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Thinking in the Network

Slavomír Gálik

ORCID: 0000-0002-8404-6297

UNIVERSITY OF SS. CYRIL AND METHODIUS IN TRNAVA, SLOVAKIA

ABSTRACT: The aim of this paper is to examine the monograph titled *Thinking in the Network* (2018), written by Miroslav Marcelli. The monograph is a contribution to a better understanding of the phenomenon of collective intelligence that is formed under the influence of new digital media, and one that could help us solve national or global problems. Marcelli emphasizes that collective intelligence needs to be cultivated. The author agrees and adds that it may be a new evolution of humanity, because the cognitive abilities have to adapt to collective thinking under the influence of digital media and communication in the cyberspace.

KEYWORDS: Thinking, digital media, internet, communication, collective intelligence.

The current expansion of digital media has led to collective intelligence being an important and widely analyzed theme in a variety of scientific fields abroad. Sadly, it is quite different in Slovakia, where Marcelli's monograph *Myslenie v sieti [Thinking in the Network]* (2018) deserves appreciation, as it is a pioneer work in our philosophical environment. It is, however, important to note that Marcelli has been working with this theme for some time and has already, either directly or indirectly, mentioned it in his monographs, for example in *Text, sieť a iné nečistoty [Text, Network and Other Impurities]* (2011), *Komunikácia: myslenie vo veľkom [Communication: Thinking on a Large Scale]* (2009), *Mesto vo filozofii [City in Philosophy]* (2011) and other publications. Marcelli's present monograph *Myslenie v sieti [Thinking in the Network]* is written using an attractive essay style in seven sketches: 1. *Úmernosť a jej hranice [Proportionality and its Limits]*; 2. *Veľkosť sociálnej skupiny [Social Group Size]*; 3. *Malé skupiny vo veľkom svete [Small Groups in Big World]*; 4. *Nenápadný pôvab malého [Unnoticeable Charm of the Small]*; 5. *Zo života hmyzu a ľudí [Insect's Life and People's Life]*; 6. *Bezhlavá múdrosť [Headless Wisdom]*; 7. *Medzi mýtickým a vedeckým poznaním*

[Between Mythical and Scientific Knowledge]. In these sketches Marcelli writes about thinking on a small and large scale, using architectural changes in a city or insect organisation as examples. However, Marcelli's work clearly graduates when he addresses the topic of collective intelligence in the network of digital media and its positives and negatives. Marcelli believes (2018, p. 19) we are currently facing a challenge to learn how to think on a large scale and thus become a part of collective intelligence that could help us find new strategies and tactics to deal with global problems. With the help of Marcelli's *Thinking in the Network*, we would like to clarify the term of collective intelligence and analyse its possibilities and risks – this is the goal of our study.

Marcelli (2018, p. 77) shares the same view of 'collective intelligence' as P. Lévy, who defines it *Collective Intelligence* (Lévy, 1999, p. 13): "It is a form of universally distributed intelligence that is constantly expanded and coordinated in real time, resulting in effective mobilisation of abilities and knowledge…" In *Cyberculture*, Lévy claims that collective intelligence is the main engine of cyber-culture and describes it further in a broader context as

> various systems of network cooperation, information methods that help with cooperation and decentralised coordination of exchange of ideas, articles, images, experience and observations between scientists and students in electronic conferences.
>
> (Lévy, 2000, pp. 26–27).

Yet Lévy (1999, p. 105) believes it is not purely a mechanical sum of information in collective intelligence, but a new kind of intelligence that acts as an extension of intelligence in individuals, so it becomes a sort of collective brain. However, new collective intelligence is not a static and universally appointed unity, but a rather dynamic and changeable one.[1] H. Jenkins, who elaborated the term of cultural convergence that is generated by collective intelligence, expresses similar ideas. Jenkins (2006, p. 11) notes that "convergence does not mean ultimate stability or unity. It operates as a constant force for unification, but always with in dynamic tension with change." Jenkins's understanding of convergence as dynamic unification, with internal tensions and changes, could also be used in the case of collective intelligence. We are presently offered various definitions of collective intelligence. *The Oxford Review Encyclopaedia of Terms* defines it this way:

1 Lévy (2000, p. 191) realizes that the project of collective intelligence must also face various obstacles. At present, they are mainly misinformation. S. Gáliková Tolnaiová (2019, p. 13) for example claims that "it is obvious that Internet communication can spread false information and fake news, but also trustworthy information."

> Collective intelligence refers to a group or a team's combined capacity and capability to perform a wide variety of tasks and solve diverse problems. (…) The primary difference between IQ (individual intelligence) and CQ or collective intelligence is the social dimension and the ability of groups to achieve unity of purpose, action and thought.[2]
>
> (*The Oxford Review Encyclopaedia of Terms*, 2020)

Of course, such a collective approach will gain better results than even above-average effort of an individual.

The term collective intelligence is not entirely new, and Marcelli (2018, p. 10 and p. 16) outlines in his work that we could find something similar in the way an army is organised or in urbanisation during the Modern Period in Europe. The beginning of the idea of collective intelligence can be found in Aristotle who contemplates the idea of a large crowd of people that could together act as one person and thus be better and more intelligent:

> It is well possible that a large group of people, where not a single one is a proper man, may in total, be better than individuals, in unity, just like a feast where a lot of people contribute could be better than another, paid for by a single person. Since there are many people, each person may possess a virtue and ideas and when they meet together, they may construct something like a single person that is multi-pedal, multi-armed and multi-sensed both in personality and intelligence.
>
> (Aristotle, 1998, p. 126)

Aristotle's concept of a "single person" who possesses qualities of many concrete people corresponds, to certain degree, with Neoplatonic concepts. In Neoplatonism, more specifically in the philosophy of Plotinus, we find the idea of unity in the diversity of souls. Plotinus speaks on this:

> all souls (unity souls and all other souls) partake in the *one*, they are united to certain extent because they do not belong to one concrete thing; they touch each other and merge here and there just like a ray of light that enlightens houses is divided, but does not break apart since it stays united and one.
>
> (Plotinus, 1995, p. 137)

If each and every soul is united with other souls and they all are combined in only *one*, then knowledge should also be distributed in a similar manner and

2 See The Oxford Review Encyclopaedia of Terms website, available at: https://www.oxford-review.com/oxford-review-encyclopaedia-terms/collective-intelligence/.

composed of some of the knowledge stored in the *one original soul* and some knowledge found in individual souls. The main difference from Aristotle's concept is in the ontological understanding of collective intelligence. While Aristotle believes that something that exceeds both individuals and collective is constructed using the interaction of individual minds of individual people, Plotinus sees one universal soul that comes "from above," a soul that divides individual souls and unites them again. These two approaches were frequently visible in the history of European philosophy; they often alternated with, or existed in parallel, each other.

In the history of European culture and in the context of collective intelligence development, there was an important component – media (written and printed word, and electronic media), which acted as carriers or information and knowledge. In the epoch of the spoken word, before the written word was formed, information could only be spread in a limited social space. In order for information to survive decades and even centuries, it needed to be passed from generation to generation. Collective intelligence of that period could be understood as intelligence that was bound to the collective memory and dependent on oral distribution of knowledge. When the written word emerged into the scene, the possibility to store and share information was greatly improved. Lohisse (2003, p. 66) cites Diodoros of Sicily, who commends the written word: "those, who are separated by great distance communicate as if they were very close, sitting side by side." The written word could conserve knowledge throughout time and space and people swiftly learned a collection of written texts stored together had added value, and thus in Greece the *bibliothēkē* (Latin: bibliotheca) came into being. Thus, the library serves as a new form of collective intelligence that resides in a certain physical space and was accessible only for the elite, i.e. for those who are literate and educated. This phenomenon grew even stronger with the invention of Gutenberg's printing press in 1455. However, the printed word did help to spread knowledge massively throughout the social hierarchy, because the information on the page was no longer available only for the privileged, but more or less for everybody who could read. With the beginning of scientific and technological revolution in 19th century, industrialization and urbanization, literacy became a vital virtue for the lower social classes. The printed world could be spread in all social classes, which is also the reason why we speak, for the first time, about a 'mass society'. Tarde (Lohisse, 2003, p. 137) could see this phenomenon very well in the late 19th century, as he spoke of it as a "spiritual community in which we interact with each other." Collective intelligence was growing rapidly at that time, regardless of distance between individuals. However, the elite understood this to be something rather negative, as it simply meant a social "average."

The 20th century with its new and evolving electronic media enable new concepts of collective intelligence; these are quite similar to Lévy's notion. We can see an example in the philosophy of Teilhard de Chardin (1990, p. 217) who elaborates an evolutionary concept of mankind that moves towards the noosphere and the Omega Point, which represents unity and diversity of minds at the same time. Teilhard de Chardin (1990, p. 201) argues new communication technologies contribute to this unification: "thanks to the discovery of electromagnetic waves, each individual finds himself henceforth (actively and passively) simultaneously present, over land and sea, in every corner of the earth." Inspired by Teilhard's concept, McLuhan came up with the similar idea of tribal consciousness spreading over the globe:

> Electronically induced technological extensions of our central nervous systems are immersing us in a world-pool of information movement and are thus enabling man to incorporate within himself the whole of mankind.
>
> (McLuhan, 2008, p. 229)

McLuhan's concept expresses an explicit relation between collective intelligence and communication technologies.

At the present time, the term of collective intelligence is understood in connection to the new digital media and their ability to provide global communication. Collective intelligence is studied by a large number of authors, for example Jenkins, Rheingold, Brown, Noubel, Rosenberg and others. The Massachusetts Institute of Technological (MIT) even has a research department called the *MIT Center for Collective Intelligence*. Wikipedia is often referred to as an example of collective intelligence, being the ultimate and respected encyclopaedia, in which hundreds of thousands of experts contribute. This is, in fact, how the internet works. Everyday users of the internet not only use collective intelligence, but also contribute to it by sharing articles or pictures on this ultimate of social networks.

Marcelli starts his thoughts about collective intelligence with mathematical examples in the first sketch called *Úmernosť a jej hranice [Proportionality and its Limits].* He explains that linear relationships, reliable when counting in small numbers, often fail in those that are big. Linear relationships, he believes, cease for example during war and in case of urbanisation. As the first example, Marcelli (2018, p. 10) uses Napoleon's calculation of the number of Mamluks and French soldiers in his armies: "Two Mamluks could easily win over three French soldiers, 100 Mamluks were equal to 100 French soldiers, 300 French soldiers were usually stronger that 300 Mamluks and 1000 French soldiers won over 1500 Mamluks." He continues:

> When not exceeding a given number, Mamluks could use certain advantages over French soldiers – their horse-riding abilities and better horses; when exceeding this number, discipline, organisation and military strategy became an advantage that could be used by the French soldiers.
>
> (Marcelli, 2018, p. 10)

In the second example Marcelli (2018, p. 13) points out mistakes made by architects, who would absurdly employ a small-house mind-set to think about a "big house" – i.e. an entire city. "Modern architects and urbanists were convinced that a city was effectively – a big house." This move from small-scale architectonic planning to a big-scale planning had some negative consequences, which Marcelli demonstrates with the case of Pruitt-Igoe, a quarter in Saint-Louis, Missouri. This was supposed to be a role representation of modern and healthy living – but in fact, it was the opposite. Marcelli explains:

> Soon after building works finished and people moved in, this quarter started to deteriorate, common areas turned into smelly rubbish tips, windows got smashed and graffiti started to appear…
>
> (Marcelli, 2018, pp. 14 – 15)

After various unsuccessful attempts to renovate the quarter, a decision was made in 1972, 20 years after the beginning of the project, to demolish it.[3] Marcelli uses these two examples to show the incomparability between thinking small and thinking big and about the urge to think big now.[4]

In the second sketch called *Veľkosť sociálnej skupiny [Social Group Size],* Marcelli contemplates the borderline of our social life. Basing his argument on R. Dunbar's anthropologic research, he asserts that the maximal size of a social

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3 Marcelli works with the problem of modern urbanism in his book *Mesto vo filozofii [City in Philosophy]* (2011). Beside other ideas, he analyses mistakes made by modern architects, who wanted to build cities on modernist principles such as geometrisation and functionalism. These great objectives lead to urban crises, demolitions of buildings – one great example of which is Pruitt-Igoe. Marcelli (2011, p. 153) notices Jencks' notion that this affair led to the fall of modernism and birth of postmodernism."

4 Marcelli (2009, p. 419) in his article *Komunikácia: myslenie vo veľkom [Communication: Thinking on a Large Scale]* emphasizes the need to think big. He bases this on a C.-L. Strauss's notion and city model: "While we study communication processes, all these impulses indicate what the demand for thinking great brings. Only today, when the great extent of communication networks and the demand to think big is really becoming apparent, can we assess productivity of the model Lévi-Strauss offered. His view of a city as a lens of collective consciousness adumbrates much of what is being developed in studies that reflect urban processes as an indication of collective intelligence." Marcelli (2011, p. 631) also reminds us to think big in his paper *Text, sieť a iné nečistoty [Text, Network and Other Impurities]* in connection with rhizomatic structure of communication in cyberspace.

group is approximately 150 members: "Around 150 members is a quantitative maximum of our mental capacity to incorporate into larger groups and maintain permanent relationships with" (Marcelli, 2018, p. 24). Therefore Marcelli says it is a pure fiction when somebody claims that they have 3000 friends on social networks or that they love everybody on this planet. Bergson thinks similarly, though in a different concept. He states that mother nature intends us to create close social ties and blood bond ties with people, and not with mankind:

> Family, homeland and human race have always been seen as a greater and greater circle, so the idea that one needs to love every person on the globe just the way we love our homeland and our families was widely accepted, despite the fact that it is natural only to love our family and close people.
>
> (Bergson, 1970, p. 365)

Our love of family members or people who are close to us in our social group cannot therefore be limitlessly expanded; we cannot love the whole of mankind.[5] Despite the fact that it is possible to communicate with large numbers of friends on social networks, Marcelli (2018, p. 27), in reference with Dunbar's research, claims that the number 150 is universally correct also in the virtual platform of social networks.

> He measured the average size of groups of friends on Facebook and compared it to the size of group of people that we socially interact with each and every day outside of the internet – offline. The result of this comparison is the very same number – 150 people for each group.
>
> (Marcelli, 2018, p. 27)

In the third sketch, called *Malé skupiny vo veľkom svete [Small Groups in Big World]*, Marcelli analyses relationship between small and large social groups. On one hand, we have informal, small groups of up to 150 members, on the other hand there are large, formal groups such as city, state and global groupings that are much, much bigger. Marcelli claims that

> each one of us is, without doubt, a citizen of two worlds. The first one, lasting for the longest possible history, places individual into small groups, … the

5 Bergson (1970, p. 364) believes that only a mystic can love all mankind, but only through God – not through their natural feelings. There is a little controversy in his understanding of love for homeland, because with current globalisation processes this love for homeland is decreasing in intensity. Also, the term of homeland doesn't necessarily incorporate just the natural components such as ethnic group, language and so on, but can equally well be a product of social construction.

> second one exceeds them in size and puts these groups into systems in which social binds are regulated by law and regulations.
>
> (Marcelli, 2018, p. 32)

Both small and large groups have their own and unique way of thinking and organizing. Despite these differences, Marcelli explains (2018, p. 33), "thinking small is able to be combined with thinking big and become thus its integral part." To illustrate this unification, Marcelli uses an example – the organisation of Protestant army during the Thirty Year's war, with King Gustavus Adolphus of Sweden as the head of this army, who divided his army into several units of various sizes. The smallest group, a company unit, consisted of 130 men. Four companies were known as battalions, three battalions created brigade and so on. It is the number 130 that is interesting here – it is similar to Dunbar's idea of a number of people in a small social group. Individual people in such groups knew each other better and became friends, which was also reflected in better commitment and dedication to help each other. Better performance in a military company then mean better results in the war. Marcelli adds that it was for this reason that Gustavus Adolphus of Sweden became the "father of modern warfare." Marcelli (2018, p. 38) finishes his sketch when he mentions Descartes, who was also convinced that there must be just one agent that organises big units. He used architecture as an example, when he explained that cities built by a single architect are nicer that those built by multiple people. Marcelli (2018, p. 42) adds to Gustavus' and Descartes's idea of organising big units – that "to achieve a desired goal, a structure must be created in which big units are divided into small groups that are easy to be controlled by decision-makers."

In the fourth sketch, called *Nenápadný pôvab malého [Unnoticeable Charm of the Small,*, Marcelli uses several examples to show how something small may turn into something big, even without a controlling principle. In the 1960s, small hippy communities grew globally, thanks to the media. However, the 1970s saw the hippy movement losing its vitality as the energy pumped into it by artists started to decrease (Marcelli, 2018, p. 45). Marcelli adds that they were replaced by Schumacher's new economy theory that praised the small and therefore beautiful: "it is no coincidence that Schumacher's words about beauty of small are noticed during each and every crisis". The third example that Marcelli uses (2018, p. 46) to illustrate the small penetrating the big is Gladwell's concept, in which it is small things that make big things happen and may start an epidemy in a given surrounding.

> Gladwell claims that epidemy may be triggered not only by oral observation, but also by media such as television or perhaps by something else that he could

> have experienced when he was writing his book: email or fax communication.
> (Marcelli, 2018, p. 46)

We see epidemic spreading of information chiefly on social networks now and in the field of economics we can now discern a branch that is called viral marketing. Based on these three examples, we can see that even something small is able to penetrate into something big, on its own, without any organising. Marcelli (2018, p. 50) finishes this sketch with a key question: "is disorganised movement of a large number of small occurrences really only prone to bring chaos?"

In the fifth sketch, called *Zo života hmyzu a ľudí [Insect's Life and People's Life]*, Marcelli speaks about organisation in small groups that do not have a control centre. A good example of such an organisation is an anthill. Ants have a signalling system and thus know what to do: they cooperate to build their anthill, fight enemies, find their way back home etc. Marcelli (2018, p. 53) therefore believes that an anthill is a "superb example of decentralised society with *bottom-up* organisation." He also believes (2018, p. 54) that we should take ants as creatures with some kind of intelligence: "But why intelligence should only mean thinking, why a construction such as anthill couldn't prove its existence?" We can see similar ideas also in Scheler's philosophy (1968, p. 55), in that he believes intelligence can be found also in nature. First, it is widespread and gradually develops and concentrates in more advanced forms of life. The greatest concentration of intelligence (practical intelligence) is, according to him, in primates. However, Scheler (1968, p. 66) distinguishes intelligence and intellect, the latter one is only found in people. H. Bergson in his philosophy (1970, p. 229) speaks of impersonal intelligence in ants, which he calls infra-intelligence. In his evolution concept, the path is clear – from infra-intelligence to superintelligence, with a mid-step known as human intelligence. Marcelli also speculates about possibility to copy this self-organising and emergent system found in ants to human society. Citing S. Johnson[6] who claims that

> cities, similar to beetle colonies, provide an opportunity for certain kind of emergent intelligence, which brings the ability to store and read information, to distinguish patterns in behaviour and respond to them.
> (Marcelli, 2018, p. 58)

6 Steven Johnson examines the relationship between parts and the whole and why the whole is sometimes smarter than the sum of its parts. He claims, based on research into various systems such as ant colonies, human brains, cities, the software, that these systems are intelligent and can emerge to a higher level. See more: Johnson (2001).

Marcelli (2018, p. 63) continues further in these ideas and takes them into the new dimension of communication technologies, i.e. cyberspace, in which emergent intelligence can demonstrate itself even more clearly. However, he also observes correctly that the road that connects the real world with cyberspace is not a one-way road, but it is open also in the opposite direction: "Cyberspace allows us interfere more and more with processes that define space in which we live our physical life – houses, streets, cities, countries" (Marcelli, 2018, p. 64) It is a human, acting as a connecting agent, that is vitally important in this bi-directional relationship based on the following sequence: reality > virtual reality of the cyberspace > reality. This connection does not exist on its own, which means that one has to actively follow requirements of communication in the cyberspace and thus – willingly or not – a person's cognitive qualities such as perception, ideas and strategy of thinking will gradually get changed. More than 50 years ago M. McLuhan (2011, p. 32) distinguished this in the context of electronic media, when he points out: "The effects of technology do not occur at the level of opinion or concepts, but alter sense ratios or patterns of perception steadily and without any resistance." Similarly, Lohisse (2003, p. 167) says that technology "constructs social structures, changes our thinking, shapes imagination and determines understanding of the world". Communication in cyberspace changes our cognitive habits,[7] which then trigger cultural and social changes, including the organisation of cities. Marcelli (2018, p. 65) notes: "societies that are based on digital networks use new smart solutions in infrastructure and the operation of housing estates." However, he realises that organising that lacks a principle of commanding authority, i.e. self-organising does not necessarily mean only good solutions, so in the following chapter he focuses his attention on big masses and crowds of people.

In the sixth sketch titled *Bezhlavá múdrosť [Headless Wisdom]*, Marcelli observes positives and negatives of collective thinking in case of bigger groups (large masses of people). He begins with the information that the majority of philosophers look at crowds of people with disrespect; they see masses of people as an uncontrollable and rather emotional pack. Despite this, he believes that we should inspect collective intelligence and try to find a potential for positive changes. Marcelli (2018, p. 74) refers to Rheingold, who notes that "combining computers and network communication may, in the upcoming information era, bring something more: smart solutions to cultural and social problems."

7 S. Gálik and S. Gáliková Tolnaiová speak about changes in cognitive abilities as the result of using digital media in their article *Influence of the internet on the cognitive abilities of man. Phenomenological and hermeneutical approach* (2015). Similar ideas are elaborated in S. Gálik's articles *Being and time in online communication* (2016) and *Influence of cyberspace on changes in contemporary education* (2017).

Marcelli also mentions Lévy's concept (Marcelli, 2018, p. 77), in which he talks about collective intelligence as of a "harmonization of individual contributions."

However, Marcelli realises that these authors came with their explanations in the beginning of these processes and we know now that along with positives, there are also some negatives that may become "smart solutions" for terrorist attacks, invading privacy and so on. Marcelli (2018, p. 79) also wonders "whether using the Internet doesn't weaken cognitive abilities to the point where we may start speaking about mass digital dementia." In this connection he mentions Spitzer's *Digitálna demencia [Digital Dementia]* (2014). Spitzer criticizes digital media and sees the biggest problem in disruption of attention, memory and interpersonal face-to-face communication. We can see similar criticisms of media influence on humans in the works of Bauerlein and Carr. During a several-year period of research Bauerlein (2010, p. 19) discovered that students in the USA are becoming less competent in subjects such as civic education, history and mathematics, which he sees as a direct impact of spending too much time surfing the internet communicating about banal affairs. Carr (2017, p. 161) sees a major problem in multitasking that comes with multimedia and, which weakens our ability to concentrate and think in a broader context. Marcelli (2018, p. 48) even states that these new cognitive habits become embedded in our nervous system, which means they are now quite resistant to change. Based on these comments, Marcelli concludes this sketch by questioning the existence of collective intelligence when he speculates whether it is not a "product of modern mythology. "

In the last sketch called *Medzi mýtickým a vedeckým poznaním [Between Mythical and Scientific Knowledge]* Marcelli (2018, p. 82) raises a question: "Why couldn't we suppose that collective intelligence rising from communication of digital media is a little myth?" Marcelli says this in reference to not only negative effects, but also refers to respected scientific articles that study collective intelligence. One of these articles was written by Dortier, who considers collective intelligence a myth. Marcelli paraphrases Dortier's approach:

> Dortier states dryly that no company, no administration is self-organised: in order to build a plane, build a house, publish a magazine or run a hospital, we need an overall plan and centre to control specialised functions.
>
> (Marcelli, 2018, p. 83)

At first sight it seems that the idea of collective intelligence is obsolete, but Marcelli just wants us to get rid of the initial over-optimism. Indeed, he believes that collective intelligence, or as he says "thinking big" is something we actually need more than ever. He demonstrates this with the Challenger space shuttle disaster back in 1986. Investigation showed that, beside other problems, communications between the engineers and managers failed. Marcelli (2018,

p. 84) informs us that a 2006 issue of *Cerveau & Psycho* journal (which specialises in neuroscience and psychology) mentions this disaster as a "typical example of negligence of the importance of collective intelligence in controlling a big organisation." Collective intelligence is thus, Marcelli (2018, p. 85) notes, back in business, its importance is declared mainly by social psychology, but there is one new idea – it should be purposefully cultivated: "Collective intelligence should be implemented, cultivated and strengthened by introducing a whole set of systematic measures." A team that is well balanced concerning emotions and social affairs is more worthy as a team with high IQ, Marcelli (2018, p. 85) is convinced. He is a little optimistic in the concluding part of this sketch:

> Despite disillusionment caused by previous failures, thinking big still continues in its search for social forms in which small community groups would not break to pieces, but would grow into their integral parts.
>
> (Marcelli, 2018, p. 86)

Marcelli's considerations show that collective intelligence or thinking big is still actual, the more so when it is confronted with numerous and serious failures, for example in dealing with global problems. He also warns that not everything may be left to spontaneous self-organisation as it can lead to a decline. Collective intelligence needs to be trained – for example in *team building* or *team training* activities. Team composition is quite important, as teams should be composed of people who are able and ready to cooperate with each other. Paradoxically, cognitive changes in people may bring a little bit of optimism here.[8] We do argue against Spitzer's scepticism because people, influenced by new media, find it more difficult to concentrate and they also remember less. Today's average students would probably not be able to compete with the average scholars of medieval universities, who excelled in concentration and memorizing, as was visible for example in rhetoric – a respected artistic discipline.[9] On the other hand, students today master associative thinking, fast communication and sharing – these are competences taught by new media and communication in cyberspace, which was not possible for medieval students. With the ability to communicate fast and efficiently comes a new collective dimension that exceeds every individual, whether we speak about organisational aspect, information or knowledge. As for

8 In regard to this, M. McLuhan (2011, p. 58) claimed that with every new form of media, we gain something and lose something at the same time: "Inventions, all of them, are extensions or self-imputations of our physical body. These extensions also require a new mutual approach, or balance between organs and extension of the body."

9 Robert S. Rait (1912, pp. 145–146) points out that the students of medieval universities had to learn the morning speech of their teacher in one day. Thus they were both deepening their knowledge and learning to formulate a sequence of ideas and arguments, which exercised their memory and verbal abilities.

the first case, we can see an example in the recent "tidying of the planet," where the idea is spread on social networks and not controlled centrally.[10] In the case of information and knowledge, we speak about change from passing on information and knowledge to horizontal spreading of information and knowledge in the cyberspace. Rankov (2006, p. 26), building on Lévy notes: "In network, culture is spread only horizontally, simultaneously, spatially and time loses its importance." Cyberspace absorbs tremendous amounts of information, including a wealth of ideas from the history. Everything is instantly ready for use and, if selected and processed correctly, offers an enormous knowledge potential. There are a number of services that offer access to information, for example Google's search engine or scientific information databases such as Web of Science or Scopus. Betti (2008, p. 164), in connection with historical hermeneutics, realised this potential and argues:

> The wealth of ideas, collected by the human race with enormous effort, certainly is a product, but a product of extraordinary importance … something that constitutes a way to gain something higher, something that spreads much further.
>
> (Betti, 2008, p. 164)

We may say that Betti's argument is very true in the case of today's extremely fast and efficient usage of information that is stored in the cyberspace of digital media.

It is necessary to conclude that Marcelli's monograph *Myslenie v sieti [Thinking in the Network]* represents an up-to-date and very interesting insight into collective intelligence. It is a surprising and inspiring work that also introduces a great number of questions about the historical but also modern evolution of mankind. Marcelli's brilliant literary style makes reading and understanding this work a pleasant experience. This is one of many reasons why I recommend this publication for philosophers, for those who specialise in social science and generally for anyone who is interested in this modern phenomenon.

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10 More on this at World Cleanup Day: https://www.worldcleanupday.org/

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