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The anthill model: how digital platform's interpretation of collective intelligence undermines critical thinking and democratic education

Pietro Corazza*

Abstract

The recent developments of digital technologies entail such deep and potentially disruptive socio-political implications that they deserve critical attention from the philosophy of education. The present article intends to face the broad issue of how digital technologies are contributing to transform the processes of knowledge production and circulation in contemporary societies, by analysing how the concept of collective intelligence is being reinterpreted in the sector of digital platforms. In particular, we are going to introduce the notion of "anthill model" to describe a peculiar interpretation of collective intelligence which currently appears to be the most common among digital platforms. The anthill model is based on the claim that algorithmic systems are potentially able to know people better than their friends and family, and even than themselves: such a conception tends to legitimise the tendency to delegate individual and collective decision to the algorithms. But this entails two deeply problematic implications for the philosophy of education, as it undermines both the promotion of critical thinking and the very foundations of democratic education. Indeed, from the point of view of the anthill model, the primary subjects of learning are no longer the human beings, but rather the algorithmic systems that exploit human data to elaborate a 'superior' collective intelligence. Confronting with such a perspective, we will conclude this article by proposing some considerations that revolve around the following question: is it possible to use digital technologies to design a collective intelligence which is not conceived as an anthill, but rather as a dialogic community?

Keywords: *critical pedagogy; media literacy education; platformisation; algorithms; AI.*

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1. Introduction

The recent developments of digital technologies entail socio-political implications which are so deep and potentially disruptive that they could also concern the very foundations of educational theories and practices. The academic discussion about education and technologies has highlighted several dimensions that deserve critical attention, and among which it is possible to identify four interconnected issues that appear to be particularly relevant: the new forms of digital inclusion/exclusion connected to the use of technologies, the prominent role of economic imperatives in shaping educational technologies, the development of machine learning and its impact on the role of human learning, the penetration of digital platforms in educational environments and the ways in which it might transform the notion of public education (Poell & van Dijck, 2018; Selwyn *et al.,* 2020). The present article intends to confront such issues, facing the broad matter of how digital technologies are contributing to transform the processes of knowledge production and circulation in contemporary societies. In order to achieve this, we will focus on the concept of collective intelligence and on its reinterpretation in the sector of digital platforms, in an attempt to show some crucial implications for the philosophy of education entailed by this issue.

The reflection will be structured as follows: firstly, we will outline the significant role played by the digital platforms in the contemporary processes of knowledge production and circulation, explaining why it is worth analysing their functioning.

Secondly, we will consider the concept of collective intelligence and, in particular, we are going to introduce the notion of 'anthill model' to describe a peculiar interpretation of collective intelligence which currently appears to be the most common among digital platforms. This model consists in a system that as a whole exhibits an intelligent behaviour, even though the individual participants contribute to it mainly without being aware of it. The fundamental objective of the anthill model is not the learning or the personal growth of its members, but the continuous improvement of the centralised processes of data collection and analysis, which is closely linked to the so-called Wikinomics, namely the strategies of economic exploitation of collective intelligence.

Thirdly, we will examine digital profiling, a strategy of data collection and analysis that lies at the heart of the anthill model, which is based on the claim that algorithmic systems are potentially able to know people better than their friends and family, and even than themselves. However, such a conception includes a deeply problematic socio-political implication, since it seems to legitimize the tendency to delegate any kind of decision, both individual and collective, to the algorithmic systems.

Fourthly, we will show how the anthill model entails two problematic implications also from the point of view of the philosophy of education: it undermines both the promotion of critical thinking and the very foundations of democratic education. This is due to the fact that, within the ant-

hill model's perspective, the most significant and influential learning which occurs in our societies is no longer the one undertaken by human beings, but rather the one carried out by algorithmic systems, which exploit human data to elaborate a 'superior' collective intelligence.

Finally, we will propose some considerations that revolve around the following question: is it possible to use digital technologies to design a collective intelligence which is different from the anthill model, and which is rather conceived as a dialogic community?

2. The crucial role of digital platforms in the production of knowledge

Nowadays, the development of technologies related to the World Wide Web allows users to have access to an unprecedented abundance of information. This fact undoubtedly creates new opportunities, but it also raises a peculiar problem. Within this context, the main difficulty is not obtaining access to information, but rather being capable of selecting the relevant pieces of information and to connect them in a meaningful framework (Harari, 2016). Edgar Morin has expressed such a concern affirming that "the universal problem for every citizen of the new millennium is how to get access to information about the world, and how to acquire skills to articulate and organize that information" (Morin, 1999: 13). In order to face this problem, it is pivotal to understand how such processes of selection and connection of information occur in a world where digital infrastructure plays a crucial role. Thus, the main questions that emerge are: who conducts these processes? And, what are their main criteria and objectives?

To find an answer to these questions, we can refer to two main theoretical frameworks: the first claims that the Web has inaugurated a process of radical disintermediation, while the second objects that the initial *disintermediation* triggered by this technology has soon been replaced by the establishment of new powerful intermediaries, thus resulting in a *re-intermediation*.

The theory of disintermediation has known a wide popularity in the first decade after the appearance of the Web. According to this theory, the fact that everyone can broadcast contents at very low costs on the web potentially allows to create and to have access to information in a more free and democratic way, bypassing the filter constituted by those institutions that traditionally had a prominent role in the mediation of culture (such as mass media, schools, political parties, religious institutions, etc.) (Rheingold, 1993; Negroponte, 1995; Reynolds, 2006). However, in the last years, several scholars have shown that this hope has been fulfilled only partially: it is true that the old intermediaries have partially lost the centrality they used to have, but this has not implied a complete disappearance of all kind of intermediaries. Instead, the old ones have been replaced, or downsized, by new ones – namely, the digital platforms (Morozov, 2011; Bratton, 2015).

Digital platforms can be defined as a kind of company that bases its business on the acquisition and elaboration of massive amounts of data (Srnicek, 2017). This model is being adopted by a wide range of companies: not only well known hi-tech firms like Google, Facebook and Amazon, but also giants of manufacturing and agricultural industry such as General Electics, Jhon Deere or Monsanto. A significant feature of economic competition over data is that it tends to reward big players rather than small ones, due to the so called 'network effects': companies with many users are able to extract more data from them, and the more data they have, the more they can improve their services, which allows them to attract even more users (Shapiro & Varian, 1999). This mechanism is self-fuelling, and thus digital platforms exhibit an intrinsic tendency toward the assumption of a monopolistic position in the market they occupy, from which they try to act as gatekeepers to cut out the competitors (Srnicek, 2017; Hindman, 2018).

Therefore, in the present scenario, few big digital platforms are playing a central role in the processes of production and circulation of knowledge, and it appears essential to analyse how they use the huge amounts of data they collect to produce knowledge. In particular they do it through algorithmic systems, which are extremely complex entities: indeed, they do not consist simply in a set of instructions through which programmers instruct a machine to execute some pre-defined tasks, they rather are part of large socio-technical systems that rely on the interaction between a multiplicity of actors, such as programmers, managers, financiers, legislators and users (Montfort, 2013; Gillespie *et al.*, 2014; Porter, 2020). Algorithms are indeed part of cybernetic systems that continuously evolve in accord to environmental feedbacks, and their modifications derive, on one hand, from the intentional interventions of humans, and on the other, from the auto-adjustments that the algorithms themselves realise, feeding on the arrival of new data (Kitchin & Dodge, 2011; Kitchin, 2017).

Hence, digital platforms can be described as *hybrid* entities, to use a concept derived from Latour (1993), that means entities that include both human and non-human components, and that involve both technical and socio-political dimensions. For this reason, the processes of data collection and data analysis can never be considered neutral, since they inevitably incorporate human assumptions and biases and are oriented toward specific goals. This issue becomes critical when platforms are used to deal with social issues, since various research projects have shown that they often tend to reproduce and reinforce gender biases, racial biases and socio-economic inequalities (Eubanks, 2017; O'Neil, 2017).

3. How digital platforms interpret collective intelligence? The anthill model

The concept of collective intelligence has recently acquired a significant role in the debate concerning how digital technologies are contributing to

modify the processes of production and circulation of knowledge (Mulgan, 2018). This term is broadly used to express the idea that collaboration within a group can generate, under certain conditions, a kind of intelligence that is superior to those of the singular members of the group, even the most competent or expert ones.

The idea of collective intelligence is clearly not new and is not only connected to digital technologies, but, according to Weinberger, the diffusion of such technologies is promoting a significant transformation in our ways of constructing knowledge. He claims that when the principal mean of expression and circulation of knowledge was the book, the processes of knowledge production were significantly moulded by the book-shape, while today these processes are progressively adapting themselves to the network-shape (Weinberger, 2011). In fact the use of books promotes the development of a linear and unitary reasoning, written by a single author or at most by few co-authors, that is almost unchangeable once published: this results in a fundamentally unidirectional kind of communication, in which the author expresses his thought but cannot listen to readers' reactions (as already noticed by Plato in *Phaedrus,* 275 d-e). On the contrary, the Web allows every research to be expanded in multiple directions through links, and it also allows to create written texts based on multi-directional communication through comments, forums and other interactive tools.

However, a conception of collective intelligence such as Weinberger's still appears quite vague, so that it is possible to interpret it in considerably different ways. In particular, it is important to notice that the concept of network itself is extremely generic, since what matters are the specific characteristics through which a particular network is organised. For this reason, it is interesting to study how the concept of collective intelligence is interpreted and embodied by digital platforms.

To analyse how the concept of collective intelligence is currently interpreted by digital platforms, we are going to introduce a conceptual category that we have decided to name the 'anthill model'. Before analysing such category, it is necessary to clarify how it has to be intended: the anthill model has to be considered as a kind of "ideal type", in the sense meant by Max Weber, namely a concept that does not correspond to any specific existing situation, but which is rather an "ideal limit-concept" to be used as a term of comparison to evaluate real social phenomena (Weber, 1922b). Thus, such a model can be useful to orient oneself in the complex task of studying the digital collective intelligence, whose diffusion is at the same time pervasive and difficult to be identified, and in addition constantly evolving.

We have drawn the metaphor of the anthill from Lévy (1997). He was the first author that introduced the concept of collective intelligence in relation to digital contexts in the 90s, when the World Wide Web was at his earliest stage. Despite being outdated, his reflection contains some ideas that appear still useful to understand the present situation, such as the metaphor of the anthill. He uses this metaphor to represent a particular conception of collective intelligence in which the system as a whole exhib-

its a behaviour that appears to be intelligent, even though the individual participants contribute to it in a 'dull' and mainly unaware way: neither they understand how their particular contribution is connected to the other parts of the system, nor they are aware of the meanings or the objectives of the overall knowledge that the collective intelligence is elaborating.

Lévy used the metaphor of the anthill to warn against the worst possible conception of collective intelligence, considering it a technocratic degeneration that must be avoided. Indeed, he hoped for the creation of a collective intelligence that, while generating an overall knowledge that is superior to the one of every contributor, it also keeps as a fundamental aim the promotion of the personal and intellectual growth of every participant, by allowing them to engage in enriching dialogical exchanges with each other, valuing their uniqueness, and promoting different perspectives. The fundamental objective of the anthill model, on the contrary, is not the learning or the personal development of its members, but the continuous improvement of the centralised processes of data collection and analysis, which contribute to expand a knowledge that remains an exclusive prerogative of those who control the platform.

What is worth noticing is that, in the last two decades, the most successful authors in the Silicon Valley have theorised and praised a conception of collective intelligence that shows the same main features of the model that Lévy warned to avoid, which is the anthill. We can identify as a paradigmatic example of this conception the theory of James Surowiecki (2005), whose book *The wisdom of Crowds* constitutes a point of reference for several of the most popular and influential voices in the US high-tech entrepreneurial milieu, such as Reinghold (2003), Kelly (2009), Anderson (2009), Shirky (2009), Howe (2006). Surowiecki affirms that collective intelligence has to be founded on principles such as diversity of opinions, independence of opinions and decentralisation, but it is significant to analyse what he means by using these three terms. Firstly, to explain the benefits deriving from diversity of opinions, he takes as a model the strategy used by bees to discover new sources of food: they do not have a decision-making centre that plans where to look for food, but they rather have a lot of explorer bees who are sent in many different directions, trusting that at least some of them would eventually be able to find good food sources. What interests Surowiecki is the high efficiency that characterises such a strategy, and the possibility to apply it in the economic field: he, indeed, argues that when technological innovations open possibilities for new markets, the best way to find effective solutions is to allow entrepreneurs and investors to experiment a wide range of different options and "as time passes, the market winnows out the winners and losers" (Surowiecki, 2005: 34). Secondly, Surowiecki's concern for independence is driven by the worry to avoid situations where some individuals in the group commit errors in judgement, and then the other members of the group assume and reinforce these wrong opinions acritically, ending up with a shared belief that is difficult to subvert, even if it is proved to be dramatically wrong. This concept, known as "information

cascade", derives from behavioural economic studies and one of its main applications is the analysis of stock markets, and specifically of financial bubbles (Ibid.: 60). Lastly, Surowiecki's interest in decentralised systems is essentially reduced to their ability to elicit and use the specific knowledge that individuals develop in relation to their local context, a knowledge that centralised systems usually fail to intercept. Surowiecki bases his reflection on the notion of "tacit knowledge" coined by the liberalist economist von Hayek (1945), which refers to a kind of knowledge that cannot be easily summarized or conveyed to others, because it is deeply connected to a particular activity or experience. This tacit knowledge is considered extremely valuable from an economic point of view, on the base of the assumption that "the closer a person is to a problem, the more likely he or she is to have a good solution to it" (Ibid.: 71).

Therefore, it appears clear that when Surowiecki talks about collective intelligence he is not interested in promoting a dialogue between the participants nor in their learning, but he rather has a different objective: allowing the collective intelligence as a whole to select the relevant information and to find the most effective solutions to problems. He even takes to extremes the principle of independence up to suggesting that people should avoid communicating with each other, in order to eschew reciprocal influences: he holds as examples situations like stock exchange offers or gambles, claiming that they should be realised simultaneously and not in sequence, to prevent individuals from being influenced by other's guesses. The only mutual interaction that Surowiecki considers convenient is competition, since it spurs people to find the best solutions.

In brief, the anthill model consists in a particular interpretation of collective intelligence whose main goal is economic efficiency (indeed, most of the examples used to build the theory concern markets, business strategies and gambling) and in which people are considered mainly as sources of knowledge to be extracted and exploited.

Such a conception lies at the heart of the so called "wikinomics" (Tapscott & Williams, 2010), a term used to identify the strategies that digital platforms use to make profits taking advantage of what has been defined "cognitive surplus", which is the value generated by the activity of the countless people that spontaneously decide to contribute to common projects through the Web (Shirky, 2010). The concept of cognitive surplus includes a wide range of activities that differ for tasks' difficulty and forms of retribution.

The first kind of projects are those which require considerable effort and highly qualified skills: the main example is here represented by Free Software and Open Source projects, in which programmers work free of charge on the collective writing of softwares.

The second kind of activities is included in the definition of "crowdsourcing" (Howe, 2006), a strategy that consists in gathering a great number of participants and in asking them to carry out extremely simple and repetitive tasks. Sometimes, this happens on a voluntary basis, with people contributing to

project they care about; for example, Galaxy Zoo requires users to observe and categorise images of galaxies to contribute to the creation of the world's largest database of galaxy shapes[11]; FoldIt, instead, requires to participate in an online game in which players use their spatial sense to correctly fold protein structures (Cooper *et al.*, 2010). In other cases, the participants receive a micro-payment for every accomplished task: Amazon has a branch named Mechanical Turk through which it recruits people to perform tasks such as image identification, detection of copying errors in catalogues or quality evaluation of search engine's results.

The last kind of activities includes all the everyday practices that people realise online without the explicit intent of contributing to any collective intelligence, but that nonetheless do contribute to increase platforms collective knowledge: every 'like' clicked on Facebook and every research typed on Google provide data that their algorithmic system use to improve their functioning (Carr, 2008).

The authors who support the wikinomics approach claim that this represents a 'win win' economics, in which not only the digital platforms gain, but the users too: indeed, such authors argue that, even when users do not receive money, they benefit from the possibility to express themselves by participating in projects they like, to receive gratifications by seeing their talent acknowledged by their peers or to gain in visibility and reputation (Shirky, 2010; Tapscott & Williams, 2010).

However, other scholars have expressed more critical judgments, affirming that wikinomics represents an example of unequal exchange: while digital platforms accumulate huge profits thanks to the users activities, the rewards that they offer in exchange do not appear proportionate at all (Formenti, 2011). The exploitation is particularly evident when it comes to paid activities, since these often consist in underpaid labour, as Howe himself, the author of the term "crowdsourcing", has acknowledged: "The labor isn't always free, but it costs a lot less than paying traditional employees. It's not outsourcing; it's crowdsourcing" (Howe, 2006).

4. Digital profiling: do the algorithms know you better than yourself?

There is a phenomenon that lies at the heart of the anthill model and deserves to be analysed, since it entails deeply problematic implications, both from a socio-political and an educational perspective. In particular, we are referring to digital profiling, that is a peculiar approach to data collection and analysis which consists in harvesting as much data as possible about every single user, by collecting information from different sources in order to aggregate them and create a personal profile as detailed as possible (Pariser, 2011). Currently, this technique is mainly used to create

1 For more information, www.zooniverse.org/projects/zookeeper/galaxy-zoo/.

targeted advertising or to offer customised products and services, in the attempt to meet the user's preferences: Amazon offers suggestions about the next object to buy, YouTube about the next video, Facebook about the next possible friend to add or content to view, and so on. Anyway, it is not possible to know with certainty to what domains this technique will be extended: that is why it is worth trying to understand the logic underlying digital profiling, beyond the currently existing applications.

It must be acknowledged that the digital profiling techniques meet an actual need: as already mentioned, in front of an abundance of contents and sites available online, it is necessary to use some kind of filters to operate a selection. But what is significant is how the profiling techniques meet this need: they do it by promising to offer the users exactly what they need, and to satisfy their specific desires. However, it is precisely this idea that raises some deeply problematic issues, concerning the way in which human beings are conceived in a collective intelligence structured on the anthill model.

Historically, the profiling techniques derive from two main sources. The first ones are the bureaucratic apparatuses of surveillance and categorisation of citizens that modern Nation States have initially developed for criminal profiling (Foucault, 1975), and then, more generally to gather the information about citizens necessary to run the complex bureaucratic-organisational systems on which modern societies are based (Giddens, 1991). The second ones are the strategies of data analysis and behavioural manipulation developed by private companies, for reasons related to both management (how to make workers more productive) and marketing (how to persuade people to buy), especially from the middle nineteenth century onwards (Davies, 2016). If the idea of state surveillance sounds familiar, the corporate surveillance has been less investigated until recent years – however, nowadays appears clear that large-scale surveillance practices are no longer an exclusive prerogative of states, since during the twentieth century they have been progressively adopted also by private companies. Digital platforms represent an intensification of such a tendency, to the point that Shoshanna Zuboff has introduced the expression "surveillance capitalism" to describe our current socio-economical system (Zuboff, 2019).

In order to understand how digital platforms conceive human beings, it is useful to analyse which conceptual categories they use to represent them: in particular, some of the basic features of digital profiling approach appear to derive from utilitarianism and behaviourism. These two philosophical paradigms are different from each other in many respects, but they do share a common premise, namely the tendency to represent human beings through a set of measurable parameters. Currently, in the context of digital platforms, these parameters are constituted mainly by biological data and by those aspects of human behaviour that can be numerically quantified. Indeed, it is possible to argue that the recent techniques of digital profiling actually extend the range of application of such utilitarian and behaviouristic approaches to an unprecedented scale: if in the past an

empirical monitoring of human physiology and behaviour was possible only within delimited place explicitly built for this purpose (such as laboratories, hospitals, prisons or workplaces), today digital devices allow to extend such monitoring practices to the whole society, including an ever increasing portion of everyday activities (Davies, 2016).

This approach is strongly linked to an assumption that lies at the base of both utilitarianism and behaviourism, which consists in an essential distrust of language as a medium of self-representation: the idea is that people are not reliable when they describe themselves, their needs or their inner states, while instead expert systems or, in our case, algorithmic systems, are able to understand people better than themselves (Atkinson, 1969; Mills, 1998). Such a claim has been explicitly expressed by one of the most influential persons in the recent history of digital profiling techniques: the psychometrics researcher Micheal Kosinski. Indeed, in a paper realised in collaboration with Facebook data scientists, Kosinski claimed that their algorithms, simply using 300 'likes' posted by a user on Facebook, were able to predict his or her personality traits and some kind of behaviours with an accuracy that was higher than the one shown by friends, family members and even partners of the person itself (Youyou *et al.*, 2015).

This approach is supported by a particular kind of biological reductionism, which considers human beings essentially as organic algorithmic systems. Kosinski, indeed, claims that a person's thoughts and behaviour "are fully biological, because they originate in the biological computer that you have in your head" (Lewis, 2018). This is not only Kosinski's opinion, but rather, as shown by Harari (2016), it represents a rather shared assumption on which the functioning of digital platforms is based, even if it is not always made explicit. For example, it is possible to find it also in the statement of another prominent figures of the hi-tech world, Google's co-founder Larry Page:

> My theory is that if you look at your programming, your DNA, it's about 600 megabytes compressed, so it's smaller than any modern operating system, smaller than Linux or Windows or anything like that, your whole operating system, that includes booting up your brain, by definition. So your program algorithms probably aren't that complicated, it's probably more about the overall computation (Williams, 2007).

According to this perspective, to understand human being it would be sufficient to analyse the biologic algorithmic systems that drive their behaviour. If taken to the extreme consequences, such a conception would result in a completely deterministic vision, where there no space left for human self-determination: that's Kosinski point of view, that plainly affirmed "I don't believe in free will" (Lewis, 2018).

Of course such claims are easily exposed to criticism: it is not hard to show that they are based on a reductive conceptions of human beings. Indeed, one of the main limits of such conception lies on a structural

"explanatory gap" that characterises cognitive sciences (Levine, 1983), namely its incapability of understanding and explaining the subjective dimension of mental states, which nonetheless plays a non-negligible role in human experience. The possibility of understanding "what it is like" to experience a particular mental state (Nagel, 1974) remains essentially out of reach for any scientific discipline, since sciences describe phenomena on a third-person perspective, while subjective qualities can only be experienced firsthand.

In the case of Kosinski's research, the very authors of the study have acknowledged the limits of the psychological model on which their work is based, which is the Big Five model: a taxonomic theory that classifies personalities according to five traits (extraversion, agreeableness, conscientiousness, neuroticism, openness to experience) (Digman, 1990). Indeed, they recognise that

> human perceptions have the advantage of being flexible and able to capture many subconscious cues unavailable to machines. Because the Big Five personality traits only represent some aspects of human personality, human judgments might still be better at describing other traits that require subtle cognition or that are less evident in digital behavior (Youyou *et al.*, 2015: 1040).

However, it is crucial to bring attention to the fact that, despite these theories being anything but unassailable from a theoretical point of view, what matters the most is that they do not remain confined to academic discussions, instead they operate as basis of concrete widespread technologies. And this happens because the digital platforms, in order to meet their practical objectives, do not need to deal with great philosophical questions concerning human subjectivity, since it is enough to have techniques that prove to be sufficiently effective in evaluating human personality in an automatised, cheap and large-scalable way.

Indeed, as already mentioned, digital profiling is already active in more and more domains of our daily lives. More importantly, in some cases it is not just about Spotify suggesting a song that matches our tastes, but it can also be part of personalised political marketing campaigns, such as those carried out by companies like Cambridge Analytica, that contributed to the electoral campaigns of Donald Trump and Brexit in 2016, and whose functioning is based on the very techniques developed by Kosinski (Grassegger & Krogerus, 2018; Levy, 2020).

Moreover, it has to be noticed that the techniques through which digital profiling can be realised are much more various than the simple monitoring of Facebook 'likes' or other similar digital behaviours, since they are extending to more and more sectors: sentiment analysis used to identify and classify emotion contained in written texts, facial recognition algorithms aimed at recognizing people's emotions (Matlack, 2013) or even personal characteristics (Wang & Kosinski, 2018), wea-

rables devices that monitor physiological parameters (Dormehl, 2015) and genetic tests[2].

This approach to the use of data entails some deeply problematic socio-political implications. In fact, the idea that algorithmic systems are able to know people better than their friends and family, and even than themselves, is almost inevitably matched with the corollary that these systems are qualified, and somehow legitimized, to counsel or guide people towards the directions that the algorithms judge to be adequate for them. The acceptance of such a conception could indeed make the idea to rely on algorithmic systems to take both individual and collective decisions sound reasonable (Harari, 2016). This is exactly what researchers like Kosinski wish for:

> in the future, people might abandon their own psychological judgments and rely on computers when making important life decisions, such as choosing activities, career paths, or even romantic partners. It is possible that such data-driven decisions will improve people's lives (Youyou *et al.*, 2015: 1040).

5. Educational implications: the anthill model undermines critical thinking and democratic education

If we analyse the anthill conception of collective intelligence from the point of view of the philosophy of education, we can identify two main problematic implications: it undermines the promotion of critical thinking and the very foundations of democratic education.

In order to clarify such implications, it is best to observe firstly in which concrete technologies it is currently possible to identify some traits of the anthill approach. The research field that is embedding mainly some of the anthill model principles is Learning Analytics, a sector consisting in "the measurement, collection, analysis and reporting of data about learners and their contexts, for purposes of understanding and optimising learning and the environments in which it occurs" (*Call for Papers of the 1st International Conference on Learning Analytics & Knowledge*, 2011). Currently, one of the main areas of application of Learning Analytics is the creation of software that aim to offer personalized learning courses to students, promising to provide the methods and the contents more adapt to everyone (*Adaptive Learning*) (Webley, 2013): some of the most prominent platforms in this sector are Khan Academy, Knewton, Class Dojo, Coursera and AltSchool (Williamson, 2017; Poell & van Dijck, 2018; Perrotta & Selwyn, 2020).

Learning Analytics is fundamentally based on the assumption that students can be fully understood by algorithmic systems (Perrotta & William-

2 For more information, www.23andme.com.

son, 2018). On this basis, Adaptive Learning programs essentially offer to teachers and parents the possibility to delegate to a software "all the hard work" of education, meaning the complex activity of understanding each student's peculiarities and individuating the learning strategies most suitable for everyone (Berger, 2013). This idea comes directly from Skinner, who proposed to introduce learning machines to face the issue of classroom's overcrowding, since this prevents teachers from dedicating a sufficient amount of attention to every pupil (Skinner, 1958).

However, the algorithmic systems used in Learning Analytics, as any other, are neither neutral nor objective, but they rather incorporate a series of assumptions and biases. Firstly, educational platforms as Khan Academy, Knewton, Class Dojo, Coursera and AltSchool exhibit a tendency towards "learnification", namely a pedagogical perspective that "focuses on learning rather than education, and on processes rather than on teachers and students": the attention is thus all dedicated to the short-term process of learning, and its real-time monitoring, rather than to the long-term objective of providing an education, which involves the promotion of cognitive, social and emotional dimensions of human development (Poell & van Dijck, 2018: 583-584). Secondly, the personalised courses offered by such platforms do include some elements deriving from Skinner's educational conception. Indeed, not only their functioning is based on behavioural chaining and operant conditioning, but, more significantly, they exhibit a conception of learning meant as an essentially individualistic and non dialogic process: students learn essentially alone, with the help of learning machines and under the supervision of a teacher, while exchange and dialogue with others are neglected (Selwyn, 2011). Some scholars have even noticed that Cass Dojo operates as a behavioural surveillance tool, based on a logic of rewards and punishments, that tends to promote competition rather that collaboration among students (Williamson, 2017; Manolev *et al.*, 2019).

The issues related to Learning Analytics appear to be even more significant, and problematic, when it comes to the use of biometric tools used to collect the so-called 'socio-emotional' data about students and to orient their behaviour. One example is represented by Empatica, a wearable bracelet that, through skin sensors, monitors the emotional reactions of students during lessons and is also able to send feedbacks: for example, if the bracelet judges that levels of stress or anxiety are too high, it vibrates to suggest the pupil to move to another task[3]. Another example is Affectiva, a face-recognition software that claims to be capable of identifying the emotions connected to facial expressions, whose possibilities of application could be hugely extended by the diffusion of distance learning (McDuff *et al.*, 2016). Also in this case, such algorithmic systems rely on questionable theoretical models: indeed Empatica e Affectiva are based on the emotion classification scale PANAS (Positive and Negative Affect

3 For more information, www.empatica.com.

Scale) and on the taxonomy FACS (Facial Action Coding Systems), deriving from a psychological research approach pioneered by Paul Ekman (Ekman, 2016), which has repeatedly been criticized for being too universalistic and neglecting cultural differences in the expression of emotions (Mead, 1975; Plamper, 2015).

All in all, it is crucial to underline that the aim of such educational technologies is not only to support students and teachers, but also to collect data about them. And, since data are becoming one of the most precious resources in contemporary data economies,

> it can be argued that the 'end users' of learning analytics are not students or teachers per se. Instead, these products work primarily in the interests of school leaders and administrators, software vendors, and a range of other third parties who stand to benefit from claims to know how learning takes place (Selwyn, 2019: 14).

This concern is linked to what has been already identified as a main problematic element of the anthill conception: namely, the claim that can exist algorithmic system capable of knowing the students better than their teachers, and than themselves. The relevance of this conception goes beyond its currently existing applications, since the technological innovation pace is so fast that urges us to consider also what could be the long-term tendencies if the anthill model were to spread. In fact, some observers are worried that the diffusion of such an approach would arise the question of the possible replacement of teachers with machines (Murphy Paul, 2012).

In response to such a worry, it is possible to propose two observations. On one hand, it is important to remind that the prophecies of an imminent replacement of teachers in flesh and blood are still distant from reality: nowadays algorithmic systems are quite far from being able to replace teachers in a satisfactory way, and moreover such a proposal would probably raise strong resistances from teachers, school administrators, students and families (Selwyn, 2011). On the other hand, it is true that algorithmic systems created to perform some tasks that traditionally were a prerogative of teachers already exist, as the aforementioned examples show; therefore, it is not possible to exclude the chance that, at some point, machines will be considered capable of replace teachers entirely. Indeed, it is worth emphasizing that the crucial issue is not simply what algorithmic systems are capable of doing per se, but how they are considered: as suggested by the Turing test, the most significant question to be posed is not whether machines are capable of thinking – or, in our case, of educating – but rather if humans believe or not that they have this capacity (Turing, 1937).

In any case, taking into account the effects of automation on the role of teachers implies considering only a part of the problem, since the issue appears to be even bigger: what could be at stake is not only the replacement of teachers, but even that of the students themselves. By saying this, we mean that the claim that the collective intelligence elaborated by digital

platforms would be superior to the one generated by human beings forces us to reconsider the concept of learning itself. In fact, it leads us to raise some crucial questions for the philosophy of education, which are:

> Where is the most significant and influential learning happening in our societies, and what kind of systems are undertaking learning? How is 'our' learning (as citizens, students, workers) intermingled with the ways that machines learn? Who is ultimately benefiting from the outcomes? (Selwyn *et al.*, 2020: 3).

If we have to reply to these questions adopting the perspective of the anthill model, the answer is clear: the main subjects of learning are the algorithmic systems, not the people from which data are extracted. Within this perspective, indeed, the education of individuals is not oriented to the promotion of the development of critical and autonomous thinking (Siegel, 1990; Freire, 1997), because they are, on the contrary, encouraged to delegate more and more decisions to the algorithmic systems, since these systems are considered capable of elaborating a knowledge that is 'superior' to that generated by human beings. Instead, an education completely coherent with the anthill model would be merely aimed at providing people with the skills that make them useful in the eyes of the algorithmic system.

But, within a model that evaluates people only in so far as they are useful to the system, what is going to happen when they are no longer deemed useful? In fact, it is essential to consider the anthill model in light of another socio-economic trend: the automation of labour, which nowadays involves not only manual labour, but also cognitive labour at an increasing pace (Brynjolfsson & McAfee, 2016). Within this perspective, when the usefulness of people decreases due to automation, the motivation to provide people with good quality education decreases as well: indeed, it does not appear necessary to teach people to accomplish complex cognitive tasks, if it is believed that such tasks can be carried out more efficiently by algorithmic systems.

So, does the scenario sketched depict a society led by artificial intelligence, where human contribution is scarcely relevant? Not exactly, because the risk of being replaced by machines does not concern all human beings. In fact, digital platforms, in order to function, do need the contribution of an elite of individuals that manage them. Therefore, according to the anthill conception, the most consequential approach regarding education would consist in providing a high quality education only to the minority of people who is entrusted with the management of digital platforms, while reducing substantially the investments destined to the majority of population, whose education does not appear to be indispensable anymore. This perspective would therefore result in a dramatic undermining of the democratic education foundations: the horizon is no more that of a school for everybody, aimed at educating individuals capable of engaging in rational discussions and actively participating in democratic life (Dewey, 1916), but rather that of educational agencies reserved to narrow elites that hold the exclusive control of digital platforms.

The pursuit of such a vision would obviously outline a scenario of extreme widening of inequalities, in which a minority of individuals could take advantage of holding the control of technological innovations to strengthen their privileges, while the majority of human beings would be relegated in a subaltern condition (Harari, 2016).

These considerations do raise some crucial and urgent questions, such as: is this scenario an inevitable doom, or is it still possible to act trying to promote transformations towards a different direction? And which side will educational institutions decide to take? Will they fight to reduce inequalities, or will they indulge and support the anthill logic?

6. Concluding reflections: is it possible to image a different collective intelligence?

It has been shown that the particular interpretation of collective intelligence that currently appears to be the most common among digital platforms, namely the anthill model, entails some deeply problematical implications, both on a socio-political level and from the perspective of the philosophy of education. Indeed, the claim that algorithmic systems are potentially able to know people better than their friends and family, and even than themselves, tends to legitimize the tendency to delegate any kind of decision, both individual and collective, to the algorithmic systems. From a pedagogical point of view, such a conception undermines the promotion of critical thinking and the very foundations of democratic education, since it implies that the most significant and influential learning happening in our societies is no longer the one undertaken by human beings, but rather the one carried out by algorithmic systems, that exploit human data to elaborate a 'superior' collective intelligence.

Nonetheless, the concept of collective intelligence appears to be promising, not only because current technologies are actually absorbing it, but also, more deeply, because it appears to be founded on a meaningful philosophical insight: Heidegger expressed it by saying that we are always "thrown into a world" and that such a world is essentially a web of interrelated meanings (Heidegger, 1927). Wittgenstein formulated a similar idea when affirmed that when we begin to believe something, we never believe in a single proposition, but always in "a whole system of propositions" (Wittgenstein, 1969: 145). Briefly, this means that thinking is not the solitary activity of a subject that reflects alone in his room trying to detach himself from the surrounding world, as imagined by the modern philosophical tradition after Descartes (1637), but rather the activity of an individual who is always situated in a web, in a collective intelligence of some sort.

The problem is that webs, as well as collective intelligences, can be structured in many different ways, and, since the anthill model appears to be a questionable way to organize collective intelligence, a question

emerges: is it is possible to use digital technologies to design collective intelligences in a different way?

The reflection of Pierre Lévy might offer some interesting suggestions to move towards an answer. Basing on the premise that "no one knows everything, everyone knows something, all knowledge resides in humanity", he considers every person primarily as "someone who has knowledge" (Lévy, 1997: 12-14). Indeed, in opposition to the idea that knowledge is something only held by 'experts', Lévy affirms that every human being holds a particular knowledge, because every life is constituted by unique experiences that contribute to shape an original point of view on the world. Hence, he stresses the importance of valorising and mobilising the intelligence existing in every person, claiming that a considerable amount of wealthy knowledge is too often ignored, underestimated or humiliated because many mechanisms in our systems of construction and transmission of knowledge penalise and mortify people evaluating them on the basis of what they do not know, instead of taking into consideration what they actually know.

For this reason, Lévy outlines a collective intelligence conceived as a dialogic community, where the priority resides in the growth of both individuals and the groups in which they gather; a community whose goal is not only to produce good knowledge, but also to allow people to express themselves, to listen to others, to experience dialogue and learn from it. Unfortunately though, he does not offer many useful indications neither about how to structure such a collective intelligence, nor about how to avoid that all this knowledge held by people is finally exploited by digital platforms to serve interests that are not determined by the people themselves.

Indeed, whoever is interested in creating a collective intelligence different from the anthill, must take into consideration some long-term tendencies that seem to push precisely in the direction of the anthill model: these are the tendencies to the bureaucratisation of society (Weber, 1922a) and to the correlated specialisation of knowledge (Weber, 1917), which, according to Weber's analysis, are structural characteristics of modern societies. Weber acknowledges that bureaucratization, on one hand offers undeniable advantages in terms of efficiency, while, on the other, it involves inevitably a component of oppression, since the subordination of individuals to the mechanisms of a bureaucratic system tends to force them in what he defines an "iron cage" (Weber, 1905). The anthill model appears to be an extension and an intensification of such tendencies.

Historically, the thinkers that have faced the issue of bureaucratisation have split into two main schools of thought. On one side, there are those, such as Weber himself, who affirm that the tendency towards the bureaucratization of society and the specialisation of knowledge are unavoidable, and moreover that some oppression is unavoidable for those who aim to deal with political matters. Hence, within this perspective, it is not considered possible to modify the basic functioning of digital platforms; at most, it is only possible to try to control and direct them in accordance with one's own values.

One the other side, instead, there are those scholars who think that, since all technologies that are too big and powerful – such as digital platforms – inevitably generate oppressive effects, no matter the good intentions of those who handle them, they should be refused. Instead, this approach proposes to create "tools for conviviality", as Ivan Illich called them, namely technologies that must be always proportionate to communities on a human scale, therefore of limited dimensions, in order to remain always comprehensible and re-designable by those who use them (Illich, 1973).

The two conceptions just described represent the poles of a very ancient debate of political philosophy, to which it is not possible to give a conclusive answer. Instead, it is rather desirable that such a debate remains open, that it is extended as much as possible, and that these issues do obtain a central place also in educational debates.

However, one further thought can be proposed in this regard: even if today the logic of the anthill seems to be pervasive and difficult to subvert at systemic level, it should not be absolutised. We should not absolutise the "algorthmic drama", namely the narrative according to which the functioning of algorithmic systems is too complicated to be understood, and the power of digital platforms is too strong to be opposed (Ziewitz, 2016). On the contrary, we should reaffirm that algorithmic systems can be analysed and deconstructed, even if this is a hard task, due to both the complexity of the systems themselves and the secrecy under which digital platforms owners keep them (Kitchin, 2017).

The educational contexts can represent a particularly fertile domain in which it is possible to to practise a critical analysis of technologies that is rooted in students' experiences of technologies (Buckingham, 2003; Jenkins, 2009) and that valorises the self-practices autonomously developed by them (Aagaard, 2021). Furthermore, there are several educational approaches that are very close to the concept of collective intelligence, and that could be fruitfully rediscovered to rethink this idea in relation to digital technologies. A paradigmatic example in this sense is represented by the pedagogy of the oppressed by Paulo Freire, which is essentially oriented to valorise students as bearers of knowledge and political instances, and to activate their reflection and action through the practice of dialogue (Freire, 1968). Moreover there are innumerable educational communities that have experimented practices of collective reflection and writing: to name but one, the book "Lettera a una professoressa" (Milani, 1967), a milestone of Italian critical pedagogy, which offers a brilliant example of collective intelligence, since it was written by eight students attending the Barbiana school, with the support of Lorenzo Milani. A complex, yet crucial challenge for contemporary pedagogy is therefore to find ways to actualise the insights and practices of such pedagogical references in relation to the profound technological and social changes that characterise contemporary societies.

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