

TikTok and ethics – when the user is not in control. Raising stakeholder awareness based on scientific evidence

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Introduction

TikTok was the most downloaded app in 2020, 2021, 2022 (Koetsier 2020, 2021; Anon. Statista 2022) as well as in 2023 (Nelson 2023). It started as dance and lipsync video-platform but by now features short-form videos on every topic imaginable (Petrillo 2021).

Musical.ly was founded in September 2016 by Zhang Yiming. Beijing Bytedance Technology acquired the application in November 2017 and renamed it to TikTok. In a short time period, this application became immensely successful (Xiong et al. 2019). The app is generally considered best for creating and sharing short creative video clips (Vijay 2023). In 2022, TikTok users worldwide spent an impressive average of approximately 23.3 hours per month on the platform (Anon. Statista 2022). Also in 2022 the average user spent 95 minutes per day on TikTok (Larson 2023).

TikTok was developed for and is almost exclusively consumed on mobile devices predominantly on smartphones. In the USA 96% of young adults (18-29), 31% of 8 year olds, 71% 12 year olds, and 91% 14 year olds own a smartphone. Teens aged 13-18 spend on average 8.4 hours a day on entertainment screen use, while 8–12-year-olds spend an average of 5.3 hours (Anon. Common Sense Media 2021). Concerning Hungary, according to a survey conducted by KSH in 2020 (Anon. KSH 2020), the age group of 16-24 spends an average of over 5 hours per day on the internet. Only 2.5% of them spend less than one hour daily, while 15.2% spend 7 hours or more, and 7.3% spend more than nine hours online. Data from KSH also reveals that the participation rate in social media among Hungarian internet users is remarkably high at 87%, which is 22 percentage points higher than the EU average and 35 percentage points higher than the global average based on 2020 comparisons (Anon. Webshark 2022). Smartphones and social media have penetrated all spheres of society. We are right in the middle what Klaus Schwab termed the Fourth Industrial Revolution. The founder and chairman of the World Economic Forum wrote the following in his famous essay (Schwab 2015): '[...] the breadth and depth of these changes herald the transformation of entire systems of production, management, and governance. It threatens to change not only what we do but also who we are. [...] I am a great enthusiast and early adopter of technology, but sometimes I wonder whether the inexorable integration of technology in our lives could diminish some of our quintessential human capacities, such as compassion and cooperation.' Even the advocate of the 'Great Reset' has concerns about the integration of new technology into our lives. As far as scientific evidence goes, he has every reason to do so.

1. The scope: a veritable epidemic

The US Surgeon General, Vivek Murthy in June 2023 issued an Advisory on Social Media and Youth Mental Health. In it the Surgeon General assesses what science has so far revealed of the beneficial as well as the detrimental effects of social media use. Here we only list some of the negative impacts that according to the Surgeon General give reasons for concern. Adolescents who spent more than 3 hours per day on social media faced double the risk of experiencing poor mental health outcomes including symptoms of depression and anxiety (Murthy 2023). The

introduction of new social media platforms may have contributed to more than 300,000 new cases of depression in the U.S. college population (Murthy 2023). There is a higher relative concern of harm in adolescent girls and those already experiencing poor mental health, as well as for particular health outcomes like cyberbullying-related depression, body image and disordered eating behaviours, and poor sleep quality linked to social media use (Murthy 2023). Greater social media use predicted poor sleep, online harassment, poor body image, low self-esteem, and higher depressive symptom scores with a larger association for girls than boys (Murthy 2023). The Advisory further cites several scientific papers on the impact of social media which may also perpetuate body dissatisfaction, disordered eating behaviours, social comparison, and low self-esteem, especially among adolescent girls (Murthy 2023). One of the studies the Advisory quotes investigated the impact of social media on adolescent girls' body image, where nearly half (46%) of adolescents aged 13–17 said social media makes them feel worse, 40% said it makes them feel neither better nor worse, and only 14% said it makes them feel better.

The Advisory also focuses on problematic social media use (PSU), and asserts that nearly a third (31%) of social media use may be attributable to self-control challenges magnified by habit formation (Murthy 2023). Researchers suggest that the overstimulation of the brains reward centre can trigger pathways that are comparable to addiction. The Advisory lists a number of platform features that are designed to maximize user engagement, such as push notifications, autoplay, infinite scroll, quantifying and displaying popularity (i.e., 'likes'), and algorithms that leverage user data to serve content recommendations. The Advisory quotes a systematic review of 42 studies on the effects of excessive social media use which found a consistent relationship between social media use and poor sleep quality, reduced sleep duration, sleep difficulties, and depression among youth (Murthy 2023). Further studies linked problematic social media use to attention problems, and feelings of exclusion among adolescents (Murthy 2023). The US Surgeon General argues his case very well and yet he seems to be hesitant to draw a conclusion: 'Nearly every teenager in America uses social media, and yet we do not have enough evidence to conclude that it is sufficiently safe for them. Our children have become unknowing participants in a decades-long experiment. ... Our children and adolescents don't have the luxury of waiting years until we know the full extent of social media's impact. Their childhoods and development are happening now' (Murthy 2023). It must be highlighted that this document is an advisory which is not binding in any way. The Surgeon General adds: 'There is broad concern among the scientific community that a lack of access to data and lack of transparency from technology companies have been barriers to understanding the full scope and scale of the impact of social media on mental health and well-being. Most prior research to date has been correlational' (Murthy 2023).

One month before the US Surgeon General issued his Advisory in May 2023 results were released of the Global Mind Project, titled Age of First Smartphone/Tablet and Mental Wellbeing Outcomes. This project uses global data from 27,969 18–24-year-olds from 5 continents and 65 countries obtained between January and April 2023. Here is a direct quote from the Introduction of the report: 'Data from the Global Mind Project (formally known as the Mental Health Million Project) has consistently demonstrated that, across the Internet-enabled world, overall mental wellbeing is systematically lower for each younger generation (Anon. Sapien Labs 2023). This trend is visible across 65 countries spanning all continents and has been exacerbated by the COVID-19 pandemic. [...] What has changed to cause this global decline? Corresponding to this time period is the advent of the smartphone and the growing ubiquity of the Internet and social media' (Anon. Sapien Labs 2023: 3).

The document lists very similar problems to the US Surgeon General's Advisory, we do not intend to repeat them here except for one striking observation: 'On average, females who acquired their first smartphone below age 10 had MHQ (Mental Health Quotient) scores in a clinically distressed range' (Anon. Sapien Labs 2023). There is consistency in the results across 5 continents and 65 countries. The results suggest cumulative effects of smartphones obtained in

childhood on mental wellbeing, which are distinct from typical symptoms of depression or anxiety (Anon. Sapien Labs 2023: 12). However, the researchers conclude that ‘We acknowledge that these results reflect population trends and correlations that do not provide definitive proof of causation. [...] We may well wait for such insight only to the detriment of future generations. We may well wait for such insight only to the detriment of future generations’ (Anon. Sapien Labs 2023: 12).

One recent model suggests that nearly a third (31%) of social media use may be linked to self-control challenges, which are exacerbated by habit formation (Allcott et al. 2022). Additionally, as we have already discussed it earlier, some researchers argue that exposure to social media can overstimulate the brain's reward center, and when this stimulation becomes excessive, it may activate pathways similar to those involved in addiction (Kuss et al. 2011). A number of studies have shown that people with frequent and problematic social media use can experience changes in brain structure similar to changes seen in individuals with substance use or gambling addictions (Andreassen 2015). Excessive and problematic social media use, such as compulsive or uncontrollable use, has been linked to sleep problems, attention problems, and feelings of exclusion among adolescents. In the US a representative survey of girls aged 11–15, one-third or more say they feel ‘addicted’ to a social media platform (Nesi et al. 2023). Over half of teenagers report that it would be hard to give up social media (Vogels et al. 2022). Nearly 3 in 4 teenagers believe that technology companies manipulate users to spend more time on their devices (Kuss et al. 2011).

The evidence is clear, scientists understand and are vocal about the dangers these new technologies bring on to future generations but all this insight can not be turned into policy because ‘science is not definitive’ and ‘causation is not verified’. As the researchers of the Global Mind Project state, my never be verified due to the ever-changing complexity of the system and ethical reason. This is the unprecedented radical scepticism (Polányi 1966) of positive science.

This then provides the context for the investigation described below. The research question that frames this investigation is as follows.

Is there a scientific approach that can reveal the true impact of social media, here TikTok, on society so that stakeholders can take action?

2. Research method

To answer this question, first we wanted to understand how scientific literature conceptualises what TikTok is. Therefore we decided to do a systematic literature review to investigate what metaphores the literature uses to refer to social media and TikTok in particular.

Metaphor is a cognitive approach, in which one object is used as a metaphorical body to explain another thing as a noumenon. According to Lakoff (1992: 1), the locus of metaphor is not in language at all, but in the way we conceptualize one mental domain in terms of another. Discovering, being aware of, and comprehending the identity of two objects is also a psychological process (Miao 2023: 85).

Systematic literature review (SLR) is the process of analyzing, evaluating, and synthesizing journal articles and scientific works filtered and selected according to specific criteria to answer a research question (Smith 2018). SLR is a detailed search for relevant studies on a particular topic that are evaluated and synthesized using a predetermined and explicit method. By reviewing the literature, the topic can be summarized, research questions can be formulated, and unknown areas that need further exploration can be identified (Rowley–Slack 2004; Webster–Watson 2002). A comprehensive systematic review is a literature review that defines the publication time frame of the articles in a specific database or databases (Reynen et al. 2018).

We searched Science Direct for the keywords ‘TikTok AND metaphor’ and found 51 relevant articles from the past three years. We also conducted a Google search for the same words and found two relevant articles.

3. Review of findings

Yuying (2022) used six reports on TikTok in *The Economist* and analysed it using critical metaphor theory (Li 2016). Yuying (2022) found that *The Economist* utilised six source domains to describe TikTok (the target domain), these are: human metaphors, journey metaphors, construction metaphors, conflict metaphors, food metaphors and light metaphors. Feng (2021: 5–6) approaches TikTok metaphors from three different perspectives: from the empirical school of communication, from the critical school of communication (Rogers 2017) and from the media school of communication. The research establishes TikTok as the source domain for the shift from text to short video; the shift from Western dominance of communication to a global communication order and as a rationality tool that fits current media demands.

Although these studies gave useful insight, our investigation wanted to establish TikTok not as the source domain but as the target domain and uncover the metaphors researchers use as the source domain to conceptualise TikTok. We found the significant metaphors that scientific researchers use (usually unconsciously) to grasp TikTok. One is the ‘platform’ metaphor (Unay-Gailhard et al. 2023) the other is the ‘tool’ metaphor (Birello and Pujolà 2023). According to Merriam-Webster’s Thesaurus a ‘tool’ is ‘a handheld device that aids in accomplishing a task’ (Anon. Merriam-Webster 2023), and a ‘platform’ is ‘a flat horizontal surface that is usually higher than the adjoining area’. Although observations about one social media cannot directly be transferred to another due significant differences is design, algorithm, functionality, etc. the ‘tool’ and ‘platform’ metaphors are probably used not only for TikTok but for other social media outlets.

‘Platform’ means that TikTok is conceptualised as place where *people are*. We often conceptualise the Internet as a place where someone can be ‘on’. ‘I am online’, ‘I am on the Internet’ are perfectly understandable sentences although there is no such actual place as the Internet. Pope Francis for example said that ‘The next continent we need to baptize is the Internet.’ Here the Pope takes the ‘place metaphor’ even further and suggests, that the Internet (target domain) is a geographical entity (source domain), a continent, and such entities are inhabited by people. In marketing communication it is an often repeated wisdom that the advertiser needs to go where his consumers are, meaning to utilise a platform such as TikTok, that the consumers utilise, although in reality there is nobody there.

Besides the ‘platform’ metaphor, TikTok is most often conceptualised as a tool that we use for different purposes. The most popular scientific theory to approach new media is the ‘uses and gratification’ theory which conceptualises TikTok as a tool that is used to gratify certain needs (Montag et al. 2021). According to the ‘tool’ metaphor TikTok is a tool like the hammer albeit a far more complex one. As we use the hammer for certain purposes so we use TikTok for certain purposes which presupposes will and agency from the users. Exploiting further the hammer comparison, a hammer is used to drive nails into objects. When doing so people sometimes hit their own fingers. We can investigate this malfunction and find a correlation with certain state of minds, personality traits, weather conditions and many other dispositional factors to explain it. For example, the amount of alcohol consumed correlates with the frequency of hitting the finger. The ‘tool’ metaphor implies that there is proper use and improper use of the tool and it is the improper use that causes harm. This why in an essay in the *Wall Street Journal*, former Amazon executive and metaverse promoter Matthew Ball could claim that since it is conceptualised as a tool ‘as with almost all technologies, it is neither moral nor immoral’ (Ball 2022).

4. Discussion and proposition

We believe that neither the ‘platform’ nor the ‘tool’ metaphor’ give sufficient insight into what TikTok really is. Here we suggest the use of new metaphor which comes from the field of ‘media ecology’ which reflects a transdisciplinary approach to research. Transdisciplinarity is defined as research that integrates knowledge across academic disciplines and with non-academic

stakeholders to address societal challenges. It is guided by the principle that ‘scientific rigor meets societal relevance’ (Robinson 2015).

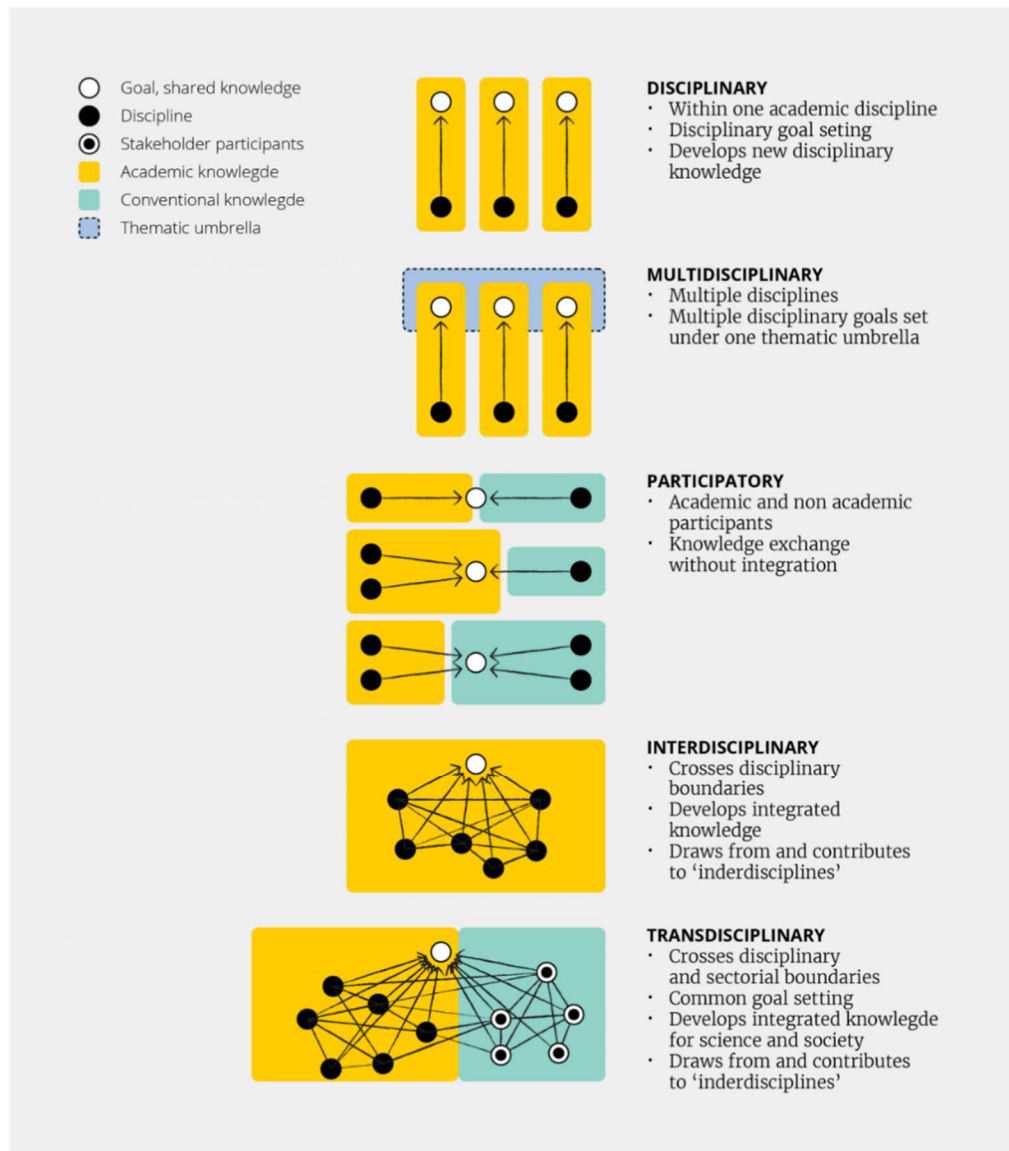


Figure 1: Schematic representation of transdisciplinary research
 Source: Morton et al. (2015)

The discipline of Media Ecology which first emerged in 1968, offers a unique framework for explaining cause due to its interdisciplinary concern with reading the ‘total field’ of evidence in order to arrive at new understandings of cultural patterns (Schuchardt 2017). According to Logan (1986: 218) key principles of Media Ecology are as follows:

1. The dominant tools or technologies of a society create patterns of usage that infiltrate or penetrate the social structures of a society,
2. These patterns change those structures, and
3. The social structures come to imitate or replay the patterns by which these dominant technologies are organized.

Put differently, societies imitate their own technologies. Life imitates art.

Media Ecology studies formal causality that is routinely disregarded by contemporary natural, as well as social science. Formal cause is one of Aristotle’s four causes. The Greek philosopher claimed, that ‘we do not have knowledge of a thing until we have grasped its why, that is to say, its explanation’ (Kyrimi et al. 2020).

- Material cause: ‘that out of which’ it is made.
- Efficient Cause: the source of the object’s principle of change or stability.
- Formal Cause: the essence of the object.
- Final Cause: the end/goal of the object, or what the object is good for (Anon. University of Vermont 2020).

For Aristotle, there were four causes which were to be studied in science: material, formal, efficient, and final. Formal cause represented the essence of a thing and final cause was an object’s purpose. Contemporary natural and social sciences have generally discarded these two types of causes and reduced everything to matter and energy (material and efficient causes) (Jain–Clark 2021: 8). What Media Ecology is claiming is that *formal causality* is essential to understanding material, efficient, and final cause.

Here we need to establish what formal causality consists of in Media Ecology. Formal cause is for example the user of any new technology. Gestalt psychology is a case in point. Gestalt psychology investigates human perception and it heavily influenced both the founder of Media Ecology, (Marshall McLuhan) and Michael Polányi in the formulation of his ‘tacit knowledge’ theory (Polányi 1966: 6). In Gestalt psychology, the formal cause is the *ground* against which the *figure* becomes perceptible (Anon. Britannica 2023). There is no figure without a ground. However, when we focus on the figure (the ‘content’), we lose consciousness of the ground. Take for example an island in the sea: if the sea changes the island changes, the sea gives shape to the island, the island is the figure, the sea is the ground. In other words, the sea is the medium. So the formal cause of a thing is the medium it is in. This is why Media Ecology treats media as environment. Marshall McLuhan once stated ‘The medium is the message’ (McLuhan 1964), that is to say, the environment is the message.

We suggest the use of the ‘environment’ metaphor to better grasp what TikTok is.

Here is an example for the environmental metaphor. When a toxic chemical substance is introduced into a river, then what you see is that certain fish die but others survive. So, a change in the environment affects certain fish species more than others, however it affects them all. It is the role of the natural ecologist to warn the general public that there is something toxic going on in the water. Similarly, when a new medium is introduced into the existing media ecosystem, the whole environment changes. This is what is meant by ‘the medium is the environment’. In biology, the environment in which an organism dwells is in fact called the medium. If the organism thrives in a medium, than it is a good medium, if it stagnates or dwindles than it is a toxic medium. This is what is meant by ‘the medium is the message’. The death of certain species of fish signifies a change in the environment which nonetheless affects the whole ecosystem. This is obvious in the case of river poisoning, but less obvious with communication media.

As Marshall McLuhan stated ‘The “message” of any medium or technology, is the change of scale or pace or pattern that it introduces into human affairs’ (McLuhan 1964). Media ecology takes the natural ecological approach and considers a new medium as a new environment. As with natural ecologists, it is the media ecologist’s duty to signify and warn the general public if there is something toxic going on in the human media landscape.

4.1. What constitutes the TikTok environment

As it has been discussed previously to maximize engagement, platforms employ various techniques, such as push notifications, autoplay features, endless scrolling, displaying metrics like 'likes' to quantify popularity, and algorithms that analyze user data to curate personalized content recommendations (like the For You page). In addition, users can create original content and respond to content made by others through likes, comments, and reshares. The ‘For You’ page is a key component of the app, specifically curated for each user based on their activity and interaction with other content. In alignment with traditional mechanisms of reward-based learning

and facilitation of the habit and addiction loops, ‘likes’ serve as a reward for all social media users (Eranti–Lonkila 2015). This satisfies the human desire for acceptance by others. Dopamine release is a key part of the positive feedback loop that drives reward-based learning; increased dopaminergic activity in the brain in response to receiving a ‘like’ encourages future TikTok use and continued content publication in hopes that the pleasurable experience will re-occur. Videos are short, which is ideal given the decreasing attention capacity of youths in the 21st century. When they play, they consume the entire device screen, which further intensifies the immersive experience for users (Meltzer 2018). Once immersed in a flow-like state, users may experience a distorted sense of time in which they do not realize how much time has passed.

It appears that structural and contextual aspects of TikTok are greater contributors to addiction than dispositional attributes of users. The extensively applied Big Five Personality traits called openness to experience, conscientiousness, extraversion, agreeableness, and neuroticism were all robustly linked to producing, participating, and consuming behavior on TikTok (Omar–Dequan 2022). Thus, the personality variables cannot really predict TikTok use which underlies the claim of Media Ecology that what we are dealing with here is environment.

Several of these attributes could be said not only about TikTok but about other social media platforms. However, TikTok is definitely unique in many ways, thus certainly creating a new environment. For instance, illustrating differences between social media platforms, Bhandari and Bimo (2020) suggested in their analysis of TikTok that in contrast to other platforms, ‘the crux of interaction is not between users and their social network, but between a user and what we call an “algorithmized” version of self.’ All insights from social media research cannot directly be transferred from one social media to another because it is well-known that each social media platform has a unique design also attracting different user groups (Marengo et al. 2020), and they elicit different immersive or ‘addictive’ potential (Rozgonjuk et al. 2020).

Conclusion

The strength of the media ecological approach is that it is *ecological*, that it acknowledges that the introduction of a dominant new medium into a cultural ecosystem creates an entirely new culture. Media is environment, every dominant new technology upsets the ratio of the human senses therefore it creates a new environment. Every technology is the extension of ourselves, the extension of some human faculty. The wheel is the extension of the legs, the hammer is the extension of the arms and so on. This is the true essence of the transdisciplinary approach, that it aims to look at a phenomenon from various perspectives simultaneously, it aims to connect the dots that different disciplines put down. If we consider TikTok a new environment, which we believe it is because all other social media apps follow suit and tailor their design to match that of TikTok’s then all the uncertainty of whether we should take action fades away. If we consider TikTok as environment then it becomes apparent that the toxic elements affect not only some vulnerable but affect everybody, even those who do not use TikTok. What we can do is to copy the success of natural ecology: the public awareness has been risen, environmentalism is main stream now, conservation of the natural environment is top priority today – it really is a transdisciplinary success story. We believe that the extension and expansion of the tetrad on new technology by various stakeholders – institutions, groups or individuals alike – will lead to increased public awareness and thus saves lives.

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