearing at just any speed. If two events follow one another in a very short interval of time, they are recognized as one[12].

Fig. 7. *Points moving in a rotational movement at a speed determined by the numerical proportions (rps).*

In order to explain the foregoing reflections, let us use a simple visualization (Fig. 7). All three points visible on the screen move in a rotational movement along

[10] T.S. Kuhn, *The Structure of Scientfic Revolutions*, The University of Chicago Press, Chicago 1996, p. 113.

[11] B. Russell, *Our Knowledge of the External World as a Field for Scientific Method in Philosophy*, GEORGE ALLEN & UNWIN LTD, London 1914, p. 146.

[12] E. Pöppel, *Granice świadomości. O rzeczywistości i doznawaniu świata*, transl. A.D. Tauszyńska, Państwowy Instytut Wydawniczy, Warszawa 1989.

circles, however if looked at directly it seems to us that only the point located on the inside circle is moving. The key to this visual puzzle is the numerical relationships recorded inside the circles. They indicate how many rotations per second a particular point makes. In the first case the ratio of 1:43200 means that the point will make one rotation after 43,200 seconds, i.e. after 12 hours. Therefore it moves at the speed of the hour hand of a clock. In the second case, the ratio of 1:1 means that the point makes one rotation per one second. Only the movement of that point can be observed directly. In the third case, the ratio of 50:1 means that the point makes 50 rotations per one second. Because the image in the discussed application is refreshed at the speed of 50 frames per second, the exposed point is always in the same spot, so its movement is not visible. Although in the last case, we are dealing rather with the limitations of projection than of perception, we have to keep in mind that similar limitations apply to our eye. The highest speed at which a person is able to record movement is precisely close to these 50 frames per second. In the case of visual sensations we are not dealing with a continuous stream of images, but with a number of discrete states. Therefore, we do not see smooth motion, only its *discrete illusion*[13].

The analysis of the physical limitations of visual perception provokes us to a broader reflection on the limitations of our cognitive abilities. We realize that indeed, our descriptions and explanations of reality are built on such poor premises. This applies not only to common cognition, but also theorems and scientific theories. Accordingly, the moving image presented here can become a starting point for a discussion in the fields of epistemology and the philosophy of science.

6. Cognitive role of art

The examples discussed in this article clearly demonstrate how much cognitive potential is hidden in images. Many seemingly complex problems can be presented on the basis of visual imagination, without the necessity to refer to advanced theories and formulas. Thanks to an approach such as this it is possible to explain the non-trivial scientific issues also to recipients who do not have an adequate theoretical background.

In my opinion, contemporary art also has an important role to play in this field, in particular media art, which uses moving and programmable digital images. Some of the examples discussed above also operate as stand-alone multimedia installations, which are presented in gallery spaces as part of art exhibitions. The interactive installation *The Turning Point* (2013) intrigues the unaware recipient

[13] J. Jernajczyk, *Lossy representations of excessive reality, Excess and Lack*, p 172-176, Wrocław Academic Hub, Wrocław 2013.

with the apparent simplicity of the screened image by encouraging him or her to touch the screen and reveal the complex truth hidden beneath that phenomenon. Similarly, the installation *Limits of Movement* (2013) draws the viewer's attention to its minimalist form and the puzzle hidden in the numerical proportions. The solution to the puzzle allows the recipient to understand the complex message, contained in the synthetic image. These works are not just about the visualization or popularization of scientific issues. They are more "about creating artistic phenomena, where aesthetic experience connects and merges with cognitive experience"[14]. That creates a unique chance to – even if it's done a slightly through the element of surprise – familiarize the recipients of art with some often complex contents of mathematics, physics, and philosophy.

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[14] R. W. Kluszczyński, *art@science. About Relations between Art and Science, Towards the third culture. The Co-Existence of Art, Science and Technology*, p 32-42, Łaźnia Centre for Contemporary Art, Gdańsk 2011, p. 37.

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Abstrakt w języku polskim

Artykuł ten skupia się na poznawczej funkcji obrazu oraz roli, jaką wyobraźnia wzrokowa odgrywa w edukacji i popularyzacji nauki. Przyjrzymy się możliwościom, jakie na tym polu stwarzają współczesne, ruchome i programowalne media cyfrowe. Stanowią one niezwykle skuteczne, lecz wciąż nie w pełni wykorzystywane narzędzie przybliżania złożonych zagadnień naukowych. Omówione tu zostaną zarówno przykłady wizualizacji o charakterze dydaktycznym, jak i prace artystyczne, które w sposób twórczy odnoszą się do klasycznych problemów matematyki, fizyki i filozofii.

dr Jerzy Smoleń

Electrosmog and Its Psychophysical Results According to Internet Report

Abstract

The concept of electrosmog can be met more and more frequently. The concept a colloquial form that came into being as a result of some scientific speculations about smog which is connected with emission of invisible electromagnetic radiation into environment. From time to time, we are witnesses of the latest experiments which should show us psychosocial harmfulness of this phenomenon. Therefore, there is the increase of anxiety in society connected with mobile devices which cause side effects of human brain that is exposed to the radiation appearing close to it.

Key words: electrosmog, magnetic field, smog, psychosocial influence.

I. Introduction

Nowadays, electric energy is an inseparable part of human life. Short-term blackout is enough to cause anxiety, feeling of helplessness, chaos or even panic in human life. Wherever there is electricity, there is also electric field. Everyday every person uses objects which more or less emits it. Even when we are young we "make friends" with these devices. These are mobile phones, televisions, computers, or microwaves, fridges and much more.

We meet some publications for a few years, especially on the Internet, which accept the negative influence of the devices on people's everyday life. Authors of the publications also stress in dismay that even 60% people are not aware of the existence of electrosmog and additionally, its negative influence on every day[1].

Descriptions of these experiments awake curiosity but they also worry. Is it true that the harmfulness of the phenomena is as huge as the press, radio, television or lately most of all Internet report? Does the content of the report always have features of academic science based on authentic investigations?

[1] *Stop elektrosmog*, in: "Cali News" (2014) Jesień, p. 16.

II. Electrosmog media reports

In English literature, electrosmog is decribed as electromagnetic pollution which contrast to typical smog of classical electromagnetic pollution in a form of different kind of smoke or chemicals. Moreover, its danger lies in impossibility of registration by human senses[2].

"Smog" in English consists of two words "smoke" and "fog". The definition is used to describe the weather, when the atmosphere is "thick". Electrosmog means nothing but environmental pollution by electromagnetic radiation. It is formed in the area of electric devices, phones, close to radio sets and radars. Generally – everytime we draw electric current our organism receives this field from surrounding. It can be said that we are almost non-stop exposed to its influence. Moreover, "practically every molecule, and even atom produces electromagnetic field with different frequency"[3].

Environmental pollution by electromagnetic waves is more and more frequently described as chemical contamination or noise threat. According to the International Frequency Registration Board (IFRB) the number of sources of electromagnetic fields all over the world increases by 6% each year. In Poland there are more SIM cards than subscribers. Electromagnetic smog became a part of our life and almost all electrical devices used by people like hoovers, mixers, hairdryers may have negative influence on us[4].

However, mobile phones are most questionable. There is more and more different information about them. The research published by *Environment International* shows that carrying mobile phones in trousers' pockets may have negative influence on men's fertility. 1353 men (1448 samples) took part in the research, it included patients of fertility clinics (results are based on 10 analyses). The research shows that exposition to the radio waves emitted by mobile phones decreases sperm motilities (8,1 %) and it reduces their vitality (9,1%) but it does not influence their number in a unit of volume. The authors of the research suggest to focus on SAR coefficient (Specific Absorption Rate) in phones. It describes the maximum number of radio waves energy absorbed by a body while using s mobile phone (watt per kilogram). It is important when a couple tries to have a baby not to carry a mobile phone in trousers' pockets for a while[5].

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[2] M. Moraszczyk, *Czy elektrosmog nam szkodzi? Wpływ promieniowania elektromagnetycznego na zdrowie*, in: http://www.poradnikzdrowie.pl/sprawdz-sie/ciekawostki/czy-elektrosmog-nam-szkodzi-wplyw-promieniowania-elektromagnetycznego_42201.html

[3] *Stop elektrosmog*, in: "Cali News" (2014) Jesień, p. 16.

[4] Ibidem.

[5] http://www.telepolis.pl/wiadomosci/telefony-komorkowe-obnizaja-plodnosc-mezczyzn,2,3,30721.html

Recently, 10th June 2014 Polish Press Agency also informed about the danger of infertility connected with carrying mobile phones in trousers' pockets by men, making reference to the research made in Great Britain[6]. The team headed by dr. Fiona Mathews from University of Exeter (Great Britain), analyzed the results of 10 tests in which 1,5 thousand men took part including the patients who were treated in fertility clinics. Three parameters of sperm quality were taken into consideration: motility (their ability to move in the direction of the egg cell), vitality (percentage of alive sperm in ejaculate) and the number in the unit of ejaculate. It occurred that the exposition to waves emitted by mobile phones decreases the vitality of sperm for about 8 percentage points as well the percentage of lively sperm in ejaculate. The influence of phones on sperm number was not so visible. "This research shows that the exposition to electromagnetic waves connected with carrying mobile phones in trousers' pockets may have negative influence on sperm quality. It may have specific meaning for men whose fertility is already in danger and there must be some additional investigations in order to estimate what kind of consequences it may have, taking into consideration whole range of population" – says dr. Mathews[7].

Another danger caused by using mobile phones as the source of electrosmog is cancer. For many years there has been a debate among specialists from a lot of scientific fields about the fact if using mobile phones may cause cancer or not[8]. There is a lot of information all over the world which are distressing.

On September 2009 in London *Radiation Research Trust* organized a big conference. During the conference some scientists sat next to each other and started to talk. There was a report presented by Swedish oncologist dr. L.Hardella who noticed a connection between long-time using mobile phone and brain cancer of adult. He discovered that the risk of brain cancer of children who frequently used mobile phones until they finished 20 years, was raised five times. The risk of brain cancer is the bigger the sooner a child starts using mobile phone[9].

Meanwhile, Polish publications show that 83 % of Polish 10-year-old children have their own mobile phones which are used by them every day and sometimes out of parents' control[10].

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[6] http://www.pap.pl/palio/html.run?_Instance=cms_www.pap.pl&_PageID=1&s=-infopakiet&dz=nauka&idNewsComp=&filename=&idnews=165747&data=&status=biezace&_CheckSum=-293816648

[7] http://www.pap.pl/palio/html.run?_Instance=cms_www.pap.pl&_PageID=1&s=-infopakiet&dz=nauka&idNewsComp=&filename=&idnews=165747&data=&status=biezace&_CheckSum=-293816648; http://www.telix.pl/artykul/chcesz-zostac-ojcem?--pamietaj-plemniki-nie-lubia-komorek-3,61746.html,

[8] http://www.zwrotnikraka.pl/czy-telefon-komorkowy-powoduje-raka/

[9] Ibidem.

[10] *Elektrosmog*, in: "Cali News" (2014) Lato, p. 13.

Even the Department of Health in the Great Britain recommends the children under 16 should use mobile phones only in necessary situations and the use should be as short as possible. But in Canada *Toronto Public Health* asked Barents to think it over very well before they decide to give their child a mobile phone. They recommended the teenagers should use it in limited way and the children should use only home phone[11].

At the beginning of 2008 the French Department of Health gave even more detailed advice. They recommended that children avoid calling when the range is low (then the emitted signal is stronger and more dangerous for health) and not to carry the phones close to sensitive body parts and keep them in cases. Teenagers should use speakerphone and instead of talking – they should write short messages[12].

In 2008 the European Research Institute for Electronic Components in Bucharest published the results of their research which seem to confirm the thesis for harmful influence of mobile phones on people's health. According to the scientists the effect of microwaves is very unbeneficial for some internal organs especially kidneys and hearts. Polish doctors drew the same conclusion. There are patients – mobile phones users – who more and more frequently come to doctors suffering from disturbance of memory, headache and difficulty in concentration[13]. Z. Bednarkiewicz from Cardiological Clinic in Łódź show that the mobile phones have an influence on an artificial pacemaker[14].

Nowadays, the Internet is full of documents about experiments of the influence of electrosmog on environment. Among them the great popularity have hand – made films and photos showing the process of cooking or making popcorn using only radiation from mobile phones. Together with the popularity of these documents rises the social anxiety connected with the influence of the electrical devices on human organism and especially on the brain which is often exposed to radiation when occurred close to it. Probably the confusion with it was begun by journalists in the biggest Russian newspaper *Komsomolskaja Prawda* who in 2006 at Easter presented British students the idea of cooking eggs without using water, but using mobile phones[15]. Vladimir Lagovski and Andrei Moiseynko were the authors. According to them, the experiment was held in this way[16]:

- after 15 minutes the egg was lightly warm
- after 25 minutes the egg was very warm

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[11] http://www.zwrotnikraka.pl/czy-telefon-komorkowy-powoduje-raka/

[12] Ibidem.

[13] http://www.idg.pl/news/331283/telefony.komorkowe.moga.powodowac.zawal.serca.html

[14] Z. Bednarkiewicz, *Wpływ telefonów komórkowych na prace stymulatorów serca*, in: "Forum Kardiologów" no 4/2000, p. 127-129.

[15] "Gazprom Snaps Up Best-Selling Tabloid". The Moscow Times. 22 November 2006. Retrieved 22 October 2008.

[16] http://www.kp.ni/daily/23694.4/52233

- after 40 minutes the egg was hot
- after 65 minutes the egg was boiled

After the presentation, on the Internet there were more and more films in different languages which were about the same topic. Moreover, a lot of doctors, specialists from public health started to uncritically refer to these films as a scientific proof indicating the problems of psychosocial influence of electrosmog[17].

3. Own experiment

Reading the above mentioned reports, there is still a question about the truth? Some scientist all over the world try to answer the question with different results. However, we are not able to verify or confront some information which comes to us. Many times, we uncritically believe in what is on the Internet with the intention that it is only publishing the information that makes it reliable.

However, reading and listening to the information about the electrosmog causes the receiver would like to ask questions about credibility of these reports because the society still exists and it will not if everything comes true and not everything from the information in people's everyday life verifies, is as obvious as these media information.

To verify the authenticity of one of the above mentioned Internet reports, three students of the Catholic University of Lublin (KUL): Aleksandra Trzos, Paula Żurakowska, and Patrycja Woźniak and a form of "zaliczenie" (a form of passing a test) during my classes on media psychology, prepared their own experiment at home. In order to do that they used the lowest quality egg (laid by caged chickens). To make the test the most credible, the egg was warmed to the room temperature . Next, around the egg they put three mobile phones: a smartphone, a phone of medium generation and an old phone. Each of them worked intensively. Smartphone with a Wi-Fi module which download data from YouTube, and the older two phones were connected together (calling). In each phone there was a SIM card of different mobile network operators. There were six wireless Wi-Fi and other AGD and RTV devices. The experiment lasted two hours. At the very beginning the temperature of the egg and air was 21°C.

When finishing the experiment the egg was not warmer at all, did not change its consistency which was still liquid which is also seen in the recording. To sum up, we have to say that it is impossible to cook the egg only thanks to being close to the mobile phone. That is why it is not wise to say that the influence of the mobile phone on the human brain is so strong while talking. Additionally, we have to look at the fact that the person using the mobile phone and would have to have close to ear at least one mobile phone for about a couple of hours. Leaving the fact

[17] http://www.skarby-natury.com/index.php?k_d=27&id=330&long&t=newsart

that phone batteries, especially in new ones, are not often able to keep such long conversations, the human should often quit every work that needs the work of two hands. As a result, when someone decides using the phones in the way, he/she usually decides to use phonespeakers or headspeakers which have to a direct contact with the human brain.

In support with the above mentioned experiment, other results of experiments can be shown, where the egg was not also boiled, in spite of the effort of some people making the experiments[18]. What is more, students also wanted to check if a direct influence of the source of electrosmog which are transmitters of phone operators may have an influence on the egg and also on human organism. In order to check it, they wanted to put the egg on the transmitter mast of mobile network, as close to the transmitter as is possible. On 10 November 2014 they send letters to Orange, T-mobile, Plus and Play operators to ask for the agreement to do that in order to make the experiment. Unfortunately, until the date of publishing the present article, the students did not receive the answer.

4. Summary and conclusion

Everyone has a high to believe in what he/she wants but the disadvantage of experiments publicized in mass media as scientific are shown with no detailed data how cells of electromagnetic waves were examined and also with lack of investigations made in laboratory conditions. What is more, the report of World Health Organization[19], describing precisely the agenda of making the investigation on cancer – the International Agency for Research on Cancer (IARC) published the examinations about the bad influence of using mobile phones. They show very clearly that from 24 to 31 May 2013 an international team consisted of 31 scientists from 14 countries tried to estimate the reality of danger of cancer connected with electromagnetic radiation emitted by more and more popular mobile phones. Dr. Jonathan Samet who was responsible for the team of scientists said that the gathered proof is strong enough to classify mobile phones to so called 2B group. To this group the substances "possibly carcinogenic" are included. It could be even worse when cell would be classified to group 2A (probably carcinogenic) or to group 1 (carcinogenic). In the opinion of IARC the proof of a relationship between cells and glioma (brain tumor) is limited[20]. In the range of the relationships between

[18] *Brainiac broadcast in Discovery Science – sample: 100 mobile phones, effect: no egg was boiled*. Compare: http://pediatria.mp.pl/komentarze/show.html?id=69225

[19] Electromagnetic fields and public health: mobile phones; http://www.who.int/mediacentre/factsheets/fsl93/en/

[20] http://www.adr.com.pl/new/pl/raport-who-dotyczacy-szkodliwosci-telefonow-komorkowych/

cellars and other kinds of cancer the proof is inadequate, which means that the quality of examinations in the range was too low or there was too little data. Scientists repeated which is often heard: there is a need of further, more systematic, international, specialist research[21].

However, it can be undoubtedly be said that electrosmog is not harmful. As everyday users of the benefits of technique we may indicate the negative effects of permanent presence in the range of electromagnetic field. We often complain about tiredness, insomnia, notorious irritation or even nervousness, headaches, disturbance of concentration and attention, problems with learning and so with memory.

The information gathered about electrosmog, on the basis of publications published in more than 6000 independent and important medical periodicals indicate unambiguously its harmfulness. Devices which we use emit electrosmog which very slowly, year after year, causes progressed deregulation of our organisms, being a factor catalyzed the development of chronic diseases.

Therefore it is important to take precautions in using the benefits of modern techniques whose influence, especially harmful, is not well recognized. Specialists advise to behave with moderation, restraint and keep distance. Everything should be done to make our everyday working spatial, and if possible free from electrosmog. The example of such a place should be our bedroom where people forgetting about work should regenerate by the rest and not expose to additional tiredness.

D. Klinghardt, a Medicine Doctor[22] who specialized in autoimmune diseases for over 30 years, which are connected with dysfunctions of autoimmune nervous system that can be caused by electromagnetic radiation, emphasizes the fact that there are safer technologies connected with using electricity (like an optical fiber technique) which for unknown reasons are not promoted by telecommunication business that is fully concentrated on the development of harmful wireless technologies[23].

We can do nothing but hope that there will be better and safer technologies in the future for our work and development.

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Abstrakt w języku polskim

Teoria elektrosmogu staje się coraz bardziej użyteczna. Koncepcja ta, istniejąca też w formie potocznej, powstała w wyniku spekulacji naukowych o pewnym smogu, który jest powiązany z emisją promieniowania elektromagnetycznego do niewidzialnego środowiska. Od czasu do czasu jesteśmy świadkami ostatnich eksperymentów, które powinny pokazać nam psychospołeczną szkodliwość tego zjawiska. Nic dziwnego więc, że wzrasta lęk w społeczeństwie połączonym urządzeniami mobilnymi, które powodują skutki uboczne w mózgu człowieka, nieustannie wystawionego na działanie promieniowania znajdującego się w jego pobliżu.

dr Agnieszka Zduniak

Seeing The Invisible. Religious Content on The Internet from The Perspective of Visual Sociology

Abstract

Logocentric cultural forms are increasingly often replaced by images in contemporary society. This constitutes a new social situation, not without influence on the sphere of religion, which has been so far dominated by verbal communication. This article analyses the usability of visual analysis to examine social forms of religiosity and spirituality. The author pays special attention to visual manifestations of this sphere of social life on the Internet, which is the most dynamically developing communication medium, pointing to those aspects of image perception and reception which can provide a sociologist with valuable information about the role of religion in contemporary culture and changes which take place in the sphere of religious communication.

Key words: visual sociology, religion, religious communication, image culture

1. Introduction

Visual sociology is a relatively young branch of knowledge about human social life, but we are likely to see its dynamic growth during the near future. This is because the number and importance of images in contemporary society is growing. The contemporary culture is no longer logocentric, but it is becoming increasingly image-centred. Visual presentations used to be mere supplements for verbal messages, but now they are in the focus of attention.

The multitude of images competing for a viewer's attention and the fact that they are being replaced by logocentric cultural forms constitutes a new social situation, which does not remain unaffected by those areas of social reality which have until now been based on verbal communication, such as science or religion. In this article, I wish to consider the usability of analysis of visual presentations in examining social forms of religion and spirituality in its broader meaning, while devoting special attention to visual manifestations of this sphere of life on the Internet, which is the most thriving communication medium.

2. Modern culture as visual culture

In 1921, Wilhelm Worringer in his famous publication entitled "Abstraktion und Einfühlung" formulated the following thesis: people perceive the world in two ways: through abstract concepts or through empathy. Abstract perception of the world is rational, theoretical, whereas empathy involves perception of reality through feelings, emotions and sensual experiences. Perceiving the world through empathy manifests itself through an increase in the importance of all the culture elements which affect the senses, including an increase in the importance of the image compared to verbal communication.[1] Such cultural transformations impact other areas of social reality, they shape the process of development of the spiritual and intellectual and even economic spheres.

These transformations are reflected in changes which are currently taking place in science, especially within the sphere of human sciences, which W. J. T. Mitchell termed the "pictorial turn". According to his diagnosis, non-linguistic systems of symbols start to play a key role in communication. Like language in the past, images have started to be the focal point of discussions in humanities. Modern information technologies and the possibility of creating, reproducing and distributing images raise them to the predominant position in contemporary culture. The pictorial turn is "a postlinguistic, postsemiotic rediscovery of the picture as a complex interplay between visuality, apparatus, institutions, discourse, bodies and figurality" [2].

Although man has been creating and using images since the beginning of history, they have never been present in his life with such intensity and their impact on every level of culture has never been so prevalent. The importance of images is not reduced to them being a communication tool. If that were the case, they would be a more or less faithful reflection of reality. But they are something far more, because they are of fundamental importance in constructing and interpreting reality. They create their own reality – whose virtual nature is apparently realised by the viewer and affects his subconscious and conscious with such a great force that the effects of such impact are perfectly tangible and observable in the real world. Increasingly often, it is not the images that are compared to the reality that they represent, but the reality is juxtaposed with images, or even shaped to copy them and to be similar to them. Images say a lot about the culture of the society in which they are created, but they also shape the culture. They reflect the socially recognised values, goals, desires – but they also define and modify them. The strength of the images' impact is noticeable in many areas of social life. According to Piotr Sztompka – "perceiving the outside

[1] W. Worringer, *Abstraktion und Einfühlung*. München 1921, p. 3-4.

[2] W.J.T. Mitchell, *Zwrot* piktorialny [*Pictorial turn*], in: "Kultura popularna" 2009, no. 1(23), p. 5.

world is increasingly mediated by images. An image constructs and articulates our perception of the world […] The ubiquity of images in our environment makes us perceive the world through stereotypes created by them"[3].

3. The influence of visual culture on religion and spirituality

The pictorial turn has also a especially affected sphere of religious communication, both in its intra- and extra-system dimension. The first of those dimensions concerns image as a form of communicating content, values, opinions, religious lifestyles within the religious subsystem – that is the way in which religion presents itself to those who function within the system – in different roles: as representatives of religious institutions, the faithful or people interested in religion or spirituality in a broader sense of the word. The other dimension is the way in which religion manifests itself – in this case through an image – towards other subsystems of social reality. Where religious communication takes place on a general social level, not limited to certain groups or circles, religious institutions must use the media as an important channel of communication.

While both roles in pre-modern society were played by traditional visual representations (painting, sculpture, architecture, traditional rituals), the principal role in the new media era is played by media visual presentations. Among them, the Internet has gained the greatest importance as a sort of Agora of the social life, the place of symbolic expression as a forum where debates on the problems of modern life take place. The visual forms of presenting religion on the Internet cannot be disregarded in an analysis of contemporary forms of religious life and religious communication, as was shown by a study entitled "Using religious websites and web portals", which was conducted by CBOS [Public Opinion Research Centre] in June 2014. The survey results show that they are used by approx. 3 million Poles, i.e. 14% of all the Internet users. They mainly seek information on current events from their parish, their religious community or general information on the life of the Church, discussions and articles on religious matters. Websites devoted to religion allow Internet users to take part in discussion forums and religious services broadcast online, to use literature on different forms of spirituality and to watch evangelisation programmes of different denominations. This is the context of progressing virtualisation of religious practices[4] .

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[3] P. Sztompka, *Socjologia wizualna. Fotografia jako metoda badawcza* [*Visual sociology. Photography as a research method*], Wydawnictwo Naukowe PWN, Warszawa 2006, p. 13.

[4] M. Libiszowska-Żółtkowska, *Nowe ruchy religijne w globalnej przestrzeni* [*New religious movements in the global space*], in: M. Libiszowska-Żółtkowska (ed.), *Religia i religijność w warunkach globalizacji* [*Religion and religiosity in the times of globalisation*], Kraków 2007, p. 200.

Photography by Anna Bielak

The subjectifying tendencies which are increasingly apparent in contemporary religiosity are expressed by such factors as stressing the possibilities and special importance of one's own subjective transcendent experience. Such experiences from the sphere of spirituality are no longer reserved for religious virtuosos. Subjectivity of an experience does not mean that they should remain internal and confined to a strictly private sphere. Popular culture makes publicising such experiences easy; it even encourages it. Owing to the Internet – a widely available communication medium – they make their way into the public sphere. Personal experiences and rituals of a religious nature, which used to be private or even intimate, are now related on Internet forums, frequently accompanied with photographs or video materials shown to all those interested[5].

Since the media are the main platform of communication in the contemporary world, observing the way in which religion functions in media communication can contribute to understanding the role of religion in contemporary society, both in the personal and social dimension.

[5] H. Knoblauch, *Märkte der populären Religion,* in: M. Jäckel (ed.), *Ambivalenzen des Konsums und der werblichen Kommunikation,* Wiesbaden 2007, p. 86-87.

4. Methodological difficulties of visual analysis of religion

It is quite difficult for a researcher who decides to analyse images with religious content, available on the Internet, to determine which of them deserve to be called religious and which do not. The problem is not specific to an analysis of visual presentations of religion, but it is a problem of the sociology of religion in general. The development tendencies of modern man make religion, or rather spirituality in a broader sense of the term, increasingly frequently manifest itself beyond the institutional sphere. Therefore, it is so important to be able to identify the phenomena of a religious nature, including those related to religious communication, in those spheres of social reality, which have freed themselves from under the influence of institutional religion.

Religion in contemporary society is losing its sharpness of contour, its distinctive nature, so it is increasingly difficult to distinguish it from other phenomena. Visual presentations of a religious nature can draw upon a specific religious tradition, but they can also relate to syncretic religiosity composed of elements of different traditions, philosophical systems, world views and images of God. Syncretic religiosity is becoming increasingly popular, and it is even becoming the predominant social form of religion in the countries of Western Europe. Religious motifs are easily perceptible in a variety of spheres of social life: in politics, art, lay ideologies, literature, in grand sports events, concerts, worshipping movie stars, in unconventional medicine, in the ecological movement[6]. In T. Luckmann's opinion, it is beyond doubt that traditional religiosity is of marginal importance in contemporary society, and it is being replaced by new social forms of religion which are personal systems of ultimate meanings[7]. However, the notion that the Church is a social representative of religion has become fixed in our cultural circle and it is its prerogative to decide what religion is and what it is not. Therefore, whenever religion is mentioned and it becomes an object of reflection, what is meant are mainly phenomena which are "religious" according to the Church's point of view. Religious phenomena from outside the sphere of religion as defined by the Church are not easily recognised in the social consciousness; they are often refused to be referred to as religious. Therefore, there is a real danger that important phenomena which constitute the forms of new spirituality, but which are not defined institutionally, may be overlooked[8].

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[6] D. Hervieu-Léger, *Religia jako pamięć [Religion as memory*], Kraków 1999, p. 16-17.

[7] T. Luckmann, *Niewidzialna religia. Problem religii we współczesnym społeczeństwie [The invisible religion. The problem of religion in contemporary society*] , transl. by L. Bluszcz, Kraków 1996, p. 72, 127.

[8] J. Matthes, *Auf der Suche nach dem "Religiösen*", in: J. Matthes, *Das Eigene und das Fremde. Gesammelte Aufsätze zur Gesellschaft, Kultur und Religion*, Hg. R. Schloz, Würzburg 2005, p. 212.

Meanwhile, it is the task of sociology of religion to study religious phenomena at every level of social reality. The first of them is the system of the institutional Church, the second is "a system of cultural patterns in which religious values are translated into behaviours and styles of thought". The third level of analysis concerns "styles of religiosity in which religious values combine with interpretation of situations which have been experienced or are anticipated"[9]. Religious studies must take into account religious phenomena at each one of those levels, they must also be conducted while bearing in mind that religious systems of societies comprise different configurations of those phenomena, each time depending on the social and cultural context.

5. Internet images of religion as a source of knowledge about the contemporary religious sphere

Internet resources provide extremely vast material for studying visual representations which relate to different dimensions of religiosity. Images and video materials which give account of events and meetings of a religious nature are a type of study material which is interesting from the sociological point of view. They present religion not only in the institutional dimension and in terms of its outer ritual, but also as a community and spiritual phenomenon. An analysis of video materials which document such meetings can help to draw interesting conclusions about what religion is to a modern man, how he experiences it and communicates it to other people, what is a religious community and what are the principles of its existence. To make such an analysis as comprehensive as possible, some important questions need to be answered.

The first is related to the authorship of such images (photographs, video materials). An image is only apparently a direct reflection of the reality that it presents. Because, in fact, it is an image of the reality as seen by its author, who can emphasise its certain parts and omit others. Owing to the development of new technologies of image recording, journalists accredited to report on an event are no longer the only intermediaries between the event and its observers; the majority of those present have means of communication, such as mobile phones and tablets, which they can use to record both an event itself and different forms of their participation in it. So it is not unimportant who has taken a picture. Depending on whether it was taken by – for example – a photographer of the Catholic News Agency or an ordinary participant of the event, the photography may show different fragments of reality, or the same fragments, but presented differently. Therefore, the communication can be "top-down" – institutional – or "bottom-up" – extra-institutional; in other words: with an internal or external perspective.

[9] J. Matthes, *Kirche und Gesellschaft. Einführung in die Religionssoziologie*, Reinbek bei Hamburg 1968, p. 149.

Another question concerns the elements which identify a photography or recording as "religious". What elements are these? Are these traditional religious symbols or motifs or symbols of different types, but which are used in a religious context? Does the arrangement of the environment indicate that there is a religious ceremony in it? What do the participants look like? Do their clothes, gestures or behaviours indicate any forms of religious involvement? Or maybe the image lacks any elements which would identify the situation as "religious"? Would the image be understandable without reference to other images or a verbal description which identifies its context?

It must be borne in mind that the situation can be of three types. Firstly, religion-related motifs can be present in a religious context. This situation can be easily interpreted as "religious" and it occurs in all types of pictorial presentations of institutional nature of socially recognised and fixed forms of religiosity. For example, photographs which present traditional religious ceremonies, which also show traditional religious symbols or items of religious worship, leave no doubt as to their "religious" nature. Secondly, religion-related motifs can occur in a non-religious context. For example, religious motifs in adolescent fashion appear from time to time in a provocative context (a rosary as an element of jewellery, images of saints as ornaments on different parts of clothing). Although they contain religious symbols, images of this type are not usually interpreted as "religious", although they can provide some sociologically important information on the impact of Christianity on contemporary culture. Thirdly, non-religious motifs (lay motifs) my appear in a religious context. For example, images and motifs taken from contemporary popular culture are frequently used during meetings of Christian youth which take place every year in Lednica; they are used to convey religious content in a way that is understandable to young people (for example, the pop-cultural motif of a heart being drawn in the sky by planes as a symbol of God's love of people).

The analysis should also include people, small groups or larger communities which perform the role of representatives of a religion. Who is representing it? Are those mainly the clergy (priests, bishops, the pope, nuns) or rather laity? Which of them dominate in the picture? Are there more men or women, young or elderly people? Is the photographer's attention focused on individuals and, if so, what is the criterion used to choose certain people rather than others? Does the picture show small groups or crowds/communities? If so, what is their structure? Is there an order or hierarchy among them? What proxemic patterns can be observed?

An important stage of the analysis concerns the type of actions taken by the people shown in photographs and type of interactions they enter[10]. Are they rather active or rather passive? Are they ritual or ceremonial actions, or are they rather routine, mundane? What makes them interpretable as religious?

[10] P. Sztompka, *Socjologia wizualna [Visual sociology]*, op. cit., p. 39 nn.

An analysis should be conducted not only of the contents of an image, but also of its emotional impact. Does the image provide only a dry account, or does it – by using certain artistic measures (for example, the appropriate use of light, choice of colour) – evoke any particular emotions or associations? As in text analysis, a sociologist should pay attention not only to the contents of the message, but also to its form: he examines not only what is being presented, but also – perhaps mainly – how it is being presented. What sort of emotions are experienced by a person looking at the photograph? Are the emotions positive or negative? Does the picture evoke a sense of identification and closeness, or rather that of strangeness and distance? Does the social reality presented in the photographs encourage the viewer to become part of it?

The answers to these and to many other questions can provide a lot of valuable information about what religion is for the man living in contemporary culture, what he understands by spirituality, how he perceives representatives of institutional religion and what he finds in the social forms through which religion manifests itself. But pictures with religious connotations can also be interpreted within the postulative sphere. A specific choice of motifs for presentation, paying attention to some events, forms and rituals rather than others, allows one to draw certain conclusions on how contemporary people understand the role of religion and what religious communication should look like.

The analysis of visual presentations also allows pictorial forms to be included in studies of religion in which contemporary religiosity and spirituality manifests itself, so it is a valuable supplement to the quantitative and qualitative methods of studying religious phenomena in a modern society. This is of particular importance, because of the increasing importance of images in contemporary forms of communication and because the intellectual, ritual or ideological dimension does not play such an important role in different forms of the new spirituality, with the dimension of the personal religious experience, recorded and communicated to other people by images, among other means, occupying the predominant position[11]. Interpretation of visual contents allows one to observe the merging of the spheres of *sacrum* and *profanum,* which is typical of contemporary popular culture. Forms and symbols which are used to communicate one's religious experience come from two main sources: institutional religion and popular culture. There is a certain interference, and even merging, of both spheres of meanings: the content which used to be reserved for religion now passes to the domain of popular culture, and the forms of expression and subjects which have been typical of popular culture are now increasingly often accepted by religious institutions.

[11] R. Stark, Ch. Y. Glock, *Wymiary zaangażowania religijnego [Dimensions of religious involvement*], transl. by B. Kruppik, in: *Socjologia religii. Antologia* tekstów [*Sociology of religion. Antology*], choice and preface by W. Piwowarski, Kraków 1998, p. 184-185.

In this manner, a visual analysis allows one to formulate many conclusions in regard to the contemporary role of religion in social life and in culture which are interesting from a sociological point of view.

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Abstrakt w j. polskim

We współczesnym społeczeństwie obraz w coraz większym stopniu zastępuje logocentryczne formy kulturowe. Konstytuuje to nową sytuację społeczną, które nie pozostaje bez wpływu również na sferę religii, w której do tej pory dominowała komunikacja werbalna. Tematem niniejszego artykułu jest przydatność analizy wizualnej w badaniu społecznych form religii i duchowości. Autorka poświęca szczególną uwagę wizualnym manifestacjom tej sfery życia społecznego w najbardziej dynamicznie rozwijającym się medium komunikacyjnym, jakim jest Internet, wskazując na te aspekty percepcji i recepcji obrazu, które mogą stać się dla socjologa cennym źródłem informacji na temat roli religii we współczesnej kulturze oraz zmian zachodzących w sferze komunikacji religijnej.

dr Barbara Kiereś

Cognitive Role of The Picture – The Didactic Aspect

Abstrakt

The article departs from the concept of iconic culture and its causes: ideology of liberalism, the gap between art and the criterion of beauty (aesthetic features) and ideology of postmodernism. In the second part of the article it is found that the picture is a *medium quod* and that its cognition and the understanding of the intention that is contained in it requires interpretation; and interpretation is conditioned by adequate knowledge and skills. In the light of these findings, visual culture blurs the difference between the real world and fiction, and it exposes a man to manipulation.

Key words: iconic culture, postmodern return, ontological status of image, manipulation of mediumistic image, pedagogy of image

I

For at least two decades in the culture of West Europe the terms *pictural turn* or *visual turn* are used[1]. The essence of this turn is the growing role of the picture in the cultural discourse, and hence a change in the character of culture: it becomes the so-called visual culture, that is such culture that reminds of a "cocoon built of pictures", and whose discourse is subject to the principle of the so-called visualization[2]. It is admitted that the development of the electronic media and of all the means of multiplication of the picture has contributed to the expansion of the picture. Investigations that are carried out by researchers proceed in two directions. Firstly, they mostly have the character of cultural studies and on the basis of the so-called anthropology of the picture they attempt to explore the nature of the "pictorial culture" and its consequences for the world view; and secondly, they also focus on the phenomenon of the picture and its role in culture, particularly on its place in human cognition.

In the cultural approach at least the following causes of the "visual (pictorial) culture" are pointed to: firstly, the triumph of the ideology of political liberalism and economic capitalism. Their common product is the so-called consumer society subjected to the principle of "McDonaldization" and represented by "pop-culture", whose main feature is "Disneylandization", or "carnivalization" of human life.

[1] W. J. Th. Mitchell, *Picture Theory: Essays on Verbal and Visual Representation*, University of Chicago Press, Chicago-London, 1995, p. 11 n.

[2] H. Bredekamp, *Theorie des Bildakts*, Suhrkamp Verlag, Frankfurt 2010, p. 13.

Another cause is the gap between art and the criterion of beauty (aesthetic features) that was introduced by the artistic avant-garde of the break of the 19th and 20th centuries, and whose culmination is constituted by the so-called anti-art. This trend dominates modern art, and it understands artistic work as creative exploration of the so-called aesthetic, that is any sensory, material in the name of "freedom and creativity"[3].

The third, most often mentioned cause of iconic culture, is the so-called post-modern turn. Postmodernism, as a definite mental ferment – is supposed to be an opposition to, or to overcome, the so-called modernism. Modernism (Latin *moder-nus* – modern) is an ideology of a radical reconstruction of the world (elimination of evil), and its mental pillars are positivism – the cult of materially useful knowledge, scientism – the cult of natural history (knowledge of the nature meets the pragmatic criteria) and utopianism, that is a vision of the ideal state (civilization). This ideology has come into prominence in modern times and at present; it has been realized in various ways, and it was characterized by extreme rationalism, that is the Cult of Rea-son. Its supporters saw the reason as an autonomous, or independent of the senses and self-sufficient (autarchic) source of knowledge about the real world. According to postmodernists the modernist project has used up its ability to generate culture, and even considerably contributed to its degeneration in the shape of civilization totalitarianism and cultural monism (communism, Nazism, fascism). Hence, they argue, the modernist cult of Logos, its Uninfringeable Principles and Meta-Narration or "all-embracing theories" should be rejected, and the lodestar of culture should be redirected from what is Logical to what is Aesthetical, that is to what is based not on autonomous Reason, but on sensory experience and on knowledge of the world gained by means of the senses. And this knowledge is subjective and relative, hence, what we call the world, are only human imaginations and creations. On the basis of this vision the coming of cyberculture is proclaimed, whose element will be an unceasing creation of possible worlds[4].

It is easy to notice that the mentioned particular causes are connected by the same general cause, which is a peculiar kind of tension between the Logical (ratio-

[3] See: *Kultura wizualna – teologia wizualna* (*Visual Culture – Visual Theology*); W. Ka-wecki, J.S. Wojciechowski, D. Żukowska-Gardzińska (ed.), Instytut Papieża Jana Pawła II, Instytut Wiedzy o Kulturze UKSW, Warszawa 2011. See also, A. Radomski, *O potrzebie wizualizacji wiedzy w naukach o kulturze* (*On the Need of Visualization of Knowledge in the Study of Culture*), in: "Roczniki Kulturoznawcze", vol. V, 2014, pp. 5-17; A. Juzefowić, *Fenomen zwrotu wizualnego we współczesnej kulturze – treść pojęcia a istota zjawiska* (*The Phenomenon of the Visual Turn in Contemporary Culture – the Content of the Concept and the Essence of the Phenomenon*), as above, p. 19-33.

[4] H. Kiereś, *Trzy socjalizmy. Tradycja łacińska wobec modernizmu i postmodernizmu* (*Three Socialisms. The Latin Tradition versus Modernism and Postmodernism*. Fundacja "Lubelska Szkoła Filozofii Chrześcijańskiej", Lublin 2000.

nal), and the Aesthetic (sensory), and that the mentioned iconic turn is the resignation from the cult of Logos-Reason and its universal criteria, and accepting what is extra-rational or aesthetic, and hence what is connected with the sensory sphere, or – more widely – extra-rational (volitive, emotional). Then, in actual fact, at the basis of the iconic turn lies a definite decision about the old philosophical argument that is expressed in the question: which is the reliable source of knowledge about the world: the reason or the senses? The question is connected with the tradition of philosophical idealism, and its solution leads to a break-up of this tradition into two opposing currents: rationalism and irrationalism. In other words, the point of the argument is the question if the world is given to us in the mental picture (representation), or just the opposite, we are dealing here with its sensory representations only. Historically, ancient sophists based on the ground of sensualism; they argued that it is sensory images of things (Greek *eidola aistheta*) that are the object and creation of our cognition; whereas Plato was a representative of rationalism; he condemned the sensory knowledge for its subjectivism and relativism, and contrary to sophists he stated that it is mental images of things (Greek *eidola noeta*) that are the object and source of true knowledge. Modernism that was mentioned above is the quintessence of rationalism; and its modern opponent – postmodernism proclaims the overcoming of rationalism and assumes the shape of cognitive sensualism, its consequence being the cult of sensory cognition and of its creation: the picture as its sensory representation or as an expression of something. As it is known, the tradition opposing idealism is realism that is based on the epistemological ground of the so-called genetic empiricism and methodological intellectualism. This position does not break up man's cognition into two opposing sources that are irreducible to each other, but it states that knowledge about the world is the result of cooperation of sensory experience that supplies us with impressions and imaginations of things, and the reason in its function of creating notions, which are peculiar cognitive "spectacles" owing to which we initially understand the thing being cognized[5]. Let us pass now to the realist theory of the picture.

II

What is the picture? It is a reconstructive or constructive (creative) image of something, a sensory presentation of it. Its origin is contributed to by cognitive powers – the senses and the reason, as well as man's emotional powers: the will and emotions. Originally the picture exists in the intentional way, that is as a modification of the human psyche, and when it is transferred by means of definite signs and recorded in an extra-mental material, it acquires peculiar autonomy and

[5] See: *Idealizm* (*Idealism*). Powszechna Encyklopedia Filozofii, vol. 4. Polskie Towarzystwo Tomasza z Akwinu, Lublin 2003, p. 721-726. *Realizm* (*Realism*), as above, vol.8, Lublin 2007, p. 666-669.

exists in a secondarily intentional way. It is a man's product, so it is consciously and intentionally brought into being and it is addressed to somebody; hence it has a meaning for a man only: for the creator of the picture and for its recipient. As a man's product, it is ontologically secondary to the real world. It is something already existing and to a large degree cognizable, like real objects, but in order to reach its meaning, its raison d'être, that is the thing that justifies its presence in the cultural discourse, one has to know the cultural code used by its producer[6]. This peculiar ontological status of the picture and its inter-subjectivity assumed by its producer – for it is addressed to somebody else – make one think that it is a cognitive mediator (Latin: *medium*). Hence, the question comes to one's mind: What kind of cognitive mediator is the picture?

On the ground of the realist epistemology two kinds of cognitive mediators are distinguished: *medium quo* and *medium quod*. Mediators of the *quo* type are defined as so-called transparent ones, that is ones that accompany the process of cognition, but do not enter the range of its subject, or do not modify its nature (e.g. spectacles, concepts). Mediators of the *quod* type, in turn, have to be cognized themselves, as cognizing them is a necessary condition of reaching the object they represent. Hence, if *media quo* represent an object, that is they do not breach the condition of directness of cognition, which is the criterion of its truthfulness, *media quod* mediate cognition and its truthfulness. In connection with the issue of cognitive mediators a few necessary criteria of directness of cognition are distinguished, and among them the following are the most important: 1. Lack of a *quod* type mediator, for this type of mediator; 2. changes the spatial and temporal location of the cognized object, and the use of a definite apparatus is connected with it, e.g. photography, television picture, which assumes; 3. referring cognition to propositions (knowledge) recognized earlier. It is stressed that in the act of direct cognition the object has to be grasped evidently – with intellectual or sensory-intellectual evidence, thoroughly and infallibly[7].

[6] See: M. A. Krąpiec, *Realizm ludzkiego poznania* (*Realism of Human Cognition*), Pallotinum, Poznań 1959, particularly Chaper XIII, "Struktura bytu intencjonalnego" ("*Structure of the intentional being*"), p. 423-448.

[7] A. B. Stępień, *Rodzaje bezpośredniego poznania* (*Types of Direct Cognition*), in: by the same, *Studia i szkice filozoficzne* (*Philosophical Studies and Sketches*), vol. I, Redakcja Wydawnictw KUL, Lublin 1999, p. 126-158.

Author: Waldemar Mirek

The above shows that the picture is a *quod* type mediator (Latin: *interpress*) and that reaching its meaning, that is what it is about and to what it refers, requires interpretation. From our experience, we know that simply seeing a picture as an object existing in the world is one thing, recognizing the object as a picture, as a man's product that is marked with a definite intention is something else, and cognitive reaching this intention, and comprehending the picture owing to this, is still something else. Let us add that the act of understanding crowns the process of cognition; in other words, it is a man's supreme cognitive act, for it consists in reaching and grasping the ultimate causes (reasons) of the cognized things. The very act of interpretation of the picture as a cultural fact is a cognitively complex activity; it consists of a description of the fact, of grasping its causes (reasons) and of its assessment. The method of interpretation conditioned in this way requires referring to the knowledge that is connected with the cultural context of the origin of the picture, with its author, with the intentions that guide him, and it also requires an analysis of the structure of the picture itself, and of its content. It is stressed that perception of a picture devoid of reflection is a naïve, or even dangerous attitude (the perceiver is convinced of reality and truthfulness of what is presented in the picture), vulnerable to all sorts of manipulations (ideological, propaganda, psychological, economic). It is characteristic that in the art of manipulation sensory images are often referred to. Manipulation itself, in its essence, consists in

producing an illusion of reality and truthfulness of what the manipulated person encounters, and this is done with the help of means that are latent, unknown to the manipulated one, and it is done for morally wrong ends. The manipulated one is wrongly convinced that what is presented to him with the help of iconic means is in accordance with reality and with the truth[8].

III

In studies connected with the picture and its role in developing culture, and particularly with its cognitive functions, attention is paid to the questions mentioned above, and hence there arises necessity of education in the sphere of perception of pictures. It is first of all education concerning all the means of transmitting the picture in social life (television, photography, the Internet, advertising). It is noticed that today's "visual culture" is a consequence of political and economic ideologies, that it conceals the real world, transfers a man to a fictional world called the Great Stereopticon that is populated by ideologically cloned "inhabitants of the mass imagination"[9].

IV

In the article the reader's attention is called to key aspects of the issue of the picture and the "visual culture". The author is aware of the fact that the problem is complex in many diverse ways and it requires, e.g. introducing some order into the question of the kinds of the picture, of the means used in imaging, and of the assumed aims of imaging. This problem ultimately refers to philosophy, but it also has its psychological and sociological context. The mentioned cognitive motifs should in the proper proportion be taken into consideration in education, and especially in pedagogy of the picture[10]. Modern times demand this kind of research. Pedagogical experience shows that pupils and students are helpless when they are confronted with a picture, and that their perception of the picture is limited to its sensory "surface" and it culminates in the impressions they experience. In other words, young people uncritically "absorb" its phenomenal, that is purely sensory, dimension and with childish naivety, without understanding, they accept what is presented in it, which leads to the conclusion that they do not distinguish the picture from the real world.

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[8] See: Z. Ziembiński, *Wychowanie a manipulacja* (*Education and Manipulation*), Wydawnictwo Naukowe UAM, Poznań 1981.

[9] See: R. M. Weaver, *Idee mają konsekwencje* (*Ideas Have Consequences*), Wydawnictwo PROHIBITA, Warszawa 2010.

[10] R. Sokolowski, *Picturing*, Diane Brown Gallery, New York 1984.

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Ziembiński Z., *Wychowanie a manipulacja*, Wydawnictwo Naukowe UAM, Poznań 1981.

Weaver R.M., *Idee mają konsekwencje*, Wydawnictwo PROHIBITA, Warszawa 2010.

Abstrakt w języku polskim

Punktem wyjścia artykułu jest tzw. kultura ikoniczna i jej przyczyny: ideologia liberalizmu, rozbrat sztuki z kryterium piękna (wartości estetycznych) oraz ideologia postmodernizmu. W drugiej części artykułu ustala się, że obraz jest *medium quod* i że jego poznanie i zrozumienie zawartej w nim intencji wymaga interpretacji, ta zaś jest uwarunkowana stosowną wiedzą i umiejętnością. W świetle tych ustaleń kultura obrazkowa zaciera różnicę pomiędzy realnym światem a fikcją i naraża człowieka na manipulację.

dr hab. Andrzej Łuczyński

Pedagogical Conditioning in The Development of Visual Perception of a Young Man

Summary

The rapid development of information technology and communication, visual creates substrate to change the conditions and lifestyle of the young generation in the area of individual and social. There is therefore no doubt that the ubiquity of "image" as the media content and the correct perception of it has a significant impact on the young person's personality, his character and relationship to the world and other people. Educational activities should encourage the young people to reflective thinking and learning about the mechanisms of visual perception, so that they can properly experience the world of visual experience. This article shall therefore reflect on the pedagogical conditions for development of visual perception of today's youth to know they are conducive to the formation of appropriate mechanisms at the reception and understanding of incoming stimuli (codes) visual; so that eventually they multiply in the young people desire for good and teach responsibility for life and its quality.

Keywords: visual perception, youth development, education.

Introduction

Visual communication, which is for young people an important mean of communication and learning about the world, is now becoming an important part of the pedagogical reflection including both educative influence of contemporary visual culture, and social functioning of important media institutions. Many educators take into account the dynamic and progressive development of digital technology and new ways of communication; they try to understand the requirements of the development of visual perception in young people to be able to indicate the most favorable conditions for the full development and education. Transformations in fact have occurred in recent years in the area of the social life and thanks to that young people have many opportunities in huge space of freedom, tolerance and "media of expression," which become their full appearances, a virtual enclave, which in its own subjective way they try to understand themselves and the world

they live. Young people who use modern visual technologies are today seeking their help in other like-minded people who could provide for them worthy interlocutors, and sometimes also guide the way of life. Today every young person in some way is subjected to the influence of the contemporary visual culture which tries to teach, have fun and help young solve their life problems.

The visual communication is now undoubtedly an important and complex organ, "creation" of human behavior, especially in relation to the younger generation – it creates the style of work, leisure, entertainment, etc. At its core "visual communication between people goes beyond pure perceptual process. It is based on sources, organizations perceived the material that allow for "reconciliation" of mental states at least between two persons. This agreement may be letting you know about something, it may be a warning, asking recall someone, expression of feelings, prohibition, injunction, etc. Understanding of each of these messages requires the use of common rules for encoding the message. When submitting letters in the word we encrypt our thoughts and we hope that the addressee understands the same code. Similarly, the signs or mathematical symbols"[1]. In this way, many young people have unhindered access to modern technology, visual communication and they know that the kind of "language" of this communication has the ability to know and understand many current developments in the world, can enrich their knowledge, complement deficiencies in education, and develop their interests. The visual communication in its various forms can also inspire and motivate young people to become more active and participate more fully in society and to provide young people the right incentives to engage in self-development, whether physical, intellectual or spiritual. There is therefore no doubt that the ubiquity of "image" as the media content and correct its perception has a significant impact on the young person's personality, his character and relationship to the world and other people[2].

The ever-increasing role of the "image" in the communication somehow makes it to function in today's world requires knowledge about the perception of visual communications. Transmission uses the image faster and harder than any other form of communication. It is, therefore, worth to reflect on the pedagogical conditions for development of visual perception of today's youth to know they are conducive to the formation of appropriate mechanisms at the reception and understanding of incoming stimuli (codes) visual; so that eventually they multiply in young people desire for good and teaches responsibility for life and its quality.

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[1] D. Bagiński, P. Francuz., *W poszukiwaniu podstaw kodów wizualnych*, in: P. Francuz (ed.), *Obrazy w umyśle. Studia nad percepcją i wyobraźnią*, Wydawnictwo Naukowe SCHOLAR, Warszawa 2007, p. 20.

[2] I. Szewczak, *Rola środowisk wychowawczych w edukacji medialnej*, in: D. Bis, A. Rynio (ed.), *Media w wychowaniu chrześcijańskim*, Wydawnictwo KUL, Lublin 2010, p. 580-581.

Visual perception in the life of a young man

Nowadays, the importance of the media in the society continues to grow and makes almost all areas of human life perceived and dealt in terms of broadly defined so called media society and the information society. TV, Internet and other media based mainly on the issue of visual content, are the main source of information about the world, they create the image of contemporary culture and shape the attitudes and tastes especially the younger generation[3]. Undoubtedly, the rapid development of the information technology and visual communication creates substrate to change the conditions and lifestyle of the young generation in the individual and the society, thereby setting new benchmarks shapes the human personality. The differentiated of the human personality, which is nowadays largely dependent on the electronic projection of visual content, including both diversity "standards" and personal patterns and styles of human behavior, can cause unpredictable changes in the education and upbringing of the young generation[4]. Responsible "formation" of human visual perception as much "exploited" in the new media technologies is therefore a major challenge not only for the parents, who are often also subject to multiple influences of the media but also the wider sphere of education.

On the basis of "pedagogy of perceptual experience is usually regarded as a necessary step on the way to the knowledge of the conceptual and has been established as one of the most well-established learning rules – demonstrative rules. Inclusion of perceptual experience and construct its representation in the precinct of pedagogical interest is an inspiration for the reconstruction of the demonstrative rules in the theory of teaching. This is necessary due to the dynamic of the relationship between education and culture, including emerging forms of virtual representation. The possibility of epistemological reconstruction of the demonstrative rules and changes in its paradigm looking at transgressive emerging concept involving an expanded idea of perceptual experience"[5]. The perception of

[3] K. Denek, *Cywilizacja informacyjna i edukacja medialna*, in: T. Lewowicki, B. Siemieniecki (ed.), *Rola i miejsce technologii informacyjnej w okresie reform edukacyjnych w Polsce,* Wyd. Adam Marszałek, Toruń 2008, p. 26.

[4] A. Toffler, *Trzecia fala*, Warszawa: Państwowych Instytut Wydawniczy 1997, p. 579-581; see: D. Bis, *Społeczeństwo informacyjne szansą i zagrożeniem dla wychowania*, in: A. Rynio (re.), *Wychowanie chrześcijańskie. Między tradycją a współczesnością*, Wydawnictwo KUL, Lublin 2007, p. 892-893; see: M. Castells, The Rise of Network Society, Oxford: Blackwell Publishers 1996.

[5] I. Samborska, *Doświadczenie percepcyjne i jego rola w uczeniu się dziecka,* http://www.ktime.up.krakow.pl/ref2010/samborska.pdf; J. Kruk, *Doświadczenie, reprezentacja i działanie wśród rzeczy i przedmiotów. Projektowanie edukacyjne*, Wydawnictwo Uniwersytetu Gdańskiego, Gdańsk 2008.

information coming from the environment is therefore determined by the system settings recipient internal factors, previous experience of perceptual and motivational processes. Perception is flexible. It is determined contextually and defined by rules and grouping messages. It is a field of knowledge that combines scientific research, the experience gathered in the studios of artistic, designer, and their objective to understand human functioning in the modern world dominated by the so-called civilization image. That what see our eyes often becomes the most serious or sole interface evaluation. In most cases, this image is the main component of the power of the first impression, which could weigh on the opinion that develops their recipient[6]. Messages transmitted this way if you are consistent and attractive you will be treated with confidence. Visual record increases the chance of getting the message because it is easier to reception and more suggestive[7].

In modern education "teaching" visual perception becomes one of the most important and fundamental issues. It is connected with the training and development of emotional, symbolic and iconic children and adolescents. In this way they gradually broaden their experience and knowledge of the form, its elements, its diversification in the history of material culture and symbolic of a man[8]. This contributes to the education of their perception of aesthetic culture. Therefore, the objectives of education in the visual arts is above all to increase the efficiency of operations on shaping the quality and level of knowledge and experience; forming attitudes and interests of young people; motivation for independent creative activities; development creative skills and unconventional thinking and actions that are useful in all professions and fields of life. The impact of education should encourage young people to reflective thinking, let them understand and feel the art and the space surrounding a man inclined to self and team work[9].

In this context, it can be assumed that education is now becoming a visual education (preparation of) a young man to receive the broadly defined "image" is perceived as a specific iconosphere, which is all around our visual space. In large part it is also preparing to think and act creatively. "Picture" and the associated values are also measures to facilitate young people with the acquisition of knowl-

[6] B. Kita, *Między przestrzeniami. O kulturze nowych mediów*, Wydawnictwo Rabid, Kraków 2003, p. 43.

[7] M. Miczka-Pajestka, *Dziecko wobec rzeczywistości symulacji*: *wokół ponowoczesnych koncepcji świata*, in: Y. Karandashev, T. Senko, D. Pluta-Wojciechowska (ed.), *Prace psychologiczno-pedagogiczne*, Wydawnictwo ATH, Bielsko-Biała 2007, p. 91.

[8] M. Przetacznik-Gierowska, M. Tyszkowa, *Psychologia rozwoju człowieka. Zagadnienia ogólne*, Wydawnictwo Naukowe PWN, Warszawa 2006, p. 139-146.

[9] I. Samborska, *Nabywanie wiedzy w kontekście doświadczeń związanych z kulturą elektroniczną*, in: K. Denek, A. Kamińska, W. Kojs, P. Oleśniewicz, *Edukacja Jutra. Proces kształcenia i jego uczestnicy*, Wydawnictwo Humanitas, Sosnowiec 2010, p. 335.

edge and information from other areas and develop cognitive activity[10]. Reliable and responsible implementation of its objectives in the field of visual formation at various stages of the education of children and youth allows achieving their emotional maturity, intellectual and moral, allowing for the harmonious development of their personality.

The process of shaping the visual perception of young people develops their communication skills associated with various forms of the socio-cultural. Contemporary culture called the "culture of image" is a culture of ubiquitous visual information. Ability of critical reception by young man recipients of varying quality of these kinds of transfers is important in the era of the lack of reliable assessment and the rate of change following the impact of new technologies of communication. Education, therefore, in a young person recipients the ability to critically assess of the visual and audiovisual messages is important for the maintenance of personal identity and mental balance[11]. Content of standards for visual education is proposed whit respecting the sphere of psycho-pedagogical and aesthetic (perception, experience, knowledge). It is therefore necessary to prepare adequate programs in the field of visual education, including interesting and varied offers for children and adolescents. In this way it will create the opportunity for young people and the prospect for the development of their (sphere) visual perception.

Conditions for the development of visual perception

Today we should see some educational impact of certain factors that in the life of a young man stimulate his visual perception; they fall permanently into the daily lives of young people and somehow "advertisement" their personal development, while defining their future – we include there in particular:

- dissemination of a variety of visual content – they provide a lot of visual information (stimuli) for a young man and allow him to meet it and understand. In addition, it provides aesthetic experiences, waking and develop his sense of visual perception;
- provide common visual experience – amuse and educate and sensitize young people to the values inherent in art, also affect their perception of the world around them;
- visual stimulation of creative interests – it stimulates young people to become more active and more deliberate reception of visual content provided by the media;

[10] M. Miczka-Pajestka, *Dziecko wobec rzeczywistości…*, op. cit., p. 92-95.

[11] I. Samborska, *Doświadczenie dzieciństwa w perspektywie mediamorfozy*, in: M. Kisiel, T. Huk (ed.), *Rzeczywistość, perswazyjność, falsyfikacja w optyce wychowania i edukacji*, Oficyna Wydawnicza Wacław Walasek, Katowice 2009, p. 61-62.

- "visualization" of certain styles of life, ideals and patterns of behavior – for the young generation is an important point of reference in the field of personal development and performance evaluation assimilated visual content [12].

However, such a rapid and extensive rooting of "the visual" in contemporary reality created a new situation – not always positive – for wide educational processes. Media use "visual message" intensely, in a very thoughtful and clever use of the opportunity to influence the young generation, pretending to adopt a central role in promoting the so-called new values and models of life characteristic of the era of post-modernity. It should be stressed that the media are trying to so influence the development of visual perception of young people to be able to spread among them a certain type of morality, while pretending to leading role in the dissemination of opinion about what is good or bad, modern, or old-fashioned[13].

Based on such media developed (created) "visual perception", many young people try to build the foundations of their personal and social identity. It can therefore be assumed that the "disguised culture " increasingly forms part of the daily lives of young people, thanks to the ubiquity of "visual communication", which with high intensity offers them more interesting and compelling than the reality of their own lives and problems. It happens that the development of visual perception of many young people is distorted and the reaching "images" become "a substitute for everyday life," in their lives followed by slow discrepancy between what is real and what is virtual. In a culture based on the visual message often appears not so much to what intellectual, aesthetic and valuable but what a sensational, simplistic, emotional, focused on pleasure and entertainment. Today's youth seems to be somewhat dependent on the "visual communication", which is ubiquitous tool of advertising, however, having little in common with the real needs of young people[14].

The mentality of a young man which is created in this way detached from any "context", it is not bound to a specific location on earth (family, nation), and its essence is the search for the elusive present or the indefinite future[15]. Indeed, some contemporary theories assume that the ubiquity of "the visual" changes in a way the social aware-

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[12] J. Gajda, *Dominująca rola mass mediów i hipermediów w kulturze i edukacji*, in: J. Gajda, S. Juszczyk, B. Siemieniecki, K. Wenta (ed.), *Edukacja mediów*, Wydawnictwo Adam Marszałek, Toruń 2002, p. 54-59.

[13] D. Bis, *Iluzoryczność wzorców proponowanych młodzieży w mass mediach*, in: F. W. Wawro (ed.), *Problemy współczesnej młodzieży. W ujęciu nauk społecznych*, Wydawnictwo KUL, Lublin 2007 p. 195-196; see: J. Izdebska, *Rodzina, dziecko, telewizja. Szanse wychowawcze i zagrożenia telewizji*, "Trans Humana", Białystok 2001, p. 218-230.

[14] Z. Melosik, *Teoria i praktyka edukacji wielokulturowej*, Oficyna Wydawnicza "Impuls", Kraków 2007, p. 30-35; see: B. Siemieniecki, *Podstawowe koncepcje społeczeństwa informacyjnego a pedagogika medialna*, in: "Pedagogika Mediów", no 1/2005, p. 88.

[15] Z. Melosik, *Mass Media, edukacja i przemiany kultury współczesnej*, in: "Pedagogika Mediów", no 1/2005, p. 69.

ness, and above all awareness of the younger generation, through the overthrow of the so-called divisions of the social space, so typical of past eras. Traditional human experience has usually been "limited" by the occupation of the position and the social environment role or by the social situations clearly separated into the private sphere (backstage) and public (the scene). Segmentation of the social experience was related to, inters alia, gender, age, family values and traditions, and according to the established boundaries and influence was essentially impassable. Media with an extremely suggestive "visual message" all these barriers refuted, there is no longer a dimension taboo of social life and personal – about power, sex, death, etc... might find anyone without the need for appropriate "initiation" or belonging to a particular occupational group or without the participation of the traditional educational process[16].

Meanwhile, the almost universal availability of all visual content for children and young people and "forcing" them unilaterally to understand custom does not create the right conditions to impact on their living environment credible authority, and greatly restricts their independence in gaining relevant experience and knowledge. "The child – as emphasized F. Adamski – just like an adult, has come to their own solutions based on their experiences and feelings; because perfection is achieved on our own, and not imposed from the outside enumeration of the rules"[17]. In the assessment of teaching "the visual message" often contributes to the dissemination of educational unwanted content, does not care too much about actually shaped world of the young generation[18]. In view of the media using primarily "visual message" are formulated so certain allegations concerning:

- present reality in the "national lampoon" – often is depicted a man and a simplified schematic view of the world;
- promote mainly the material values- success and happiness is mostly limited to the realm of wealth and leisure;
- lower the artistic level – a flood of mediocrity, flattering common tastes, production indiscriminate, but profitable entertainment[19].

This raises the risk that poorly growing visual perception of the young man can lead to a misunderstanding of some basic dimensions of human existence,

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[16] T. Goban-Klas, *Media i komunikowanie masowe. Teorie i analizy prasy, radia, telewizji i Internetu*, Wydawnictwo Naukowe PWN, Warszawa-Kraków 1999, p. 143.

[17] F. Adamski, *Posłowie: Wychowanie ukierunkowane na wartości wyzwaniem aksjonormatywnego ładu społeczno-moralnego*, in: F. Adamski (ed.), *Wychowanie personalistyczne,* Wydawnictwo WAM, Kraków 2005, p. 415.

[18] T. Lewowicki, *Od środków nauczania do humanistycznie zorientowanej technologii edukacyjnej,* in: D. Denek, F. Januszkiewicz, W. Strykowski (ed.), *Edukacja. Technologia kształcenia. Media*, Wydawnictwo UAM, Poznań 1993, p. 128-135; see: D. Bis, *Iluzoryczność wzorców…*, op. cit., p. 195-196.

[19] J. Gajda, *Pedagogika kultury w zarysie*, Oficyna Wydawnicza "Impuls", Kraków 2006, p. 165.

uniqueness dimension of human existence and all forms of social and cultural life. As you can see, these risks relate in particular young people, the "visual message" creates a huge space of freedom in which in their own way they are trying to understand themselves and the world they live[20]. This attitude is spreading also to the land of values and moral principles, contributing to the spread in the world of youth attitudes and behavior characterized by lack of understanding of their own identity. This means that many young people do not have anywhere own roots, or in the family, or in a broader social context, thereby losing the truth about themselves – who they are. This fact emphasizes the alienation of youth S. Van Calster stating that "media man in the long term, the world will begin to submit artificial than real, losing interest in their environment and, consequently, instead self-realization will feel alienation. (...) The resulting emptiness of life and fills the imaginary world of television and figures as «addicted» goes back to the extremely closed world of loneliness, without contact with real people"[21].

Young people inherently sensitive to beauty, truth, justice, believing in the ideals suggested today in a variety of visual projects (commercials) that in order to be able to be themselves, to gain the approval of their peers and to open the way to a career and happiness they must strive for independence – must become an unfettered thinking and behavior[22]. Moreover, how often is given them an illusory world of pseudo values where manipulation and instrumentalization becomes the norm typing in a more or less extreme desire at the expense of other so-called success in life. As J. Szafraniec stated it happens because of inter alia unprecedented cause escalation "images" sterile of values[23]. There is therefore no doubt that the emerging visual perception which is still shaping in a young man has a significant impact on the development and education; it also affects his or her state of health, cognitive and emotional realm, the realm of behavior in shaping the image of the world, building a cultural identity, attitude towards themselves and other people, to the problems of global and local. Additionally, it stimulates contacts with peers and physical activity, deepening of the spiritual life and discovers and develops their life interest and passion[24].

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[20] K. Ferenz, *Iluzja i rzeczywistość codzienności w świecie dziecka*, in: "Pedagogika Mediów", no 1/2005, p. 15-18.

[21] S. Van Calster, *Czy telewizja izoluje człowieka? Konsumpcja zamiast komunikacji*, in: "Communio", no 6/1995, p. 46.

[22] Z. Melosik, *Teoria i praktyka*…, op. cit., p. 53-73.

[23] J. Szafraniec, *Wyluzowane media, wyluzowane dzieci, wyluzowany świat. Medialne konsekwencje filozofii luzu*, in: "Wizja Publiczna", no 9/1997 p. 3.

[24] J. Izdebska, *Dziecko i rodzina polska wobec zagrożeń telewizji i innych mediów*, in: J. Wilk (ed.), *W służbie dziecku*, t. 2, Wydawnictwo Poligrafia ITS, Lublin 2003, p. 409-410; see: D. Bis, *Społeczeństwo informacyjne*…, op. cit., p. 904-905; see: J. Izdebska, *Dziecko w rodzinie u progu XXI wieku. Niepokoje i nadzieje*, Trans Humana, Białystok 2000, p. 78-79; see: M. Jalinek, *Nie wyrzucaj telewizora*, in: "Edukacja i Dialog", no 2/2003, p. 28.

Final reflection

One of the primary responsibilities of families and schools is therefore appropriate prepare the child to receive "visual communication" through the proper development of his visual perception. It is therefore necessary constantly remind parents and teachers that the education of the younger generation may not be beyond the "society", only through the mass media and their often ambiguous message[25]. According to Z. Sareło "the problem becomes even more complicated when we consider the increasing ideological pluralism. What are the chances of achieving the child's identity, where each person creates his educational environment will have its own view of the world inconsistent and constantly changing? How will this affect the understanding of values? (...) Already today we can for example observe the increasing loss of human expediency vision of own life. (...) As a result, they recognize each other as a whole without the bases and roots, no past and no future"[26].

Therefore, an important goal of treatment should be educational upbringing of the person who will appreciate the advances in technology and at the same time receive a critical way and due distance to recognize and evaluate the presented values or attitudes[27]. In the development process of visual perception of a young man should, therefore, put special emphasis on the ability coming to a proper understanding of the visual stimuli (codes), and the need to make choices received visual content[28]. It is also important to encourage the adoption of children and young people actively compared to the surrounding reality, so as to raise their needs and creative skills, and not accustom them to passively submit to influences coming to them visual stimuli.

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[25] H. Wistuba, *Rozwój osoby ludzkiej w powiązaniu ze środkami masowego oddziaływania*, in: F. Adamski (ed.), *Kościół a kultura masowa*, Wydawnictwo WAM, Kraków 1984, p. 32-33; see: D. Bis, *Społeczeństwo informacyjne*…, op. cit., p. 906.

[26] Z. Sareło, *Media w służbie osoby. Etyka społecznego komunikowana*, Wydawnictwo Adam Marszałek, Toruń 2000, p. 31-32.

[27] A. Sugier-Szerega, *Dziecko a kultura popularna*, in: D. Wadowski (ed.), *Kultura – Media – Społeczeństwo,* Wydawnictwo KUL, Lublin 2007, p. 555.

[28] D. Bis, *Iluzoryczność wzorców*…, op. cit., p. 217; see: T. Kukołowicz, *Rodzina wychowuje*, Oficyna Wydawnicza Fundacji Uniwersyteckiej, Stalowa Wola 1996, p. 145-188.

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Abstrakt w języku polskim

Szybki rozwój technologii informacyjnych i komunikacyjno-wizualnych tworzy podłoże do zmiany warunków i stylu życia młodego pokolenia w zakresie indywidualnym i społecznym. Nie ma zatem wątpliwości, że wszechobecność "obrazu", jak i treści medialnych oraz ich prawidłowego postrzegania ma znaczący wpływ na osobowość młodego człowieka, jego charakter i stosunek do świata oraz innych ludzi. Działania edukacyjne powinny zachęcać młodych ludzi do myślenia refleksyjnego i nauki o mechanizmach percepcji wzrokowej, tak aby mogli oni właściwie doświadczać doznania wizualne. Ten artykuł miał zatem pokazać pedagogiczne dążenia do rozwoju wizualnego postrzegania dzisiejszej młodzieży, aby sprzyjały one tworzeniu odpowiednich mechanizmów w recepcji i zrozumieniu napływających bodźców (kodów) wizualnych; aby pomnażały w młodych ludziach pragnienie dobra i uczyły odpowiedzialności za życie i jego jakość.

dr hab. Adam Maj, dr Mieczysław Dudek

Media Pedagogy as a Sub-Discipline Discipline of Pedagogy

Abstract

Educational practice and its elements differ in terms of theory establishing the subject of pedagogy and its sub-disciplines. Therefore, it is claimed that media education is considered such an educational practice. Regarding media pedagogy in terms of pedagogical sub-discipline implies its scientific character, its own identity and individuality among other pedagogical sub disciplines. Assuming its subject as scientific criteria, sources, research methods, theoretical legacy as well as internal coherence can indicate that media pedagogy can be conceptualised as a sub discipline of pedagogy. In this perspective, media pedagogy is science: empirical, humanistic, philosophical, praxeological. For the above mentioned reasons media education plays the following functions: descriptive, explanatory, normative, prognostic, practical.

Key words: media education, media communication, practical competence, communicative competence, information competence, intellectual competence, ethical competence.

Introduction

Media Pedagogy functions within numerous countries such as United Kingdom, Germany, and USA as a sub-discipline of pedagogydiscipline. Whereas in Poland, it is continuously shaping its both individuality and essence. L. Bandura used the term media pedagogy for the first time in 1983[1]. Recently in Poland the dynamic development of media science together with its pedagogical concept has been progressing. A wide variety of meritorical publications have been published recently. However, in particular environments there has been a dilemma wtheher a theoretical legacy may be treated as an internally coherent pedagogical sub-discipline or rather as a multi – faceted reflection specified with the term media pedagogy? Assuming that one might say about media pedagogy as a pedagogical sub-discipline, one might reflect on chosen elements and contexts, being aware that this is only a reason for further discussion.

[1] L. Bandura, *Pedagogika medialna,* in: "Ruch Pedagogiczny" 1983, no 3-4, p. 3-12.

Media education

Pedagogical development as a science ranges form practice to theory as well as from theory to practice. Educational practice and its elements diverse in terms of theory establish the subject of pedagogy and its sub-discipline s. Therefore, it is claimed that such educational practice is considered as media education, which is spread all over the Polish schools and academic centres. The rapid development of civilisation and new technologies, especially information and media technologies set new challenges to modern human. According to B. Siemieniecki media education should prepare individuals to "reception and usage of media as a modern human being's intellectual tools"[2], "to conscious and critical reception of numerous kinds of media communications"[3], to provide knowledge concerning media as tools responsible for communicating the intent of as well as interpersonal communication.

Considering education in terms of schooling and couching[4], media education is perceived as supporting the development of pupils within contexts and media contents, as well as media education, teaching media literacy. Media education seeks to obtain the ability of using mass media, such as technological (as a tool, media statement) and cultural (concerning content, its interpretation – cultural interpretation and creating their own statements). In terms of wide understanding the essence of culture – with its ethical, philosophical, anthropological, spiritual and socio- cultural elements, it can be claimed that media education implies potential recipients to both critical and selective reception and generating communications, whose criteria are aimed at person's own good – the participant in media communication. Therefore, it can be plausibly stated that media education makes an entrance into media space, its users as well as media communication in order to create numerous media recipients' competences, including among other things: media competences: practical, communicative, in the field of information technology, intellectual competences, along with cultural[5], and ethical competences.

In the educational process the subject of media has been present for over twenty years. However, in an updated core curriculum its contents has been distracted in educating numerous subjects, as well as in separate IT classes (primary school) or within IT classes (junior high school, secondary school)[6].

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[2] B. Siemieniecki, *Media w pedagogice*, in: B. Siemieniecki (ed.), *Pedagogika medialna. Podręcznik akademicki,* vol. I, PWN, Warszawa 2007, pp. 137.

[3] Ibidem.

[4] K. Rubacha, *Edukacja jako przedmiot pedagogiki i jej subdyscyplin,* in: Z. Kwieciński, B. Śliwerski (ed.), *Pedagogika,* t. 1, PWN, Warszawa 2003, p. 25-28.

[5] B. Siemieniecki, *Media w pedagogice,* op. cit.., p. 137-138.

[6] Rozporządzenie MEN z 27 VIII 2012 r. *w sprawie podstawy programowej wychowania przedszkolnego oraz kształcenia ogólnego w poszczególnych typach szkół*, Dz. U. 2012, poz. 977.

For instance, educational IT aims in a secondary school are the following:

I. "Safe computer and its software use, using computer network, communicating through both computer and information technology.
II. Searching, gathering and processing of information derived from numerous sources develop with the use of computer pictures, texts, figures, motives, animations, multimedia presentations.
III. Solving the problems along with taking up the decisions with the use of computer together with algorithmic approach to problem solving.
IV. Using computer, programs and educational games in order to broaden knowledge and skills in numerous disciplines, with the aim of developing interests.
V. Evaluation of the dangers and limits, developing appreciation for particular social IT development and usage"[7].

Media education has been applied not only in different types of schools but also in a higher educational schooling system in numerous forms and contents. This type of a formal education run by educational institutions does not get a lot out of education media process. There have been different informal types of thethe above-mentioned education. For instance, as a part of extra curricular classes, workshops, trainings, courses organized by numerous social institutions, cultural centres, as well as vocational training centres etc.[8].

Media educational practice is extremely rich and diverse in terms of training, educating, its forms, contents, educational aims, along with theoretical basis.

Media Pedagogy as a scientific discipline

Regarding media pedagogy in terms of pedagogical sub-discipline implies its scientific character, its own identity and individuality among other pedagogical sub disciplines. Assuming its subject as scientific criteria, sources, research methods, theoretical legacy as well as internal coherence can indicate that media pedagogy can be conceptualised as a sub discipline of pedagogy.

Media pedagogy has its individual and relatively fixed subject of research. If pedagogy is considered in terms of scientific reflexion over educational practice, thus media pedagogy as its sub- discipline is a scientific reflexion over media pedagogy. Thus, media education is a subject of media pedagogy. On the background of views by L. Bandera and W. Strykowski[9] the subject of media pedagogy is specified

[7] Ibidem.

[8] See: M. Gejdoš, *Kultura szkoły jako wartość szkolnej wspólnoty,* in: "Pedagogika Katolicka" no 3(2/2008), Stalowa Wola 2008, p. 128-133.

[9] W. Strykowski, *Pedagogika medialna,* "Edukacja Medialna" 1997, no 4; ibid, *Pedagogika i edukacja medialna w społeczeństwie informacyjnym,* in: P. Juszczyk (ed.), *Edukacja medialna w społeczeństwie informacyjnym,* A. Marszałek, Toruń 2002.

by W. Osmańska-Furmanek and M. Furmanek. The elements of media subject consist of the following:

- Media didactics
- Media education, educating through media
- Media techniques
- Media studies
- Media research[10].

Media didactics concerning issues connected with the ways of instrumental media use in an educational process, within certain methods, strategies, forms as well as means (so called thelittle media), together with media functions, their dynamics and impact on thethe process of education. By its very nature, it contains issues concerning teaching media education as well as e-learning as a media specifity of training along with its education. Thus, media education is conected with general didactcs and it constitutes its sub – discipline.

Media education and education through media concern rules, methods, forms, and means used for preparation of pupils to critical, responsible usage of mass media, it concerns as well reflextion over function and the meaning of mass media in educational process in different periods of the development of pupil (in a family, at school, in a peer or social group). The issue of media communication (global) is closely related to media education as forms of socialization, whereas media culture as a result of media maturity.

Media techniques concern knowledge about media, media communication, the ability of its understanding and creating.

Media studies refers to knowledge of the functionings of media, its forms, genres as well as media communication theory.

Media research (normative, empirical) includes processes connected with media occuring within three planes: macrosocial (social development), microsocial (interpersonal influence and communication), interpersonal (the process of thinking, knowing, constructing knowledge)[11].

The given outline concerning the subject of media pedagogy, together with its elements do not cover all issues, since the dynamics of civilization changes in terms of brand new technological mass media is ahead of scientific reflection. However, the above mentioned planes indicate that the subject of media pedagogy includes all the peadagogical issues, determined by relation: human – the media.

The subject of media pedagogy research suggests its both cognitive and research sources. Similarly to media pedagogy research along with its sub – disciplines, to media pedagogy it is pedagogical practice (practical sources) and the knowledge

[10] W. Osmańska-Furmanek, M. Furmanek, *Pedagogika mediów,* in: B. Śliwerski (ed.), *Pedagogika,* t. 3, GWP, Gdańsk 2006, p. 298.

[11] Ibidem.

of other sciences (scientific sources)[12]. Thus, the source of media pedagogy is both practice of media pedagogy and knowledge of related science: psychology, sociology, social communication, teaching about media (Information Technology) as well as biomedical basis of both development and education, philosophy, and ethics. The legacy of the above mentioned sciences should constitute the source in understanding the process of media education.

Both educational practice test as well as output processing of other science legacy is necessary to do with the use of an appropriate **methodology**. There is a lack of a unified method within the entire pedagogy, instead it is applied an ordered multiplicity, adequate for the analyzed problem[13]. In media pedagogy, it is possible to apply both inductive methods (experimental and empirical) and deductive (purely rational), analysis and synthesis, fenomenological, hermeneutic, dialectical, pedagogical experiment, educational monograph, individual cases, educational monograph, diagnostic survey, quantitative and qualitative methods.

The target stage of scientific enquiry constitutes **theory**, which includes explanation of the same discipline. Every science includes a particular theoretical dimension – a coherent set of claims, in which the logical, abstract, with the characteristics of conceptual critisism aspect prevails. It is accompanied by other features, such as systematic and verifiability. Previous theoretical and empirical studies indicate that media pedagogy has already had theoretical legacy, which constitutes coherent and ordered theoretical knowledge concerning media education, its essence, process (aims, contents, methods, forms, means, course), conditions as well as importance in development of pupil. This theoretical knowledge has been widely dispersed in numerous subdisciplines (for instance in theory of education, didactics, preschool, school and academic education, family pedagogy, social pedagogy, special pedagogy, pedagogy of care), therefore, it requires integrity within media pedagogy[14].

It seems that both the subject of the research, sources, methodology, scientific theory indicate the individuality of media pedagogy as a pedagogical subdiscipline along with its internal coherence.

Thus, as W. Osmańska-Furmanek and M. Furmanek claimed, it is fair to state that media pedagogy is "pedagogical subdiscipline examining both processes and phenomena extending in the media and with the help of media generating in this context directives for medial education"[15], it is therefore for education (teaching and learning), and raising a pupil.

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[12] See: M. Nowak, *Podstawy pedagogiki otwartej,* Red. Wyd. KUL, Lublin 1999, p. 159.

[13] Ibidem, p. 165.

[14] See: M. Gejdoš, *Troska o integralny rozwój i wychowanie człowieka,* in: M. Nowak, T. Ożóg (ed.), *W trosce o integralne wychowanie*, Lublin 2003, p. 205-211.

[15] W. Osmańska-Furmanek, M. Furmanek, *Pedagogika mediów,* p. 297.

The characteristics of media pedagogy as a pedagogical sub-discipline

Referring to characteristic features of pedagogy as a science, one can specify features and functions of media pedagogy constituting its subdiscipline.

M. Nowak characterizes pedagogy as natural science (empirical, investigating specific educational processes, experimental), humanistic (undrstanding of spiritual life), philosophical (questions about the meaning, causes, conditions, educational goals, standards and the key values), praxeological (defining and justyfying ways and rules of educational process, applied science, practical)[16]. In this perspective, media pedagogy is science:

- empirical – describing and explaining phenomena occurring within the process of media education, in specified events, seeking the bonds and dependencies;
- humanistic – focused on understanding the phenomenon of media education in the perspective of experience, especially spiritual, the subject of media education – pupil – human;
- philosophical – considering the meaning of the process of media education, its goals, rules along with ethical norms and axiological dimension;
- praxeological – formulating reasonable directive for media educational practice.

For the above mentioned reasons media education plays the following functions:

- descriptive – diagnoses educational situations cause by media, on account of media (how it is);
- explanatory – based on the analysis of the facts as well as adequate science achievemnets reveals the essence of educational process together with media education, its understanding in personal perspective (why is it so?, how to understand that?);
- normative – formulate and justify the rules, aims, overarching values of media education (how it should be?, why it should be?);
- prognostic – expects future state as a consequences of the development of media, media education or lack of it, (how it may be?, what would it be like?);
- practical – formulates the indications for media educational practice and its efficiency (how to work effectively?).

Reffering to ontological, antropological, and axiological pedagogical basis, one may attempt to characterize media education, asking more questions than finding answers.

Ontological basis of media education pay attention to reality of media education (media education of man) – what is it, what is the essence of it, what is the process of education as well as media education? In response it is necessary to take into account complex along with multifaceted nature of education as well as perceiving it as a human fact. Referring to an educational structure (pupil, educator,

[16] M. Nowak, *Podstawy pedagogiki otwartej,* op. cit., p. 226.

educational situation) it is necessary to ask about the structure of media education, which enities constitute it, and in which circumstances (situations), what is the virtual world, what is the meaning of it: does it contribute the educational situation or is it quasi entity? Both realistic and integral vision of education as a process for the full development of human requires claryfying the reality of education along with media education in terms of anthropological aspects.

Anthropological basis of media pedagogy refer to the fundamental principle of human welfare – the education entity, their dignity, rationality, freedom, responsibility, the ability to search the truth, guided by moral good, the ability to love, sense of beauty. In this context, media education should be supporting full development of a pupil, their biological, mental, social, cultural, spiritual sphere.

Axiological dimension is connected with ontological and anthropological media educational basis. Education is to familiarize a pupil with the world of ordered and reasonable values. Media education is to promote values adequate to pupil's personal dignity, among them the media values (for instance technique, information technology, social communication, social ties, cultural goods – truth, moral good, legal interests, integrity – copyright, cultural, religious experiences), among the above mentioned a significant function plays media critisism – axiological critisism, responsibility for one's actions, moral and social responsibility, spiritually- religious responsibility. These and others media valueas have a different rank in the hierarchy of values, whose objective criterion is a human being and its integral structure range from biological to spiritual sphere. In the process of media education, a pupil should discover the meaning of values, learn valuation as well as discover the meaning of values. Then, their ontological maturity becomes a shelter against antivalues, such as media values. It protects them from the dangers whose carrier is the content of numerous contemporary media.

The guide in the world of values and implementation in media education is a competent teacher, having adequate knowledge, skills, the sense of responsibility, the ability to creative, educational work: educating and learning pupils.

Conclusion

An outline given over media pedagogy seems to confirm its status as a subdiscipline of pedagogy, which should develop rapidly, in order to enrich practice with its theoretical research results. It can be fairly stated that there is nothing more practical than an appropriate theory. In its aftermath medial education may be developed in a full term as a practice of medial education of the young generations belonging to civilization of media.

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Abstrakt w języku polskim

Edukacja medialna jest wspieraniem rozwoju uczniów w obrębie kontekstu i treści multimedialnych, a także nauczaniem umiejętności korzystania z multimediów. Edukacja medialna zmierza też do uzyskania za pomocą środków masowego przekazu zdolności do interpretacji wytworów kultury i tworzenia własnych doświadczeń kulturowych. Z powodu szerokiego rozumienia kultury (jej przejawów etycznych, filozoficznych, antropologicznych czy duchowych) można stwierdzić, że edukacja medialna oznacza przygotowywanie potencjalnych odbiorców zarówno do krytycznego jak i wybiórczego przyjmowania treści obecnych w komunikacji medialnej, wytwarzanie u odbiorców kompetencji praktycznych, komunikatywnych, informatycznych, intelektualnych i etycznych.

dr hab. Mariusz Śniadkowski
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Contemporary Challenges of Visual Education

Abstract

In the process of upbringing we primarily refer to intrinsic values, as a determining factor of human views and actions. In today's world in which an easy access to information generated in many instances by pictures, media are more involved in educational process than ever before. Children are being raised in the environment soaked with all forms of media coverage. As a result we are noticing changes in behavior, ways of communicating and adopting norms and values than differ from the one accepted by older generation. This is raising new educational challenges. How to educate a contemporary man, in respect to an overwhelming presence of all forms of images.

Keywords: education, image, media.

1. Introduction

In the process of upbringing, we primarily refer to value, because there is no education without values. The values are important as it determines views and actions[1]. Contemporary expression of values and relationship to the value is the image and image culture.

For the purposes of this study the author did not cite a number of definitions and approaches of education. I understand education as "supporting pupils in their adolescent lives in the realization of a wide range of values leading to the depths of humanity"[2]. So included education draws attention to the educational situation, which is determined by the terms of the social, cultural, natural, pupil, teacher, and the relationships between them, and Transcendence. Important place here is not only the attitude of educators and teachers, but parents in the family home, the environment of peer and media. Assimilation of values is carried out

[1] Because the value of preferences determine the goals and aspirations of the human, as well as regulators of conduct.

[2] K. Chałas, *Wychowanie ku wartościom. Elementy teorii i praktyki*, vol. 1, Lublin – Kielce 2003, p. 40-41.

by imitating the strong patterns, interiorization and internalization of norms[3]. Negligence or lack of education for the family and school problems may imply difficulties in their implementation. You should also pay attention to the influence and role of the media in the education of children and youth, especially the image of contemporary culture that has dominated the media.

2. Education and the Media

Media fit very tightly in the educational situation, fill the space in which the child resides, and grows, becoming the dominant factor in life[4]. For centuries, the young man was raised and shaped in the system designated by the triad: family – school – church. Today, in the age of computers, the Internet and easy access to other media, the old system has been enhanced with an additional element, transforming into tetrad: family – the media – the school – the church[5]. Media gaining ever-increasing influence on education while marginalizing the role of other educational institutions, including the most important – family. They affect both the attitude and mood, and the way of thinking and the system of the entire society and youth in particular. Thanks to advances in information and communication technology and entering the picture in mass communication domain, also make cultural changes, e.g.: a change in the behavior of communication and preference other than in the older generation of social norms. Cultural changes implied growing supremacy of the image in contemporary mass communication educators draw attention to the importance of the image and the co-existence of word and image in contemporary education and upbringing. The surrounding images for the most part are associated with the word, but expressed differently in television, newspapers, and websites.

This situation gives rise to new learning and educational dilemmas. On the one hand, the development of technology for easy access to the rich and needed in the process of education information resources, on the other hand, it provides a lot of useless information, sometimes false, or even harmful educationally. In this meeting of a man with a technique it is about using increasingly more perfect tools not to destroy the sacred tradition of several thousand years axiological environment[6].

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[3] Comp. K. Olbrycht. *Prawda, dobro i piękno wychowaniu człowieka jako osoby,* Katowice 2000, p. 72.

[4] See: J. Izdebska, D*ominacja mediów w środowisku wychowawczym dziecka,* "Edukacja i Dialog", no 4/2000, p. 29-38.

[5] See: J. Morbitzer, *Edukacja wspierana komputerowo a humanistyczne wartości pedagogiki*, Kraków 2007.

[6] J. Morbitzer, *Świat wartości w internecie*, Konspekt 18/19 (2004), in: http://www.wsp.krakow.pl/konspekt/18/wartosci.html.

Visual media by his supremacy of image, data massification, superficiality and hectic pace of media can cause cognitive chaos and famine interpretation of consumed information. Short texts, snapshots images, fast and brief information is a challenge for media content, the adoption of which requires concentration, contemplation, and finally interiorization. Contemporary culture dominated image media. Visual media has created its own cultural context, shaping not only the production and interpretation of such depictions of all shows, but also today's vision of the world based on a new language combining the visual with the verbal forms[7]. So how do we educate young people in the age of image culture?

3. The transmission of visual and verbal communication

The widespread use of the image, and above all the photographs in the culture and mass communication formulated references for new types of imaging. Most often the images do not show the outside world today, do not reflect to objective reality, but apply to other images of the world, there are certain signs[8].

Production and interpretation of visual messages operates on other levels than the production of verbal messages. Verbal signs are, in fact, deeply conventionalized, their interpretation requires knowledge of a specific language, and visual signs constitute incomparably open importance, which imposes a more comprehensive interpretation. This interpretation requires the recognition of similarities in the case of an iconic character, experience in a trade and cultural knowledge index for symbolic character. Moreover, the presence of one aspect of the mark does not exclude the coexistence of the other.

Images have form, structure, and are subject to certain conventions and rules. However, they are different from the words. The image can not deny, present conditional modes, illustrate the contradictions, indicate the past, and reveal the passive or active. Imaging signs create their own reality. To interpret this reality recipient must know the code – the system used by the Convention, the person who creates a visual message. Mutual relationship of visual and verbal elements is culturally shaped. It makes the same repertoire of visual and verbal forms are organized differently, and thus create different meanings depending on the cultural context. Visualization to students the principles of the Convention is not the same imaging equipment in their analytical tools to enable a critical analysis of visual materials. Visual reception level is determined by the quality of human participation in the surrounding culture, and therefore, preferred and actualized values.

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[7] N. Pater-Ejgierd, *Kultura wizualna a edukacja*, Poznań 2010, p. 13.

[8] See: Ibidem, p. 22-24.

4. The need for visual education

Curricula in the Western type of education are based primarily on verbal discourse. Raised the current problem is the presence of visual problems in our curricula and visual education itself. Images in the educational process are clearly present, for example, in modern language learning books. In the literature on research in the field of media education are the causes of low indicated the presence of purely visual issues in school curricula. Among them are indicated: the issues of visual competence of teachers; belief that children raised in an environment visually acquire alone the competences visual; art education rooted in the traditionally understood artistic-aesthetic sphere; insufficient level of analysis of visual and verbal realm of media messages[9].

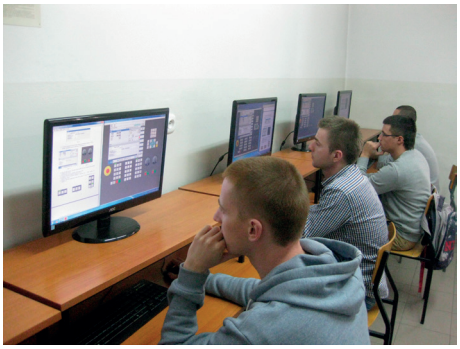
Among the current challenges and objectives of media education is indicated, inter alia, the need to make young people aware of the ideological dimension of broadcast television, portraying the potential dangers of the visual part of the television broadcast, vocational skills, and visual comparison of verbal discourse[10].

It is difficult to fully agree with the view of visual education threats researcher Natalia Pater-Ejgierd that teachers rarely use new media in the classroom, primarily due to the lack of appropriate competencies[11], zero preparation for the implementation of the media in the education process. For example, educating future teachers in the Education Technology – Computer Science at the Technical University of Lublin attention is paid in addition to the technical aspects also visual media competence, knowledge of how to edit the image, the importance of the image, the co-existence of word and image in contemporary socio-cultural conditions, forms of visual communication and visual – verbal communication. And research on the socio – pedagogical usefulness of information technology indicates that an appropriate interpretation of visual communications, production and distribution of images and the knowledge of the forms of visual culture among teachers are constantly increasing. These studies are described in the quarterly "Socio – pedagogical usefulness of information technology" edited in the Department of Teaching Evaluation Method and Lublin University of Technology.

[9] N. Pater-Ejgierd, *Kultura wizualna a edukacja*, Poznań 2010, p. 213-214.

[10] Ibidem, p. 214.

[11] Ibidem, p. 218-219.




The classes in the computer lab at the Technical Education and Information.

The image can be a medium truth about the world. It is not about treating the image as a literal, and the only means to obtain information. Image allows you to know, because it shows how to operate some of the ideas and values. Moreover, it shows reality and the people working in the different strands involved in the events, conflicts, survival. These are the positive aspects, as tend to reflect and value selection. Because the values that are not confronted with life and repeatedly verified, and for which there is still looking for new arguments, cease to function as a force to stimulate the development of a person.

5. Visual education in human development

English esthetician Herbert Read has created a system of education through art. It would lead to integral human development at the level of his intellectual functioning, emotional and motivational-volitional as a reflection of the ideas of truth, beauty and goodness in the work of art[12]. Art becomes a tool for shaping a man of creative attitude towards the world and himself (creation and self-creation). Contact with art (expression and perception) is the mean to achieve this goal. Education through art is, as outlined above, the formation of a man on three levels: mind, will and emotions

Irena Wojnar understood education through art at three levels: mind, will and emotions[13]. Experience with education through art, can try to be applied in the education of visual and media education programs.

First you have to pay attention to the form and content of the image shows. Form refers to the style, morphology, technique, the importance of psychological and aesthetic value. Picture style, that is, its characteristics, indicates means of expression. In the morphology the important role is played by the composition of

[12] See: H. Read, *Wychowanie przez sztukę*, Wrocław 1976, p. 296-297.

[13] I. Wojnar, *Teoria wychowania estetycznego*, Warszawa 1984, p. 160.

images, planes, and contrast, brightness, and saturation values. Technical aspect concerns the technology used, and psychological analysis – the most common psychological reactions to the image. Aesthetics includes the value of the form and content of the image.

Another category relates to the content of the transmitted image. Categories can be distinguished objectively, iconographic and historical. First examine the objectivity of the image. You should consider how to emphasize the point of view of the questions put to give specific meaning to what pupil sees. Iconographic analysis is the description and interpretation of images in terms of content and symbolism. What is needed is knowledge of symbolism and social conditions in which an image has been created. Knowledge of the historical aspects helps you discover their impact on the analyzed image. For obvious reasons, the education of the visual image is to be accessible to the audience.

The visual aspect of education should be emphasized that the experience of the image seen an open process, and media coverage of human shapes from childhood to old age. Assuming that the image affects the man and shaped into three levels: mind, will and emotions, we can conclude that it is a tool in education. In this respect, taking into account the first recipient of the indicated surfaces by contact with the transmission of visual meets their interests, preferences, perception is learning, analyzing phenomena, develops intelligence, critical and independent thinking.

Contact with the image not only shapes a person on the plane of reason. Forcing to think or reflect models of human relationship to other people and to the world, and shapes co- survival teaches empathy, builds active attitude to social reality. We are talking about the education of the will plane.

Next action on the mind and will of the human person usually combined with the art of the plane and its impact on feelings. The message in a form of an image arouses aesthetic experiences, sometimes moves to a new level of thinking and feeling. The image becomes a mediator between the intention of the author and the experience of the recipient. It is a mean of communication between two people.

The above-indicated plane of the use of the media to shape the image of man is not exhaustive. Without a doubt, media coverage at the level of visual – verbal appeals to the recipient by the truth, goodness and beauty, i.e. it works on the mind, will and emotions.

6. Summary

The impact of images on the mind will and emotions require attention to educational function. Education through image and media education is a dual process, as it assumes that education for the reception of media but also creates images and visual communication. The purpose of education, therefore, is to create a healthy visual contemporary culture; the image is not devoid of axiological dimension and not shallow cultural practices and getting the right relationships and man's relation to image and verbal-visual media messages. This gives a chance to values education.

Currently, visual media by its supremacy and self-image cultural context seem to destroy the world and deepen the axiological chaos. Many of the images contained in the transmission media is appointed by the commercial criteria, political or ideological, and not because of the quality, truth or goodness. Present day culture exhibits many signs of anti-culture of their areas and are expressed in absolutization or hedonistic utilitarian values, affirmation especially the material side of life, promoting mass and anonymity, depreciation individualism. However, the picture can be a tool and visual message space to shape your own and correct hierarchy of values. This will happen when the education will be addressed not only the acquisition of instrumental skills and technical skills, but will also include education towards values, to prepare people for life and reflective value selection, the ability to compare the visual and verbal discourse. The aim is not only about the preference value of accepting or knowledge about them, but with their implementation, experience and creation, as an unsupported value, unsupported in existence cease to function as a creative force to stimulate the development of a person.

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Abstrakt w języku polskim

W procesie wychowania człowieka odwołujemy się przede wszystkim do wartości, ponieważ to one determinują ludzkie poglądy i postępowanie. Obecnie w epoce powszechności mediów, technologii informacyjnej i związanymi z nimi obrazu, media wpisują się w sytuacje wychowawcze, wypełniają przestrzeń, w której dziecko przebywa i w której wzrasta, stając się dominującym elementem jego życia. W związku z tym zaczęły następować zmiany konwencji w zachowaniu, sposobie komunikowania się oraz preferowaniu innych niż w starszym pokoleniu wartości i norm społecznych. Taka sytuacja rodzi nowe dylematy edukacyjne i wychowawcze. Jak więc wychowywać w sytuacji kształtowania współczesnego człowieka przez obraz i kulturę obrazu?

Prof. Iryna Kozlovska,
Prof. Yuryi Kozlovskyi

Integration in Education: Historical Preconditions, Definitions and Aspect of Research Activities of Higher Educational Establishment

Abstract

The paper considers the problem of methodology, theory and practical use of integrative approach in education. The expediency of educative integrology of a new scientific branch is grounded. The attention is focused on the offered law of integration and its application in different parts of educational process: a system that contains three basic laws of educational integration and consequences of their application is theoretically grounded. Specific examples of practical use of the integration laws are considered and their development prospects in educational and research activities of the universities are defined.

Keywords: integration, integration in education, integrology, educative integrology, laws of integration, integration of scientific and learning activity of the university, integration of knowledge

I

Pedagogical science is the basis for making practical decisions in the sphere of topical tasks of education and personality development as well as scientific activity of the staff and students of universities and colleges. The system of education has integrated qualities in relation to the properties of its components, so it cannot function effectively if the set of its subsystems, components and connections is not complete. Scientific work is an important aspect of university employees' activity as a complex of targeted actions directed to solving certain problems. The results of intellectual work are research papers, theories, projects, "in all cases, both of industrial and of intellectual activities that are included into the entire volume of work – we have results that can be used to meet human needs: in the first case of material origin, and in the second case – of cultural one"[1].

[1] T. W. Nowacki, *Podstawy pedagogiki pracy*. Wyd. IV // *Pedagogika pracy*. – 2005. – № 47. – p. 120.

II

Integration of merely subject knowledge leads to the accumulation of the knowledge (according to the principle of localization), in this case we simply summarize the information. Such approach is not integrative in nature and leads to the overload of content of training with secondary and outdated information. Consequently, there is an urgent need to archive and to minimize the unnecessary information. However, the integration of problematic knowledge generates new knowledge (according to the superposition principle): elements of problematic knowledge are jointly enriched and complemented.

Since ancient times the philosophers have been thinking of universal and multifaceted relationships among all things that happen in the world. Their works contain many attempts to cover and reveal universal relationship in nature. The ancient Indian "Upanishady" and magicians' studies of the Ancient East contain reflections on the close ties among all things that happen in the world and these relations are considered to be universal and multifaceted. Often those conclusions do not lie on the surface, but are buried deeply beneath. These trends are clearly manifested in the modern education as striving to form in students an integral picture of the world in all its diversity, to combine the knowledge of nature and technology with the spiritual world of the creative person.

In our opinion, the optimal combination of homogeneous and heterogeneous knowledge in the content of teaching material encourages not only the formation of high-quality expertise but also development of the students' intelligence. Revealing of the relationships in the content of training, their emphasis and development are now one of the necessary conditions for intensification of educational systems. The attempt is important to explain the diversity of the world by insufficient primary sources. The idea of universal connection and unity in nature was often shown in the search for all existing primary sources. Peculiar for modern education is the search for fundamental knowledge and values that can establish appropriate educational systems based on a few laws which all the others are subordinated to. In the content formation of modern education it is necessary to consider that knowledge has different purposes. The scientifically based correlation of theoretical and practical knowledge must be directed to the creative personality formation.

In the Renaissance and modern times needs and development of the technology facilitated the establishment of science based on philosophy of antischolastic character. In spite of the dominance of analytical approach in science the integrative trends were considered. They were found in the search for common features, phenomena and things, in attempts to unite them into types and classes of the numerous classifications. The specific direction of cognition appeared. It was an attempt to explain the whole world on the basis of one theory or science. Firstly, phenomena of real world were explained by laws of mechanics, later by laws of mathematics (considering its integrative role to express metric properties of the

phenomena and processing of empirical observations results). At that time, the humanitarian type of education appeared and developed. The philosophy had an integrative role to combine knowledge of different subjects for a long time. However, a significant number of modern philosophical systems which contradict one other, did not give opportunities to establish constant criteria and to choose a one from philosophical systems as a basic one to unite all knowledge acquired by mankind. It is confirmed by numerous examples of philosophical systems analysis. The tendency to create integrative sciences or even one integrative science was peculiar. That is why scientific research ought to be directed at revealing and developing universal laws of nature, the formation of fundamental knowledge and human values systems. Modern educational systems consist of a large number of relatively autonomous subsystems the functioning of which can be coordinated on the basis of an integrative approach to learning and education.

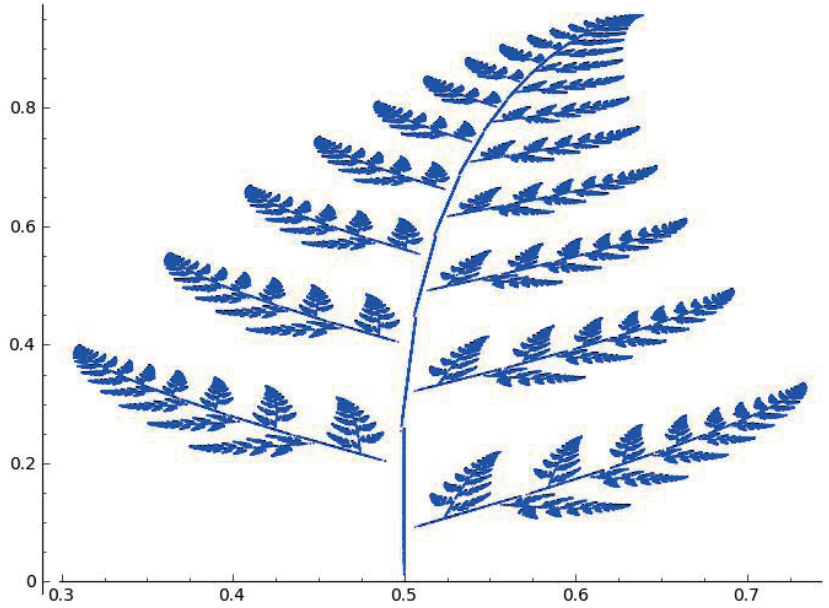
III

The attempts of various sciences' classifications confirmed the aspiration of philosophers to understand the unity, interrelations and mutual influence of different spheres of knowledge: science as a whole had to interpret the direction of human activity and every science had to make its individual contribution. The intensive searches of basic (existing or artificially created) sciences were conducted to integrate the well-known knowledge. Various bases for such integration (concept of single laws of movement by Sh.F.Furye, creation of a single integrative science based upon the ideas of universal gravitation by K.A.Sen-Simon etc.) are offered. However, these attempts were not successful because they only described regularities and essence of different forms of matter movement in terms of limits of some particular form of movement or a specific basic science. One of the reasons for such failures was the lack of rational approach towards the integration itself.

On the basis of the ancient ideals of so-called pandeya (universal knowledge), the German Romanticist suggested a plan of the Encyclopedia of Organic unity of sciences. In a series of cases, science studies were interpreted as the science of sciences and philosophy was identified as the substance of all sciences. The program of the unified science as an absolute totality, as a universe, sometimes led to magic and mysticism. However, the very idea to create a unified science was extremely vivacious.

Synergetic approach, which at the modern stage, starts to be used effectively in education, implies the existence of potential structures and complex integrated systems that are necessary to identify and implement. It is a kind of counterbalance to those numerous approaches that are directed at different artificial educational constructions or educational systems built without a proper analysis of the profound existing opportunities. The topical problem of modern education was closely connected with these questions: the formation of interdisciplinary, integrated and

synthetic courses. Practically, they are not different, although they have significant differences arising from the nature of the notions of interdisciplinarity, synthesis and integration.



Barnsley fern as an example visualization of fractal mathematics. Authors: Assoc. prof. US Marcin Kostur and Dr. Łukasz Machura.

IV

Therefore, in the development of science, until the beginning of the 19th century the trends of integration and differentiation of scientific knowledge were clearly determined. At that time, many scientists found these processes opposed one another and tryid to find the dominant one among them. In addition, various concepts of science perspectives development were devised. The tendency for the coordination of knowledge constantly increased, especially with increasing quantity of scientific inventions. This prompted not only the demonstration of the unity of the world, nature and scientific knowledge but also the search for the effective ways of integration of knowledge accumulated by scientists in different countries and at different times.

The term "integration" in its modern sense was not practically used in the science studies, especially in education, until the beginning of 19th century. However, the processes that can be called the integrative ones were researched. As stages that almost all sciences pass are similar on the methodological level, thus their experience application is possible (with some restrictions).

In our opinion, two stages are required for the full development of the modern education: the classical, linear analysis (which will help in the organization and generalization of the vast empirical data) and innovative one that will form it as the whole theory of self-organized systems. Forming of the classical education laws system is the basis that can serve the foundation for the development of probabilistic ideas, development of synergetic ideas. Modern scientific developments on the problems connected with the formation of the stochastic regularities are helpful but the criteria for their development have to conform with the system of classical laws similar to the laws of Newton in physics. These classical laws must constitute a particular case in more complex , non-linear laws of education but can contradict them in no way in limiting cases.

Besides the failed attempts of global integration of sciences, a rational and effective process of local integration took place. The attempts to establish relationships between the processes of integration and differentiation, to determine the place of each of these processes in cognition are also important.

Search for the basis and conditions of scientific knowledge unity continues in the 20th century. At that time, efforts of philosophers were directed to reveal invariant structure of single, unified science. Significant impact on the development of the idea of integration was exerted by the principle of reduction: an explanation of the complicated, higher phenomenon took place by means of reduction to a simpler, lower one. The concept of integration has become scientific in general along with such concepts as structure, system, information, model, management, feedback and others.

We would like to note that the numbers of parasitic, false integrative researches are developed in parallel, where the term "integration" is used without adequate scientific and educational study or just as a kind of slogan. For ethical reasons we do not give examples of such works but their availability and their abundance leads to a devaluation and leveling of the integration concept of its scientific and educative context.

It can be concluded that the integration of knowledge as an expression of profound tendency towards their unity, in various forms has been accompanied by the development of scientific thoughts since ancient times. Correct implementation of integration in education is impossible without reliance on historical experience of philosophy and science studies that allows to avoid false methodological principles, to identify positive and negative experience of knowledge integration, to develop conclusions proven over time.

At present, there are dozens of definitions of the term "integration". The ideas of integration actually penetrated into all areas of education. In 1993, at a session of UNESCO, the interpretation of knowledge integration as an organic relationship, interpenetration which is determined by its result, i.e. the forming of a single integrative world picture was made. The definition of "integration" in its educative context, with strictly fixed sense and meaning is a necessary condition for the development of the theoretical basis of integration.

V

The concept of "integration" is a scientific category in a general sense: it can perform the same function in educative systems as well. We did not want to create a strict definition of the concept. Below we give an expanded definition of integration: integration is the process (a two-way process, systematic and structural) of interpenetration, consolidation, unification of knowledge; integrity incipience; establishing connections between relatively independent earlier things, processes, phenomena when these relationships are essential for defining the functioning of phenomena which are integrated; combining elements accompanied by complicated and strengthened connections among them, the interpenetration of the whole system elements, transformation of some forms into others; the historical stage of knowledge movement towards the unity; a specific form of educational content unity; interpenetration of information from one training course in the other one.

On the basis of the above, we offer our interpretation of a narrower concept: integrative integration is the interaction of elements (with given properties) accompanied by the establishment, complexity and strengthening of significant connections among these elements on the basis of a sufficient cause as a result of which the integrated object (the whole system) with qualitative new properties is formed, the individual properties of the output elements are stored in its structure.

Various characteristics of integration are highlighted in a number of scientific and methodological developments (block10). We mention only some of them that are important in the educative aspect.

VI

Today we have a variety of studies concerning integration levels selection. Generalizing them and on the basis of our own developments on this problem, we note that the selection of integration levels corresponds to the division of the operation of the concept in formal logic and requires a clear selection of characteristics according to which the division is made. In our opinion, the following features are advisable to select: the number of elements that are integrated; the degree of relationship between the elements of integration, nature of integration elements. On the basis of such selection of features, there are three options for the allocation of integration levels:

Classification of the integration levels according to the number of integrated elements: first level is microintegration (for a small number of elements), the second level is mezointegration (with optimal number of elements), the third level is macrointegration - with a significant number of items that requires additional clustering). During the integration we distinguish the integration level in particular: if there is a small number of items, there is the micro integration with weak symptoms of the integration result. Similarly, at the level of macrointegration, the number of items is too large and the new integrative system can "collapse". Those

extreme cases are sometimes useful, but only for short-term educative purposes. Stable integrative system is formed only in accordance with the optimal number of elements on the level of mesointegration: this number should be large enough to provide a new quality due to the integration and at the same time not too large to prevent the destructive processes inside the integrated object. We consider the following visual analogy as useful: properties of chemical elements depend on the number of protons in the atomic nuclei but with the very large number of protons these nuclei become unstable as in the transuranic elements. However, each of the elements is necessary in order to use their properties correctly. We would like to note that this division is natural, not artificial, as the number of items is one of the essential features in determining the integration levels.

Classification of the integration levels according to the degree of interconnection between elements: the first level constitutes the interdisciplinary connections (minimal, apparent interrelations), the second level is systematic integration (optimal essential interrelations that cause forming of integrative systems, in particular integrative courses), the third level is metaintegration (grouping items in subsystems with strong relations and those subsystems into a metasystem with the optimal relations leading to the appearance of metasubjects). Here, we give another analogy: the power of interrelations between the particles of matter determines the state of the matter. Due to the virtual lack of interaction between particles, we have gaseous state: analog of interdisciplinary connections because on their level integration elements can exist quite independently and interact only for a tiny fraction of the time. Interdisciplinary connections, relatively speaking, do not have their own "volume" or their own "shape" and interactions can only be used occasionally. Here, we have most degrees of freedom, the greatest mobility but, at the same time, the smallest amount of the interaction.

Systematic integration is similar to the matter being in the liquid state, when its shape is not retained but volume is stable. In this case, certain regularities appear in integration use, the degrees of freedom reduced but the results of integration use increase. Variation of integrative courses, integrative learning systems or integrative teaching problems are entirely on this integration level, which is often optimal for educational systems. On the level of metaintegration, weak relations between large blocks of knowledge and, at the same time, strong relations inside these blocks, there is a solid body according to the distant order in the arrangement of particles. The shape and volume in each block is defined as in the model of the solid state allowing to use the advantages of previous levels at the same time and to place the integrated blocks inside the metasubjects freely (as for interdisciplinary relations) and at the same time to provide sufficient power of the interaction inside the blocks in order to systematize knowledge.

This division into levels is natural as well because the degree of interaction between elements influences the integration result significantly. Apart from that,

we have important analogies regarding metasubjects as well as systematic objects in the "grand" science. For example, a number of sciences, particularly physics or biology can be interpreted as the metasubject, the metascience that consists of a number of disciplines: physics and mechanics, thermodynamics, optics etc. and biology with botany, zoology, cytology etc. Relations between subjects (blocks) are not very strong but inside those disciplines systematic knowledge integration dominates. Such sciences can be called metascientific disciplines. We note that not all sciences are like that: for example, historical sciences are built according to other principles. Among metascientific disciplines (and, accordingly, educational metasubjects) two main types can be distinguished: natural and artificial ones. Physics, mathematics or biology can be included in the natural ones that were formed according to the basic idea of metascience . The artificial metasciences appear to meet specific needs at certain stage of development and are developed in the so-called hybrid sciences.

Classification of the integration levels according to the nature of elements: the first level is the corpuscular integration (the elements have clear boundaries or values and interact as particles), the second level is the integration of the wave (the elements do not have clear boundaries and interact according to the principle of waves). We would like to note that the principle of systematic quantization is fundamental in the theory of "compression" of educational information on the basis of which theories such as the theory of generalized semantic generalization, theory of consolidation of educative units, the concept of knowledge engineering etc. are developed.

VII

The development of science in universities and colleges is necessary to upgrade their competitiveness in the global educational and scientific space. It is possible on the basis of the integration of educational and scientific activities, organic combination of the university research with the needs and orders of business structures. However, the essence and formation of scientific university activities have not been considered yet as a pedagogical problem, the methodological basis of its modeling has not been developed and theoretical basis for development of qualitative and quantitative criteria to evaluate the results of the research of faculty members has not been sufficiently grounded. Therefore, an important problem nowadays is the analysis of the essence of scientific activity of higher educational establishment and interaction of its main kinds in the context of pedagogical science problems.

One of human activity results is the creation of scientific concepts, theories, perception of the whole world. This is the work of scientists, inventors, artists and others. No one makes them use maximum efforts; it is the pursuit of expression and enrichment of cultural, scientific and artistic values. These are scientific and literary texts, intellectual and emotional heritage - it is the result of work and

immaterial developments, that is spiritual, intellectual works, great emotional distress are dominated.

The process of mathematical complex processes' modeling involved in education foresees objects' modeling formalization. For example, the descriptive models[2] are based on the formalization using algebraic equations or systems of equations. The required connection of formal means and notions of science with a certain systematic object representation causes the requirements pertaining to mechanisms of means transfer from one science to another. Formal mathematical means' transfer into pedagogy provides possibility of such "vision" and pedagogical phenomena's presentation which corresponds to systematic representation of mathematical science. Systematic representations corresponding to two sciences require special inspection and study.

For successful use of modern possibilities of mathematical modeling it is necessary to choose formalization criteria that allow pedagogical problems' transfer into a form suitable for mathematical processing because a mathematical model is abstract from the process. Well-conducted pedagogical problem formalization is an adequate description of the real process or phenomenon and makes it possible to solve theoretical and practical problems by means of mathematical models. Correct formalization ensures effectiveness of mathematical means used for solving pedagogical problems.

Scientific systems' formalization, particularly in pedagogical science, requires theorems on incompleteness set by K. Gödel[3] to be taken into consideration. These theorems of mathematical logics showed complete inability to formalize mathematical sciences' ideas and its grounding by the same formal system means. Gödel's theorems prove the formal systems' incompleteness and insoluble, inconclusive and compelling regulations available. The first Gödel's theorem states that scientific system of knowledge cannot be formalized completely. The second theorem adds onto the first one: when a consistent formal system is proved to be incomplete. Scientific significance of the incompleteness theorems is that it showed complete inability to formalize the human thinking, that is vastness of formal representations of nature development and formal proof inability of system consistency by means of the same system.

The results of scientific research can be considered formally (according to trivial obvious indices such as the number of publications) and in a formalized way (choosing the method of scientific results' presentation in one of the analyzed forms, for example, the mathematical one).

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[2] S. Bednarek, *Opisowe modele w dydaktyce: możliwości i ograniczenia zastosowań,* in: "Dydaktyka Szkoły Wyższej", Instytut Polityki Naukowej i Szkolnictwa Wyższego 4/88 (89), pp. 61-72.

[3] K. Gödel, *Über formal unentscheidbare Sätze der Principia Mathematica und verwandter Systeme,* Monatsh. Math.Phys., 1931, Bd 38, pp. 173-198.

The method of formalization is based on the philosophical categories of content and form that provide its science-based use as evaluation of scientific research results. The prerequisite of correct formalization is the rational formalization of specific processes and selection of indices group impractical to formalize.

The choice of mathematical means for formal data processing causes the effectiveness of formalization of the results obtained by faculty members. Scientific formalization of pedagogical problems is an adequate description of the real process or phenomenon and makes it possible to solve theoretical and practical problems by means of mathematical models.

For successful modern possibilities the use of mathematical modeling based on the formalization of pedagogical phenomena and processes it is necessary to choose formalization criteria which allow to transfer pedagogical problems into the form suitable for mathematical processing. We would like to emphasize that for such complex notion as "the result of scientific activity" evaluation both qualitative and quantitative criteria should be used.

VIII

The essence of scientific activities of universities and colleges (industry, pedagogical, industry and pedagogical, educational, developing etc.) was revealed. The necessity of interaction between the main kinds of research activities of universities and colleges in the context of pedagogical science was grounded. Possibilities and necessity of scientific work results' formalization as an important part of the faculty members' activity were analyzed. Science-based formalization of the pedagogical problem is an adequate description of the real process. In addition, it enables the solution of theoretical and practical problems by means of mathematical models. Theoretical and practical problems were shown on the basis of the philosophical categories of form and content.

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Abstrakt w języku polskim

Jednym z wyników ludzkiej działalności jest tworzenie pojęć naukowych i koncepcji postrzegania całego świata. Jest to zadanie naukowców, wynalazców, artystów i innych twórców. Nie ma przeszkód, by dążyć do tych maksymalistycznych wysiłków. Zwłaszcza w nauce powinno się dążyć do sformułowania podejścia integralnego, do nowej syntezy między wiedzą przyrodniczą, technologiczną i humanistyczną (wiedzą o duchu). Tym nowym typem integracji jest rozszerzone jej rozumienie jako synergii. W artykule rozpatruje się tak ujętą integrację wiedzy matematyczno-technologicznej z wiedzą pedagogiczną.

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