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ESSAYS

HYPERCONNECTION IN THE AGE OF HEALTHY LIFESTYLE TECHNOLOGIES: RELATIONSHIPS BETWEEN HEALTH, DATA PRIVACY, AND EDUCATION

HIPERCONEXÃO EM TEMPOS DE TECNOLOGIAS DE ESTILO DE VIDA SAUDÁVEL: RELAÇÕES ENTRE SAÚDE, PRIVACIDADE DE DADOS E EDUCAÇÃO

HIPERCONEXIÓN EN TIEMPOS DE TECNOLOGÍAS DE ESTILOS DE VIDA SALUDABLES: RELACIONES ENTRE SALUD, PRIVACIDAD DE DATOS Y EDUCACIÓN

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Abstract: The objective of this essay is to problematize the healthy lifestyle technologies universe beyond the uses and implications at the individual level, revealing ethical-structural implications specific to the logic of platformization. The Actor-Network theory is used, in addition to concepts such as platformization and datafication to shed light on a specific case of application of digital technology as an illustration of a broader movement. In the end, four resistance strategies are suggested for the area of Physical Education in the face of the hyperexposure of subjects using such applications.

Keywords: Physical Education. Digital technology. Privacy.

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1 INTRODUCTION

The omnipresence of digital technology devices in our lives continues to expand. Mobile and wearable technologies (Lucena, 2016; Moreira; Baranauskas, 2015), along with developments in virtual reality (Pereira; Peruzza, 2002), artificial intelligence (Harasim, 2015) and the Internet of Things (Silva *et al*., 2017) have changed the ways we relate to the world and, above all, how we learn about/with culture and ourselves. These technologies have also reshaped production, circulation and consumption of goods and services in various fields.

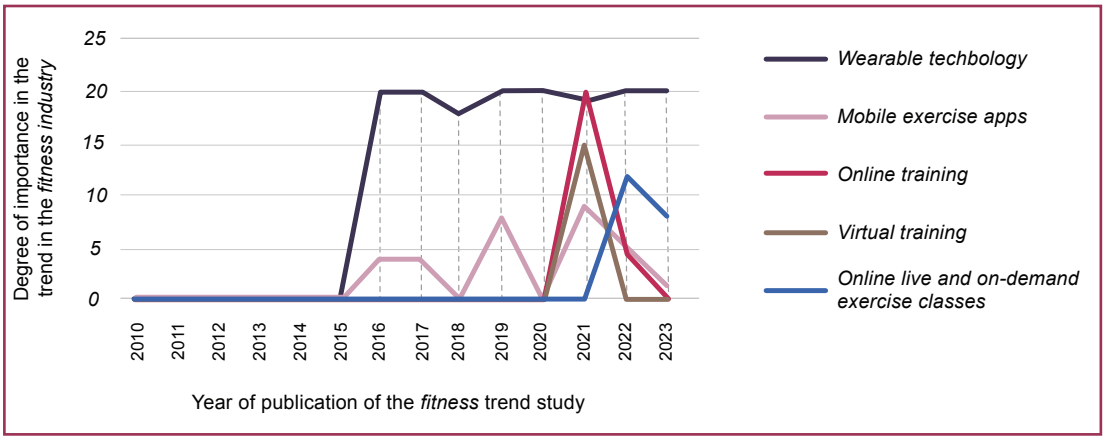
Specifically in the field of body, food and body transformation practices, such digital technologies have gained visibility and are being referred to by some of the literature as "healthy lifestyle technologies"[1] (Chung *et al*., 2017; Goodyear; Kerner; Quennerstedt, 2019; Kerner; Goodyear, 2017; Yang; Casey; Cale, 2023). They are heart rate monitors, pedometers, accelerometers, calorie counters, and online food inventories, among others, which, independently or in combination, make up the functionalities of mobile applications, wearable devices, and social media platforms, among others. The set of healthy lifestyle technologies has been widely used to monitor indicators of physical activity levels by the general population, transforming our relationship with this social practice.

However, it is important to mention that the consumption of such technologies would not be possible if there were no investment by the fitness industry in offering products that redesign the ways in which the population relates to physical practices.

In this context, a worldwide study of fitness trends conducted annually over the past18 years by ACSM's Health & Fitness Journal (2006-2023) aims to forecast trends in the health and fitness sector for the following years based on a survey answered by members of "all four sectors of the health and fitness industry (corporate, clinical, community, commercial), as well as academia" (Thompson, 2013). Based on the historical monitoring of this study, we realize that it is after 2015 that we have the emergence of digital technologies as a trend for the sector, with emphasis on wearable technologies showing strong potential for sustained prominence. However, other innovations, such as mobile applications, virtual classes/workouts, or even live or on-demand workouts, have also gained ground since the emergence of the COVID-19 pandemic, as can be seen in Figure 1.

1 International literature does not delve into the concept beyond characterizing it as a set of technologies that provide new opportunities for promoting physical activity. In this sense, despite seeking out traces of research that use this concept, we previously considered an uncritical and linear perspective of health with a strong anchoring in the causal relationship of physical activity or active life as an increase in health status.

Figure 1 – Health and Fitness Industry Trends.



Source: Author based on the work of Thompson (2010-2023).

In this sense, there are some positions recorded in the literature that consider that Physical Education could invest in understanding the opportunities in which digital technologies would be a positive didactic alternative in different contexts (Casey; Goodyear; Armour, 2017). At the same time, the literature still questions the (possible) options given to teachers and students to participate in this constant data mapping (Lupton, 2015), especially when considering critical training in the context of data surveillance.

In this way, they raised several concerns regarding the use of digital technologies in the context of Physical Education activities with regard to obtaining private and personal data from students and the consequent risk of commercialization and exploitation by third parties (Gard, 2014), as well as the fact that governments and companies may make use of the datafication of bodily practices in the management or control of citizens' health (Williamson, 2015).

Therefore, to understand such criticisms, the notion of datafication becomes essential. The term originated in 2013 (Mayer-Schönberger; Cukier, 2013) to refer to the transformation of human actions into quantifiable data, enabling the tracking of subjects and predictive analyses of their behaviors. Such tracking is becoming increasingly sophisticated and enables dynamic analyses of behavioral metadata, constructing predictions about user practices (Van Dijck; Poell; De Waal, 2018). The contemporary datafication process has been justified by the technological imperatives announced by Selwyn (2017), in which, based on the premise of time, practicality and information agglutination, technological processes are gaining more and more space in our social practices.

The main concerns are specifically among school-aged youth. Lupton (2017) identified an increase, at this age, in the use of digital technology in an attempt to promote and manage youth health, including social media and wearable devices, in addition to the use of online portals to search for health information. It is noteworthy, for example, that young people between 13 and 18 years of age are subjects in a period in which they are informed, and inform themselves, about physically active lifestyles and develop their health knowledge (Gard; Lupton, 2016; Lupton, 2021a; Rich, 2018). Additionally, literature indicates that the use of digital technologies by

young people to enhance their health and fitness has increased over the last decade (Lupton, 2021b).

Currently, it is possible to find several review studies on the effects of wearable physical activity trackers (Böhm *et al*., 2019; Ridgers; Mcnarry; Mackintosh, 2016), mobile applications (Rodríguez González; Hassan; Gao, 2022), online media or social media (Goodyear *et al.*, 2023; Goodyear *et al*., 2021), or even smartphones (Domin *et al*., 2021) in increasing physical activity in young people. However, even though the compiled results are not conclusive for an improvement in the level of physical activity, fetishization of technological devices and the datafication of bodily practices continues.

In this context, we consider the continued use, even in the face of an unclear improvement in physical activity levels, as an act of fetishism linked to the idea of alienation of the commodity (Zeferino, 2019; Novaes; Dagnino, 2024). Following this line of thinking, the commodity, in this case digital devices aimed at a healthy lifestyle, are naturalized in their uses without a political/historical reading and judged as strictly technical artifacts, obscuring the user/platform relationships.

When dealing with changes in young people's behavior in physical activity based on the use of wearable devices, the literature analyzed indicates that no strong evidence was found of long-lasting changes in behavior in interventions between 20 days and 18 months, but rather a short-term positive effect with the use of wearable devices in increasing physical activity in the daily lives of young people (Yang; Casey; Cale, 2023).

Regarding psychological responses to the use of healthy lifestyle technologies, the review by Yang, Casey and Cale (2023) points out positive, negative and critical effects. Among the positive effects, relative extrinsic elements (such as the characteristics of the artifact used), intrinsic elements (such as personal health needs), and elements of the user experience are perceived. Among the negative effects, unsatisfactory characteristics and design, data inaccuracy, irrelevance of data to individual needs, and generation of feelings such as boredom and body shame stand out. Regarding critical stances, the text by Yang, Casey and Cale (2023) evidences that young people consider that the applications are not suitable for their age group, but rather as an adult resource to promote health, as well as fearing commercial uses of such applications.

Finally, regarding the elements that facilitate or are barriers to the use of healthy lifestyle technologies by young people, the study shows that information, interaction and entertainment are factors that facilitate adherence to use, while the credibility of the health information available and the lack of adequate guidance and support act as barriers to usage (Yang; Casey; Cale, 2023).

Therefore, the panorama that can be observed is one of the current literature's focus on the individual impacts of the use of healthy lifestyle technologies, which, to some extent, fails to observe the collective demands of the consequences of the

massive generation of personal data, the process of datafication of life[2] (Lemos, 2021), and the resulting social implications that confront a health narrative linked to positivity of monitored performance.

In this sense, this text aims to problematize the universe of healthy lifestyle technologies beyond their uses and implications in the individual dimension, revealing ethical-structural implications specific to the logic of platformization, a concept that I will explore in the next sessions.

2 LENSES FOR READING THE WORLD WITH HUMAN AND NON-HUMAN ACTIONS

In the recent history of Brazilian Physical Education, especially since the 1980s, the ways in which we relate to bodily practices have been the object of analysis from the perspective of critical and humanist theories. These readings are generally anchored in the processes of production of human meanings, whether private or institutional.

Thus, ensuring respect and recognized advancement for the field that this moment represented, it becomes productive to raise other paths of thought to problematize new/other frontiers demanded in contemporary reflections, among them the ubiquitous presence of technology in the context of experiences of bodily practices.

In this regard, a theoretical path currently used to understand social issues not solely linked to human action is the Actor-Network Theory – ANT (Latour, 2012; Lemos, 2013). In ANT, we seek to understand social relations based on human (historical subjects with a social function) and non-human (for our purposes, digital technological devices – artifacts created based on social demands, but which lack intentionality in their uses) actants[3].

ANT was developed in the 1980s and challenges some assumptions of classical sociology by considering that human and non-human elements (things, objects and other animals) compete in an interdependent and collaborative way in daily processes and social practices and that, therefore, their associations are amenable to analysis for the construction of scientific knowledge. The associations between the various actors, whether intermediaries and/or mediators, make up a network that does not require fixity, but that is remade with each association. According to ANT, it is precisely in the possibility of tracking the associations that promote translations between mediating actors that the reading of the phenomenon is promoted (Latour, 2012).

The notion of translation in Latour's theory becomes important at this point since it presupposes the coexistence of two mediators in association that displace, invent, and create a new connection that affects the actants, modifying them, generating

2 According to Lemos (2021), the datafication of life is a new moment in digital culture in which widespread and omnipresent data tracking can generate distributed surveillance and produce other ways of relating to knowledge, as well as other formats of regulated sociability.

3 For ANT, it is possible to think of two types of actants, the mediator and the intermediary. The mediating actant element is the one that transforms, translates and modifies the meaning that it supposedly conveys. The intermediary actant element reproduces the existing actions, without modifying them (Latour, 2012).

adaptations of interests and, consequently, new possibilities of social facts (Latour, 2012; 1994b).

ANT has already been named as a sociology of associations (Latour, 2012), as well as being called a sociology of mobility (Lemos, 2013), precisely because it focuses on the trail of the flow and/or circulation of connections of actants in a sociotechnical network. The notion of a sociotechnical network is also crucial to the ANT line of thought, as, in it, not only digital technology devices or groups of people are connected, but rather, elements that are open to new components of interaction/connection, forming "hybrid collectives" (Latour, 1994a). Thus, each actant of the sociotechnical network, whether human or non-human, represents a node of this network and, by its nature, enables other social configurations and emerging practices.

From the ANT perspective, it is legitimate to think of users of healthy lifestyle technologies as human actors and the *hardware* and *software* as non-human actors who build a network of resignification of health, physical activities, and bodies. In this same sense, Mendes and Barbosa (2022) believe in ANT as a differentiated and less deterministic possibility of analyzing the dynamics of actors and their associations in the field of Physical Education, while pointing out that this theoretical contribution, to date, has not been significant in the academic production of the area.

In the reflection proposed in this text, we start from the understanding that healthy lifestyle technologies, the object of our interest in this debate, operate in platform structures, that is, "(re)programmable digital infrastructures that facilitate and shape personalized interactions between end users and complementarians" (Poell; Nieborg; Van Dijck, 2020, p. 4), which guide/influence users' decision-making.

At this point, ANT also helps us to think about the relationship between user actants and digital technology actants when they place themselves in associations. Every actant's action is potentially a trigger for effects, that is, it implies another action, a doing that "makes doing" (Latour, 2012). From the perspective of ANT, the action establishes a continuous movement in a network, in which the actants are symmetrically interconnected (without distinction between human and non-human actants). Mutual affects thus engender performances that move translations in the establishment of flows that redefine socio-material networks (Lima, 2022). Thus, the slightest click or permission from a user causes the algorithm, through its prior programming, to act on its network of associations, feeding the database and giving continuous *feedback* to the acting user, altering, and often strengthening, the possible links between the user and healthy lifestyle technologies.

In this way, users of healthy lifestyle technologies are linked to the platform structure because:

> […] platforms structure how end-users can interact with each other and with complementors through graphical user interfaces, offering specific benefits while withholding others, for example in the form of buttons – like, follow, rate, buy, pay – and metrics related to them […] This form of platform governance materializes through algorithmic ranking, privileging specific data signals over others, thus shaping what types of content and services become visible and prominent and what remains largely out of reach. (Poell; Nieborg; Van Dijck , 2020, p. 7)

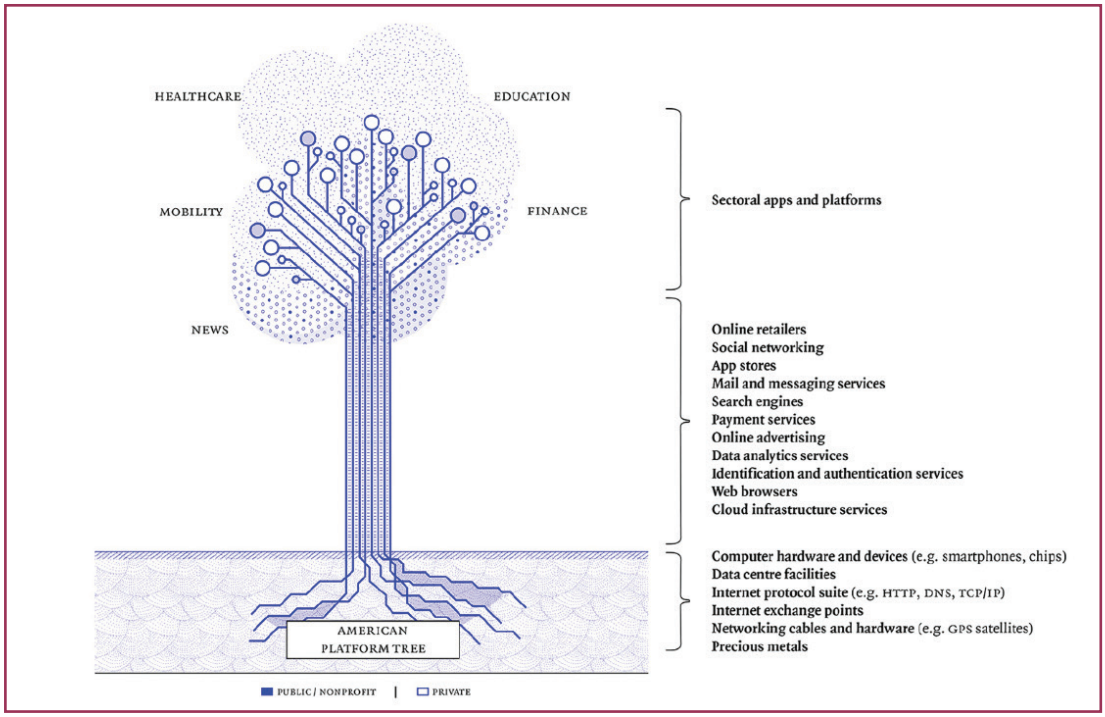
Thus, it is necessary to recognize the growing phenomenon of platformization as an interpenetration of digital, economic and governance structures in various sectors of life, including bodily and self-care practices, and, consequently, to understand how to analyze it. In our study focus, the user/platform association promotes a self-tracking mechanism, conscious personal body monitoring practices with the purpose of self-management of life behaviors (Lupton, 2014), which feeds the logic of platformization via datafication (Mayer-Schönberger; Cukier, 2013). Given this scenario, there are already studies that critically analyze the logic of self-tracking in the field of body practices/physical exercises, such as the work of Lima (2023), under the logic of ANT.

According to Poell, Nieborg and Van Dijck (2020), platformization is a process that reorganizes practices and imaginaries around platforms, which is why it is urgent to understand how non-human actors proceed. However, to talk about platforms, it is imperative to know their structures or, as Van Dijck (2022) warns us, it is necessary to understand in order to "create imaginaries".

In an attempt to mobilize such understanding, Van Dijck (2022) points to the metaphor of the tree as a symbol organized in layers (roots, trunk and branches – twigs and leaves) that, in an integrated way, represent dynamic systems and their own internal flows.

Figure 2 presents the structure suggested by the referenced author, highlighting the layers. In it, the root layer refers to infrastructure (cabling, satellites, protocols, hardware, data traffic, etc.), the trunk layer points to intermediate elements (browsers, cloud infrastructure, authentication services, social networks, search and messaging mechanisms, etc.), and the branch layer announces sectoral application services (education, health, mobility, finance, etc.).

Figure 2 – Tree as a metaphor for understanding a platform ecosystem.



Source: Dijck (2020).

Following this metaphor, we can think of each leaf or branch of the tree as an application, a piece of software, that is affiliated with a service sector. The leaves and branches can be as numerous as the tree is dense and are connected by a long and robust trunk. In the metaphor, the trunk represents spaces that aggregate information from some Big Tech, that is, services that are not necessarily sectorized (e.g.: email, social media, browsers), but that are important because they are the entry point and processing point for a large flow of data. At the base of every platform ecosystem are the devices, processing centers, protocols, and cabling, among others, which, in Van Dijck's (2022) metaphor, are understood as the root of the tree.

Adopting this metaphor to guide non-specialist readings, the main highlight of thinking about the layers of platforms is the possibility of observing the direct implications of such structuring and, consequently, problematizing our intentions at this moment, at least in two points: vertical integration and cross-sectoralization (Van Dijck, 2022).

That said, according to the tree metaphor, vertical integration concerns communicability in the ecosystem of platforms at different layers (infrastructure, intermediaries and sectoral applications). This concept illustrates that data shared in the intermediary layer (e.g., authentication services, browsers, social media) follow vertical flows that feed data to the infrastructure and sectoral application layers. Vertical integration under the justification of facilitating and generating convenience and personalization of use generates a privatization of user data flows (Van Dijck, 2022).

Cross-sectoralization refers to the collection, processing, and association of personal information and behavioral data of users in various sectors (e.g., education, health, and security). The combination of data flows enhances algorithmic action in providing more products, services, and content, adding commercial value, based on user behavior (Van Dijck, 2022). Therefore, the two elements (vertical integration and cross-sectoralization) are examples of the complex associations between non-human actors based on data from human actors.

In times when "the idea of privacy is changing as technologies of intrusion and invasion of personal, non-public spaces are transformed" (Silveira; Avelino; Souza, 2016, p. 218), it is important to reflect on the ethical implications of the use of data (voluntarily offered, observed or inferred)[4] collected and made available in the systems that surround us in a vertical integration of platform structures. As a rule, this vertical integration of platform structures promotes a blurring of boundaries between infrastructures and sectoral applications, with a free flow of data. It is in the intermediate layer that there is a frank integration of data justified by convenience (unified identification and authentication) that ends up privatizing flows of use, conditioning users and service providers (Van Alstyne; Parker; Choudary, 2016).

4 This is the classification used in the World Economic Forum document. To learn more, simply visit: http://www3.weforum.org/docs/WEF_ITTC_PersonalDataNewAsset_Report_2011.pdf. Accessed on Sept. 12, 2023

Other issues worth highlighting focus on the so-called intersectoralization that allows companies to collect and connect personal information and behavioral data from various sectors, migrating data to compose profiles or market niches.

In the context of healthy lifestyle technologies, it is understood that the data presented in the experience of physical activities and eating can be used as a surveillance instrument, as already pointed out in the literature (Gard, 2014; Lupton, 2015), or become something marketable to characterize new consumption niches and/or product offerings, as I will explore in more detail in the next section.

There is already evidence that health applications are understood as a body monitoring center that generates a disciplinary potential, where users often feel induced to achieve and share their daily goals, as well as follow friends or acquaintances (Pang *et al*., 2019).

In response to the technological imperatives that pressure a narrative of optimization of mapping bodily and self-care practices, it is necessary to provide the population with a broad clarification of the processes of collection, treatment and use of data provided in a diffuse manner in interfaces meticulously designed to be welcoming, because, according to D'Andréa (2020, p. 55), "platforms do try to make invisible or even hide their sociotechnical operating logic", and, in the meantime, it becomes important to take a close and in-depth look at the controversy between freedom/surveillance in the use of digital technology applications for health.

It is in the back-end[5] that the compiled data gains silent power that enables "a unique set of competing and coordinated platforms to govern the core of the world's digital information systems, exerting, from there, unprecedented economic, social and (geo)political control" (Van Dijck, 2022, p. 22).

3 DATAFICATION OF LIFE: FROM MACHINE LINEARITY TO THE RECURSIVITY OF FEEDBACK THAT SELF-DETERMINE HEALTH

Chinese philosopher Yuk Hui (2020), in one of his arguments in the book *Technodiversity*, has focused on the difference between mechanism and cybernetics to reflect on how much the ecosystem of machines has changed our ways of living. For the author, while the mechanism works based on linear causality, cybernetics has circular causality based on information that can generate self-determination of the elements in question, including human behavior.

An intriguing example to illustrate such an advance in the field of body monitoring is that, towards the end of the 19th century, scales became one of the most widespread monitoring technologies and formed a common mechanism for everyday monitoring parameters for thinking about health (Schwartz, 1986). In this technology, body mass is verified based on its ability to displace another object of pre-defined mass, a causal relationship of imposing a comparative force of gravity between two bodies.

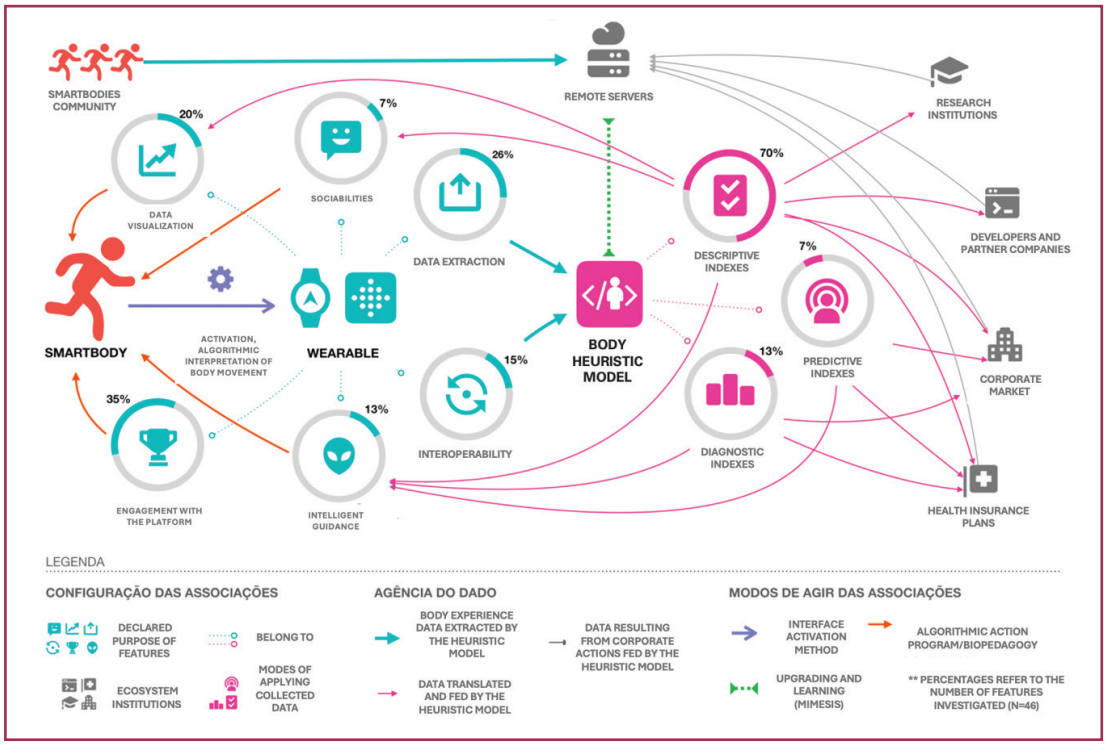
5 Back-end or backend is the term used in software engineering and architecture to designate the structure that combines servers, applications and databases that enable the functionality developed in software programming in general. Generally, this structure is invisible to the user (Lima, 2023).

Nowadays, with digital scales becoming increasingly complete, the pure data of our body mass does not tell us much when we operate a health logic about ourselves. We talk about body composition, energy consumption, calories and metabolism, in addition to associating these with physical activity levels, sleep quality, among others. The data is associated, processed, and generates information and feedback that are constantly updated, generating an increasingly sophisticated self-tracking and surveillance agenda. This is cyber logic.

As a thought exercise on healthy lifestyle technologies, the reader is invited to think about one of the most important wearable devices. This is the company *Fitbit*, which dominated the global wearables market until 2017 but continues to have strong relevance in the market (Bitencourt, 2021). Its products are devices that can map (weight, height, age, distance traveled, workouts, food records, stress levels, sleep, snoring, etc.), associate (physical fitness, calorie intake, workout progression, etc.), process (well-being reports, sleep profile, etc.), and deliver (details of achievements, new challenges, celebrations, etc.) data.

The know-how of the company, created in 2007 and with several monitor models, currently called smart devices, created a true body monitoring ecosystem that included several agents (developers, complementers and users) expressed in Figure 3.

Figure 3 – Diagram of the configuration of the body-information *wearable associations*.



Source: Bitencourt (2021).

In the image, we can see a structure of data provision by a community of users, formed by individuals who voluntarily share their data, triggering an algorithmic interpretation by joining the device in exchange for readings of their condition or bodily action. Through the delivery of information such as heart rate, oxygen saturation, stress, sleep, skin temperature and exercise mapping, a narrative is created that the

data is collected for the good of the user, as a rhetorical trick that overshadows other interests. In the words of Bitencourt (2020), when dealing with data, the company "endorses Fitbit's data extraction practices, while obscuring the commercial interest agendas and risks that the use of Fitbit wearables *poses* offers users autonomy, freedom, privacy and security" (p. 175).

Surrounded by the ostensive feedback on the performativity of their acts in the form of visualized data, by the guidelines given by the device to improve performance, and by the possibilities of sociability that can be found through engagement on the platform and outside the application (blogs, communities, social networks, etc.), the subjects (end users) are unable to perceive the application of the collected data, whether they are body data or usability data of the available interfaces.

Therefore, it is certain that in the feedback dynamics, the user has a ready and continuous possibility of personalizing the reading of his/her body and bodily practices based on the data collected, processed and re-presented through descriptive, predictive and diagnostic indexes. However, the recursion does not stop there; the construction of such indexes presupposes the sharing of data with corporations (research institutions, partner companies, developers, health plans, etc.) that use them for purposes specific to their interests and feed back into the heuristic model of biopedagogy. When observing the image that systematizes the dynamics of the use of Fitbit, it is possible to identify numerous associations that promote the "make do", with possibilities of translations in terms of TAR.

From a micro perspective (end-user perspective), all this application engineering has consequences for the way people live. Oliveira and Fraga (2019), when mapping mechanisms that can drive or influence decision-making by fitness apps, summarize some important movements on how continuous feedback affects how the subjects manage their relationships with physical activity, namely: self-disclosure (display of self), quantified self and gamification of life (gamification of life). All these movements accentuate recursion, with a substantial increase in data generation, increasing the datafication of bodily practices and changing ways of relating to one's health and forms of sociability (inducing behaviors, directing attention, and generating engagement in certain actions). Such movements, which are not exclusive or unique in the universe of healthy lifestyle technologies, go beyond applications and constitute transmedia narratives, entangling multiple media channels and exponentially enhancing the datafication of life (Lemos, 2021).

From a macro perspective (from the perspective of developers, complementers and corporations), the creation of the chain proposes an accentuation of this interweaving between transfer and recursive data processing. In this sense, Bitencourt (2021, p. 19), who has extensive and fruitful work on Fitbit, explores the hypothesis that "capture of multiple variables and Fitbit's longitudinal analyses are more useful for business intelligence strategies[6]; while the refinement of the analysis and prediction of individual symptoms prove more profitable for the medical and pharmaceutical

6 Strategy for collecting, organizing, processing, analyzing, sharing and monitoring information that supports business management (decision-making, identifying market niches, etc.).

sectors, for example". In other words, based on Yuk Hui (2020), Western technology narrows the logic of technology linked to the capitalist society model.

On this premise, if Fitbit was initially conceived as a small leaf or branch of the tree within the platform metaphor (previously presented) and originally fulfilled the function of providing sectoral services (health) in the field of healthy lifestyle technologies, today we need to review this impression.

The fact is that at the end of 2019, Alphabet (Google) incorporated Fitbit into its conglomerate of companies (Bitencourt, 2020, 2021) and this action that seems to us to be a distant commercial agreement takes on relevant contours to problematize elements in relation to the notions, already pointed out, of vertical integration and cross-sectoralization.

As context, it is important to highlight that Alphabet (Google) represents one of the five Big Tech companies that influence the entire Western market and significantly affect the Eastern market (along with Amazon, Meta (Facebook), Apple and Microsoft). According to Google's portal[7], Big Tech currently has 115 products available for sale aimed at different sectors of society (71 of which are aimed at the general public; 28 are designed for companies and 16 are aimed at developers). With integration as a principle, the identification or login service (Google ID) is a catalyst mechanism for cross-sectoralization. In this way, by subscribing to some of these products, creating and linking their ID to the products, the end user is expanding the possibilities of mapping their life in different sectors (health, education, finance, etc.).

Thus, Alphabet (Google), being a company that already has recognized strength in infrastructure layers (cabling, satellites, protocols, hardware, data traffic, etc.), the trunk layer – intermediate elements (browsers, cloud infrastructure, authentication services, social networks, search and messaging engines, etc.), ends up also monopolizing spaces for collecting, processing and remastering behavioral data from end users, which we are calling cross-sectoralization (branches and leaves, like Fitbit).

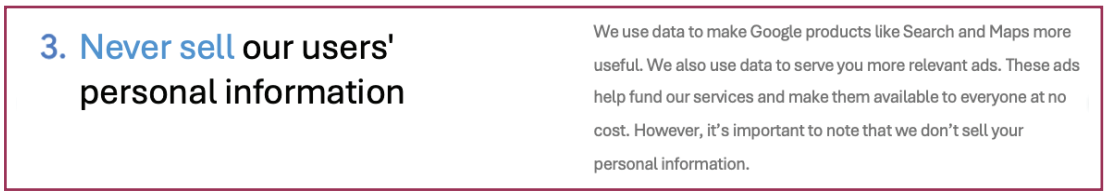
In this way, vertically integrated (from the infrastructure layer, through the intermediate layer, to applications for end consumers), this company carries out:

> […] its influence upwards, downwards and sideways. As long as data and content flows continue to pass through the trunk – flows that can be exclusively extracted, processed, combined and reused – its operators define the shape of the tree (Van Dijck, 2022, p. 31).

Therefore, the necessary concern becomes increasingly relevant given that, in its privacy and security policy, the company emphasizes that there is no sale of user information. However, it admits that they use the data in Google products, for displaying ads, among others (Figure 4).

7 More information available at: https://about.google/intl/pt-BR/products/#all-products.

Figure 4 – Excerpt from Google's privacy and security principles.



Source: Google's privacy principles page[8].

After the purchase by Alphabet (Google), FitBit went through a process of adapting its processes and integrating platforms. In June 2023, Google also announced that Fitbit users must be linked to Google accounts, strengthening the integration logic and enhancing the cross-sectoralization. Now, it will be the users' body data and physical activity behavior that will be evaluated by this market giant.

As these companies gain access to their users' data, other nuances appear in various sectors of life. To concentrate on the relevant field, we should focus on mapping health issues. An illustrative example of how data managed by Fitbit can be powerful is the initiative of a study that used data from 200,000 users of this technology to build predictors of viruses caused by Influenza between 2016 and 2018 (Bitencourt, 2021). Subsequently, such data favored a new study with more than 100,000 North American and Canadian users (more than 1,000 confirmed cases of infection) to develop algorithmic models that could anticipate the symptoms of COVID-19[9] through physiological signals (respiratory rate, heart rate and heart rate variability).

Thus, considering: a) the logic of data integration, b) the cross-sectoralization of data, and c) the blurring of the limits of sharing data from Google applications and companies, the question is to what extent this Big Tech does not make use of such data, predictors, patterns, indexes and diagnostics with its other subsidiaries and/or partners in commercial actions, such as those described on the company's own page (Figures 5 and 6).

Figures 5 and 6 – Companies that have commercial agreements with Google Workspace and Google Cloud.

Source: Google Workspace and Google Cloud business partners[10].

8 Available at: https://safety.google/principles/ . Accessed on October 13, 2024.

9 To learn more: https://blog.fitbit.com/early-findings-covid-19-study/ and https://www.medrxiv.org/content/10.1101/2020.08.14.20175265v1. Accessed on October 13, 2024.

10 Available at: https://workspace.google.com/intl/pt-BR/industries/healthcare/ and https://cloud.google.com/solutions/healthcare-life-sciences?hl=pt-br. Accessed on October 13, 2024.

These are telemedicine portals, research institutions, pharmaceutical companies, and health insurance plans, all of which are largely privately owned, which compete for functionalities within the large Google platform tree and which, to some extent, may have access to data (pure or processed) throughout the ecosystem of this platform. Due to the rigor of thought and the obfuscation of evidence, it is certainly not possible to state all possible uses of data by the entire chain of companies that make up the Alphabet (Google) company, but the proposed reflection is powerful and necessary.

In any case, the field of mapping these possibilities of market engineering, associated with user data on platforms, has already been studied under the rubric of surveillance capitalism (Zuboff, 2021). In this, the logic of capital has been directed at the digital and behavioral surveillance of users with a view to transnational marketing actions. And, in this sense, platform infrastructures become a new *locus* for the exercise of capitalist practices.

The questions arising from this expanded perception of the use, production and circulation of data are mainly ethical and economic in nature. Many of them cannot be readily answered by the fateful realization that platforms control the entry, circulation and distribution of all online traffic, making entire societies dependent on their systems and blurring the distinctions between market, civil society and State, as well as their respective responsibilities, to avoid more formal regulatory strategies (Gillespie, 2018).

4 NOT TO COMPLETE OR… WAYS TO RESIST

National literature shows that the field of Physical Education has been approaching discussions related to media and technologies since the 1980s (Pires *et al*., 2008). Over time, reflections in the field have been increasing significantly in terms of pedagogical treatment for the formal teaching of Physical Education. In a literature review that addresses the relationship between the field of communication and the field of Physical Education in Brazil, Araújo, Marques and Pires (2015) point out the growth of research with emphasis on analyses of media products related to sports themes, with digital technologies also being the most thematized vehicles. However, at that time, themes such as platformization and ethical implications in the man-machine relationship were not visualized.

Today, even considering that we already have a framework for analyzing how relationships with digital technology enter the training of Physical Education teachers (Araújo *et al*., 2021a; Araújo; Oliveira; Souza Jr., 2019; Araújo; Ovens; Knijnik, 2023; Souza Júnior; Oliveira; Araújo, 2022) and some in the field of educational activity (Araújo; Knijnik; Ovens, 2021; Araújo *et al*., 2021b; Araújo; Cavalcante, 2023; Fonseca *et al*., 2020; Chaves *et al*., 2015; Sousa *et al*., 2014), critical reflections are still required to think about digital technology at the interface of Physical Education with health, as in the study by Oliveira (2020) that brings a critical sociological analysis on the impact of using an application focused on prescribing physical activity, by algorithm, and its repercussions on the management of its users' bodily practices.

Thus, in a post-COVID-19 pandemic moment in which we still need to understand some of the implications that digital technologies can have on our lives, I list in this space some resistance movements that can be activated by the collective in the area but which can also be exercised individually. Thus, these movements aim to announce important elements in the digital literacy of Physical Education teachers and/or students in professional training, concerning ethical, responsible, academic, and socially endorsed use. Thus, they are:

4.1 LOGIC OF TECHNODIVERSITY

The first resistance movement is the commitment to the notion of technodiversity, defended by Yuk Hui (2020). The author denounces the multiple expressions of technologies that have historically been stifled in favor of a universal idea of technological advancement, generally expressed in technologies that accompany economic and political projects. On the other hand, he promotes efforts to recognize local technologies that are shared in specific contexts. This stance is based on the idea that no technology is neutral, but rather that it brings a governance project to which its users are subjected. Thus, diversifying digital and analog technologies to manage bodily practices can be an interesting exercise to optimize the principle of data privacy. The exercise of varied uses of technologies connected and not connected to the World Wide Web is a movement that can make us less dependent on datafication on platforms, given the difficulty of collecting and processing user data and, consequently, of the predictive analysis of our behaviors.

4.2 DIGITAL SKILLS MATRICES

As a second resistance movement, it is necessary to recognize and explore the Digital Competence matrices available to teachers (whether they are Physical Education teachers or not), organizing new skills necessary for the use of technological devices in the context of teacher education. The most widespread are MIL (Wilson *et al*., 2011) and DigCompEdu (Redecker; Punie, 2017), theoretical frameworks developed by UNESCO and the European Union, respectively. Araújo and collaborators (2021a) present a reading of proposals for teacher education in Physical Education in light of the aforementioned theoretical frameworks. According to the results presented, the responsible and democratic use of media and technology (which involves the identification of copyright, data uses, licenses applied to digital content, etc., in addition to the use of digital technologies in a safe and responsible manner for civic participation) is the weakest dimension in teacher training in Physical Education. Based on studies carried out by theoretical frameworks (Wilson *et al*., 2011; Redecker; Punie, 2017), which highlight the need to invest in ethical, responsible and democratic uses of technology, it is believed that focusing on this axis of training enables less naive citizen action in the face of digital technologies. Thus, this effort, as a path taken through education, requires critical training permeated by the forms of management that the area of Physical Education has faced, especially its effects on the platformization process.

4.3 DATA PROTECTION LEGISLATION

As a third resistance movement, it is suggested to appropriate and make use of data protection legislation. These legal documents govern data protection and refer to the treatment of data in digital environments. Thus, with a robust reference that has sought to confront ethical issues strongly, we have the General Data Protection Regulation (European Union, 2016). Inspired by this first one and still gaining strength in the daily demands of Brazil, we have the General Law for the Protection of Personal Data (Brazil, 2018). Therefore, teachers and other subjects must look at such devices to understand the conditions under which their data can be protected.

4.4 GUIDELINES OR PROTOCOLS FOR THE USE OF DIGITAL TECHNOLOGIES

As a fourth resistance movement, the search for guidelines or protocols for the use of healthy lifestyle technologies is proposed. Despite the different opinions that coexist between adherence and suppression of the use of technologies, it is necessary to seek guidelines that are based on evidence. A recent example of a protocol for the use of technology is the document *Guidelines for using social media to inform behaviors related to physical activity, diet, and quality of life* (Goodyear *et al*., 2021). This document, created after systematic reviews, user surveys, and consultations with experts, as well as focus groups with children and young people, recommends the ways of producing and circulating content on social media to promote positive changes in behaviors related to physical activity, diet, and quality of life. There are seven dimensions to be considered, namely: social content, personalized material, authentic content, relatable material, reliable information, engaging presentation, and regulated material. Thus, again through education, we find a way to manage the use of digital technologies and their traces.

Of course, not all concerns arising from the use of healthy lifestyle technologies will be resolved by these resistance movements, but we will be in a movement of continuous attention so that the guarantee of our health, as an individual social right, can be assured through collective movements.

A huge research agenda is opening for this field, and, in this sense, we invite the area to look into the developments that are yet to come.

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Resumo: O objetivo deste ensaio é problematizar o universo das tecnologias de estilo de vida saudável para além dos usos e implicações na dimensão individual, desvelando implicações ético-estruturais próprias da lógica da plataformização. Aciona-se a teoria Ator-Rede, além de conceitos como plataformização e dataficação para pôr em evidência um caso específico de aplicação de tecnologia digital como ilustração de um movimento mais amplo. Ao fim, sugerem-se quatro movimentos de resistência para a área de Educação Física frente ao quadro de hiperexposição dos sujeitos usuários de tais aplicações.

Palavras-chave: Educação Física. Tecnologia Digital. Privacidade.

Resumen: El objetivo de este ensayo es problematizar el universo de las tecnologías de estilo de vida saludable más allá de los usos e implicaciones en la dimensión individual, revelando implicaciones ético-estructurales propias de la lógica de la plataformatización. Se utiliza la teoría Actor-Red, además de conceptos como plataforma y datificación, para resaltar un caso específico de aplicación de la tecnología digital como ilustración de un movimiento más amplio. Al final, se sugieren cuatro movimientos de resistencia para el área de Educación Física ante la hiperexposición de los sujetos usuarios de dichas aplicaciones.

Palabras clave: Educación Física. Tecnología Digital. Privacidad.

CONFLICT OF INTERESTS

The authors declare that this work involves no conflict of interest.

AUTHOR CONTRIBUTIONS

Allyson Carvalho de Araújo: Conceptualization, research, writing, and manuscript review.

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EDITORIAL RESPONSIBILITY

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