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Spreading Fitness Literacy as Biohacking on YouTube: The Body as Self-Actualisation

by

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Abstract

This investigation explores the informal and digitally mediated educational effect that do-it-yourself (DIY) biohacking YouTube videos have on cultivating and moulding the human body into a fitness machine. Biohacking is understood as a tool or instrument produced through knowledge of diet and exercise regimens. It is argued that this form of literacy enables corporeal control and transformation. This new perception of the body or contemporary self-identity has been escalating since mass urbanisation started increasing on a global level.

The wealth of health and fitness information available on social networking platforms drives the fitness megatrend and increases lay literacy on fitness and health, much in the same way lay literacy was historically affected by the invention of the printing press in early modern Europe. This research draws parallels between the historical impact of the invention of the printing press on public literacy, and the current effect of social media on improving the global public's health and fitness literacy, leading to what is described as the fitness revolution.

Social networking sites amplify awareness of fitness culture by visually mediating the ultimate body and its practices to masses of users, creating a platform where users can learn from and interact with fitness and health specialists and enthusiasts worldwide. Consequently, the fitness megatrend is spread through digital media such as free video-sharing information, workout programmes, training schedules and diet plans as a form of biohacking that shapes the development and perception of the human body as a fitness instrument and acts as a self-actualising tool.

This research seeks to fill a gap in the literature regarding health sciences and contemporary biohacking practices on social networking sites, promoting fitness practices as well as the informal pedagogical significance of digital platforms with regard to DIY healthcare. An extensive review of literature was conducted to contextualise historical phenomena of mass communication and literacy, leading to changes in public opinion and behaviour. A discourse analysis was carried out on case studies from top-performing fitness channels to determine the pedagogical potential of biohacking YouTube media. While user engagement on popular fitness videos reflected

different degrees of understanding of fitness practices, analysis of engagement clearly revealed aspects of increased fitness literacy in public discourse on YouTube. This substantiates the contention that contemporary social networking sites such as YouTube promote knowledge production and an increase in biohacking practices that enhance audience fitness literacy, thereby contributing to the prevalent fitness megatrend.

Keywords

Biohacking, DIY, fitness literacy, fitness megatrend, healthcare, YouTube, digital media, social networking sites, participatory culture

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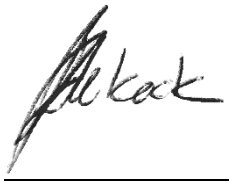
Plagiarism declaration

I declare that *Spreading Fitness Literacy as Biohacking on YouTube: The Body as Self-Actualisation* is my own work, based on my personal research and that I have acknowledged all material and sources used in its preparation, whether they be books, articles or any other kind of document, electronic or personal communication. I also certify that this document has not previously been submitted for assessment and that I have not copied in part or whole or otherwise plagiarised the work of other persons.



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CHAPTER ONE: INTRODUCTION

1.1 Background contextualisation

Almost everyone has a desire "tone up" for the next holiday season or perhaps lose some weight for an upcoming social event. And yet, heart disease, obesity, diabetes and autoimmune disorders are increasing at a startling rate (Stancic 2021, Communicable versus Noncommunicable Diseases). In fact, the worldwide prevalence of lifestyle obesity almost tripled since 1975 (World Health Organisation 2020). Whereas humans historically died from infectious diseases, medical technologies have ensured that we do not become fatally sick from bacteria or infected injuries in the twenty-first century. Instead, we participate in behaviours such as in poor nutrition, inactivity, social isolation, poor sleep habits, excessive stress, as well as the consumption of various damaging substances (Stancic 2021, Communicable versus Noncommunicable Diseases). We are living in an era of self-imposed chronic disease.

The good news is that regular exercise has been proven to reduce the chance of health problems such as heart disease, diabetes, high blood pressure, some forms of cancer, mental illnesses and inflammation (Bean 2010, 6; Centers for Disease Control and Prevention 2005; Newton 2008, 136; World Health Organisation 2018). More and more information is available about ways to improve the quality of one's lifestyle and potentially extend one's life-expectancy. For that reason, this research explores a digitally mediated phenomenon of bio-literacy that promotes healthy lifestyle or "body-hacking" practices in popular participatory culture spaces, such as YouTube.

As an individual with a radical weight-loss before-and-after photo stored somewhere in the cloud and experience as both a personal trainer and an overweight body, I can attest to the transformative potential of having a fitness trainer's virtual guidance available at the launch of an application. My experience has allowed me to critically analyse fitness culture practices to determine how the regular consumption of or exposure to fitness content on social networking sites (SNSs) promotes biohacking habits.

SNSs such as YouTube enable do-it-yourself (DIY) experimentation with biohacking – a self-help approach to the science behind a trim and healthy body. The trend emerged

with developments in digital technology, when large amounts of data became accessible through smartphones and personal computers. Biohacking is the improvement of physical and intellectual performance through self-directed evolution (Yetisen 2018, 744). Through the application of expert health- and fitness-related biohacks, different levels of personal enhancement are achieved. I contend that many active SNS users become fitness-literate by consuming fitness content on participatory spaces such as YouTube. Biohacking-related YouTube videos are thus argued to be utilised as pedagogical material to enhance the health of international audiences.

The advancement of a healthy lifestyle is a fast-increasing trend in urbanised and global consumer societies. Globally, the fitness industry grew from 162 million to 174 million gym memberships in the first 10 months of 2019, and this number is expected to surpass 230 million by 2030 (International Health, Racquet and Sportsclub Association, 2019). A massive variety of products and services aimed at enhancing the body and aiding personal health and fitness is flooding markets and meeting an ever-increasing demand, particularly in developed countries. Jean Baudrillard (1970, 14) already noted in the 1970s that health-conscious consumers were turning from religion to reliance on treatments, therapies and regimes aimed at optimising health and body.

Increased value is placed on physical activity and fitness in an attempt to escape the ills of the contemporary sedentary urban lifestyle. In the twentieth century, individual fitness was encouraged, with self-actualisation and self-improvement as the main aim (Maguire 2008, 1-2). The fit body has recently become a sign of an individual's self-discipline and good health, even providing purchasing power (King 2006, 48). Roberta Sassatelli (2010, 12) similarly highlights the increasing role of the fit body as a marker of status and expression of identity.

Technological developments increase the possibility of healthy living by visually mediating the road to a fit and active body. These developments also provide non-specialists with the means to autonomously manage their physical well-being. The evolution of participatory digital platforms and interactive devices is facilitating health tracking and increased health awareness, as well as providing easy access to nutrition and exercise guidance. This contributes to what is called the second fitness boom or fitness megatrend.

The fitness megatrend is characterised by the integration of customisable, mobile and interactive technologies created to be used in customers' fitness endeavours (Hajkowicz, Cook and Littleboy 2012, 4; Millington 2016, 185). The first fitness boom took place from the early 1980s and was marked by the expanding market of fitness products and aids such as treadmills and fitness media like exercise videos featuring Jane Fonda (Figure 1) for home use (Millington 2016, 185). The fit body became a commercialised image, with fitness gyms as the main site where such a body could be produced (Sassatelli 2010, 9-10).

Figure 1: Jane Fonda home workout videos covers, Jane Fonda website, 2012.

Developments in digital technology support the spread of the fitness revolution to YouTube's two billion users, currently amounting to one-third of internet users (YouTube 2020a). YouTube provides viewers access to myriad perspectives, advice or "hacks" that could produce a fitter body, akin to the manner in which the development of the printing press in 1450 (Eisenstein 2005, 335) enabled modern thought through mass literacy.

Jodi Pilgrim and Elda Martinez (2013, 60) define literacy as generally referring to reading and writing effectively in a variety of contexts. In the twenty-first century, the concepts surrounding literacy are overlapping and have transformed. The definition of

literacy increasingly reflects the capacity to use technology to collect and communicate information. Leu *et al.* (2004, 1572) conceptualise the new literacies of information and communication technologies (ICTs) and the internet as comprising the strategies, skills and approaches required to effectively use and adjust to the shifting ICTs and contexts that develop constantly and impact our lives. These novel, digital literacies enable us to use the internet and other ICTs to find information, assess the value of that information, produce information to resolve questions, and to finally share the information with others online.

This study explores the impact of new technologies, specifically SNSs such as YouTube, on the global public's fitness literacy. In this study, literacy is understood by drawing parallels with the increase in traditional literacy (the ability to read and write) that was caused by the development of the printing press. Mass public literacy was precipitated by ready access to the printed word, afforded by the printing press. The spread of literacy in the fifteenth century can be interpreted as one of the most transformative events in the world (Easton 2008, 47). I propose that a similar transformative revolution is currently playing out in the fitness industry, due to the widespread impact of literacy about the human body, as created by SNSs. The interactivity of SNSs allows individuals to construct a semi-private or public profile within the system, and to attract a list of users (or subscribers) with whom they share a connection. It also enables users to view and interact with others within a limited system (boyd and Ellison 2008, 211). SNSs have attracted millions of users, many of whom incorporate the content into their everyday rituals. In this research, the fitness megatrend is explored as it is spread through YouTube videos to cultivate and shape the image of the human body into a fitness machine. The intense fitness training and health tracking processes are identified as a form of basic, low-level biohacking. Basic biohacking entails changing the body through training and healthy lifestyle choices, but not enhancing appearance through invasive interventions by means of physical extensions and implants, which would be classified as more advanced biohacking.

On YouTube, views and subscriptions contribute to a channel's status within the platform. View time on YouTube currently accumulates to more than one billion hours of video content watched daily in more than 100 countries and 80 different languages

(YouTube 2020a). The fitness community on YouTube is an exceptionally large and active group, with more than 8 000 channels in the community (YouTube 2020b). These channels focus on biohacking methods like exercise routines, exercise physiology, nutritional information and other lifestyle-related hacks.

This research explores fitness literacy through the analysis of visual and textual strategies as employed by popular YouTube fitness channels, as well as user interactions with videos as indicators of audience fitness literacy. Two popular YouTube channels, Athlean-X and Blogilates, are analysed as case studies. Jeff Cavaliere (Figure 2) is the owner of the most-watched male fitness channel on YouTube, Athlean-X. Cavaliere is a physical therapist and strength coach who uses his channel to educate audiences on subject matter ranging from common workout mistakes to nutrition advice (YouTube 2020b).

Figure 2: Athlean-X YouTube creator Jeff Cavaliere with a client, ATHLEAN-X website, 2018.

The second case study channel is owned by Cassey Ho, the founder of Blogilates (Figure 3). Ho is a certified group fitness instructor and Pilates teacher (Ho 2009), and hosts the currently most-subscribed-to female fitness channel on YouTube.

Figure 3: Cassey Ho leading a POP Pilates Workout, Blogilates website, 2009.

1.2 Aims and rationale of the study

This research aims to explore how the fitness megatrend presents and shares the same tendencies, by increasing public literacy, as those historically produced in the west by the printing press. Just as the printing press enabled the spread of literacy and caused a global "revolution" since 1450, it is argued that the fitness megatrend, fuelled by shared information spread on SNSs, particularly YouTube, is creating a transformation in the way the human body is perceived (Eisenstein 2005, 335). The transformation of the human body through fitness regimes is identified as a form of basic biohacking, where biohacking refers to a prescriptive DIY instrumentalist approach to the human body. This research aims to demonstrate, through the analysis of popular YouTube fitness channels, how SNSs contribute to the spreading fitness literacy of participants.

This study's findings are of significance as they determine the diffusion of fitness literacy to establish the pedagogical value of YouTube as a digital platform. This research seeks to fill a gap in the literature regarding the informal educational significance of digital platforms. It also aims to define the gap between professional health sciences and DIY biohacking practices. This investigation explores critical areas in the informal and digitally mediated educational process that was not possible until

very recently and has therefore not been explored yet. Determining the effect of technologies on culture is essential as we are continually exposed to these novel technologies and therefore need to be aware of the impact media content has on our everyday experiences. Since the digital humanities are a uniquely current discipline, there are ample opportunities for research. At individual level, this exploration has provided me with insight into the value of a healthy lifestyle as promoted and supported by open-source knowledge systems.

1.3 Research design

This section names and discusses the overall research approach utilised to test the thesis of this study. The application of the employed techniques (namely, case studies and discourse analysis) is discussed under the methodological approach (section 1.4). This study falls within the scope of qualitative research. The basic premises linked to this research are briefly outlined below in order to justify the research approach and satisfy the research aims. Qualitative methods cover various interpretative research techniques that seek to discover meaning and describe phenomena in the social world. Robert Yin (2016, 9-10) defines the five features of qualitative research as follows: studying the meaning of human lives and roles, representing the views and perspectives of participants, accounting for real-world contextual situations, and contributing insights toward explaining social behaviour and thoughts. Qualitative research is also characterised by acknowledging the potential relevance of multiple sources of evidence rather than relying on a single source alone.

This study employs qualitative methods such as visual and textual analysis, which allow for the systematic analysis of selected case studies. Qualitative data collection methods used in this study include observing the communication between participants on SNSs, social interactions, actions, scenes, the physical and virtual environment created by social media, and group dynamics observed on SNSs. Research materials include the content of personal documents, printed and audio-visual materials, graphics and YouTube videos, archival records, and social media texts (Yin, 2016, 139).

1.3.1 Case studies

A case study is defined as an intensive study of an individual case or a small number of cases in which context and setting are considered. This technique relies on observational data and has the potential to apply to more cases (Gerring, 2017, 28; Robson and McCartan, 2016, 150). This means that case studies depend on the collection of evidence surrounding the area of interest.

In this specific study, case studies of fitness channels were conducted to contextualise online fitness culture and analyse visual and textual strategies related to biohacking and fitness literacy. The rationale for using high-impact fitness channels on YouTube as case studies of the impact of SNSs on the fitness megatrend is to contextualise and demonstrate the impact of progressive social media and internet technology on enhanced fitness literacy. Thus, the theoretical contribution of this study lies in the demonstration of enhanced public fitness literacy as distributed by professional fitness experts on SNSs such as YouTube.

The foremost concern of this research methodology is to generate knowledge of the specific subject in question, and to come to conclusions and make recommendations which can be used for theoretical elaboration. Additionally, a semiotic approach is adopted in the analysis to interpret visual elements presented by the case studies.

Case studies offer advantageous techniques to allow for detailed knowledge about phenomena by getting as close as possible to the subject by means of observation in natural settings (Yin 2016, 68). Case studies provide the opportunity for innovation and are appropriate for studying behaviour and rare phenomena – such as literacy and fitness trends in this exploration. Selected case studies are examined in a structured manner to discover principles that can be applied to similar cases. A literature review of key theories provides the theoretical grounding for the various case studies.

Although case studies were a suitable technique for this research, there are some concerns surrounding their use. This technique carries the inherent risk of the researcher losing focus, or having difficulty remaining unbiased (Hofstee 2006, 123). To improve

the quality of findings, I diversified sources through combining case studies with theoretical exploration and discourse analysis.

1.3.2 Discourse analysis

The objective of this study is to capture a snapshot of popular YouTube fitness video engagements in order to analyse the spread of fitness literacy through YouTube. Discourse analysis is a qualitative method centred on the examination of language. It is based on the understanding that language has a vital role in social functions and that the study thereof grants a better understanding of social functioning. Furthermore, it is the ideal methodological approach for a study which requires the close analysis of messages and their context. By analysing the content and functions of discourse, an interpretation can be justified by detailed arguments and attention to the material that is studied (Gill 2000, 188). Discourse analysis has a wide range of applications, ranging from linguistic investigation to investigations into social practices. Thus, this approach allows for virtually any social text to be used as a basis for analysis, including public group discussions such as those found on YouTube.

In discourse analysis, it is not only the content of what is being said that creates the basis for conventional analysis, but the way in which communication is occurring. Unlike purely linguistic approaches that are centred on the rules of language use, discourse analysis accentuates the contextual meaning of language. The unit of dialogue or the phenomenon of interest can vary from silence to a single word or sentence to a full conversation. Interpretations in this study are therefore based on the details of social media communications, audio-visual material and contextual knowledge (Robson and McCartan, 2016, 371-372). Wodak and Meyer (2001, 141) describe the eight primary principles of discourse analysis as follows:

- Addressing social difficulties.
- Power relations are discursive.
- Culture and society is based on discourse.
- Ideological influencing is accomplished through discourse.
- Discourse is historical.
- The connection between text and society is mediated.

- Discourse analysis is interpretative.
- Discourse is a method of social action.

Analysis, interpretation and explanation of social issues are thus at the core of discourse analysis, therefore, the roles of communicators, motives of communication and context will be explained. Teun van Dijk (1993, 258-259) places a description, explanation and critique of the ways dominant discourses influence socially shared knowledge and attitudes at the centre of discourse analysis. This means that the influence of structures (in this case, SNSs) determine mental processes and the formation of social representations (such as of the fit and healthy body), and of social attitudes (the process of becoming fitness literate).

A major benefit of the discourse analysis technique is that authentic conversations can be analysed. This enables researchers to describe the actual communicative processes and to base conclusions on what happened. Material for the discourse analysis of this study occurs naturally in social contexts, and therefore I did not influence the material (Jørgensen and Phillips 2002, 120). As discourse analysis is sometimes criticised for being an exercise in interpretation and not necessarily analysis (Machin and Mayr 2012, 208), an effort was made toward greater objectivity by considering multiple observations and by choosing two diverse case studies. This enabled me to compare cases in terms of gender, approach and philosophy to determine the varied impact of the message. This approach also tends to require a detailed analysis and allows only relatively small amounts of discourse (Jørgensen and Phillips 2002, 120). This limitation has also been partly overcome by applying multiple research techniques, such as content analysis and historical research, to understand present practices in light of the past and to examine trends across time.

Discourse analysis is best suited to reflect authentic conversation, and allows for the description and reconstruction of communicative processes to reveal obscured fitness literacy communications in textual engagement on fitness media content. The combination of research techniques is applied to demonstrate the contribution of YouTube as SNS to the distribution and intensification of the fitness megatrend.

Through conducting multiple case studies and a discourse analysis, a research design was established to explore the impact of YouTube on fitness literacy.

1.4 Methodological approach

This section further interprets the methodological framework by discussing the adaptions made to the standard research methods introduced previously. The research framework used in this study started by developing the research question, followed by a literature review to define terms and context of the impact of SNSs on social behaviour leading to the fitness revolution, as well as phenomena such as biohacking. The literature review includes extensive historical research in order to draw parallels between the increase in traditional literacy that resulted from the development of the printing press and new technologies such as SNSs (YouTube) on the general public's fitness literacy. In Chapter Five, a combination method of multiple case studies and discourse analysis techniques is applied to fitness videos with high levels of engagement on YouTube.

Subsequently, the aim is to assess the possible increase in users' fitness literacy following their engagement with fitness videos on YouTube. Two of the most-viewed biohacking videos from each channel were selected (for a total of four videos) to analyse. Particular emphasis was placed on the analysis of video comments as a potential arena for reflection of knowledge. Two or more comments from each video were assessed using Fairclough's critical discourse analysis model (Fairclough 1989, 26). In total, six texts will be analysed.

Jørgensen and Phillips (2002, 4) believe that different perspectives provide different forms of knowledge about a phenomenon, thus leading to a broader understanding. By drawing historical parallels and comparing two divergent case studies, multiple perspectives were considered, followed by the application of the research design.

An introductory overview of the background information and contextualisation of the respective fitness YouTube channels is provided, followed by a description of the procedure for the selection of case studies, video content and comments. The six selected texts from YouTube are collected, critically read and analysed for patterns to

emerge (Gill 2000, 187-189). Finally, the findings from both case studies are compared, conclusions are drawn and recommendations are made to add sophistication to the study.

1.4.1 Application of multiple case studies

Case studies can get remarkably close to the subject of interest, especially by means of direct observation in "natural" settings. In this study, a set of individual case studies were selected to provide examples of emerging fitness trends and allow for detailed analysis and comparison of multiple cases.

1.4.2 Channel selection process

The fitness community on YouTube is an exceptionally large and active group. Fitness-themed channels typically focus on biohacking methods such as exercise routines, muscle mechanics, nutritional information and sleeping habits. This study focuses on Athlean-X and Blogilates, currently the most popular individual male and female fitness channels on YouTube, respectively, judged by their numbers of followers compared to other fitness channels. By 2020, Blogilates has over 4.78 million subscribers and Athlean-X 9.6 million (YouTube 2020b). These channels are focused on different aspects of physical culture since they are targeted to gendered audiences. The set of gender-inclusive case studies offer superior insights as opposed to research utilising a single case study, which does not reflect the full diversity of sources.

The selection of case studies aimed to capture a typical representation of popular YouTube video engagement and indicators of fitness literacy therein. For that reason, channels that achieved the greatest reach were identified. In establishing the corpus for analysis, YouTube's search engine (www.youtube.com) was used to search for the keyword "fitness". Results were then filtered to show the channels with the highest view count first. On 4 February 2021, Athlean-X and Blogilates were identified as the most-subscribed-to male and female fitness channels.

1.4.3 Video selection process

To produce evidence of biohacking literacy spread through SNSs, one popular exercise video and one top nutrition video were selected from each channel to diversify content of analysis. Videos were required to contain fitness content or biohacking practices such as nutrition and exercise and must have been posted within the last 12 months. Images were obtained by taking screenshots of scenes in the video illustrative of biohacking practices.

1.4.4 Application of discourse analysis

To optimally explore selected areas and contextualise natural biohacking as fitness literacy on YouTube in order to answer the research questions, relevant discourse on top fitness videos was collected and used as the basis for analysis leading to conclusions.

Flick (2014, 144) views language as the primary medium to construct different versions of events and experiences, taking into account their particular purposes and social contexts. Discourse analysis is therefore principally concerned with the study of the process of communication itself. The methodology focuses on the relationship between structures of text, language use and verbal communications, while at the same time considering cultural structures and social representation (Yin 2016, 69). Discourse analysis can thus be applied to analyse different social domains and explore language use in broad societal and cultural developments, such as globalisation and the spread of mass media communication (Jørgensen and Phillips 2002, 2).

Norman Fairclough's model of critical discourse analysis from his book *Language and Power* (1989) proved valuable to this study. Fairclough's systematic procedure contributes to making the research process transparent and replicable, which is an important indicator of the value of qualitative research. Comments indicative of fitness knowledge were transcribed and analysed according to Fairclough's critical discourse analysis model, which consists of three interrelated processes. Firstly, text is analysed to formulate a description that is concerned with the formal properties of the text. Secondly, the analysis is processed to interpret and explain the relationship between text and interaction. Finally, an explanation is provided which is concerned with social

analysis and the relationship between the interaction and the social context (Fairclough 1989, 26).

The disadvantage of Fairclough's method of critical discourse analysis lies in the level of detail required, which allows only for a small amount of material to be analysed. As there are large volumes of engagement on the selected videos posted on SNS, the comments chosen needed to include only those indicative of fitness literacy (Jørgensen and Phillips 2002, 147). Two or more individual comments from each video, with the shared theme of fitness and nutrition, were included in as part of the case study. Recognising the shortcomings of textual analysis, discourse analysis was used as a heuristic technique to spearhead the analysis of the texts in question.

1.5 Literature review

This literature review seeks to provide a critical overview of published works that pertain to the subjects of literacy, fitness culture, biohacking, YouTube as an influential and opinion-forming digital platform and physiological literature.

1.5.1 Literacy as revolutionary technology

This study creates an analogy between the concepts of enhanced public or mass literacy and the fitness revolution as hosted on social media platforms. Thus, the contextualisation of literacy and the history of the printing press serve as the first leg of the analogy. Although several studies cover the history of the press and its influence on mass literacy, digital biohacking practices have not been connected to the printing press and early literacy.

A historical contextualisation of the first instances of (western) public literacy and the printing press serves as a springboard for the rest of the study by establishing a comprehensive definition of literacy. Influential American social critic Howard Rheingold defines literacy in the essay *Participative Pedagogy for a Literacy of Literacies* (2013). This essay is focused on digital participatory cultures and proves valuable in the interpretation of YouTube as a participatory digital platform. Rheingold (2013, 217) explores literacy in relation to social media. He sees the printing press as enabling literacy and collective knowledge production, since digital social participation

allows for collective interaction. He interprets social media as augmenting human behaviour and sociality and contributing to literacy by bridging sociality and technology. This is because literacy is essential to the human ability to enable participation by sharing systems and technologies (Rheingold 2013, 215-217). Consequently, social media platforms such as YouTube develop new forms of digital literacies that give individuals access to a particular participatory digital culture, as is the case with fitness. Rheingold's article *Twitter Literacy: Knowing How to Use It Is Key* (2019) similarly describes literacy as a set of skills for encoding and decoding information that grant an individual access to a community.

Carl Kaestle similarly explores traditional literacy in *The History of Literacy and the History of Readers* (1985) as "the ability to decode and comprehend written language at a rudimentary level, that is, the ability to look at written words corresponding to ordinary oral discourse, to say them, and to understand them" (Kaestle 1985, 13). Gates (2009) also defines print literacy as learning to read and write, and offers an account of the transformations in western culture as brought about by the discovery and development of printing in Europe.

The shift to print culture and the impact of Gutenberg's movable type printing press is contextualised first through American historian Elizabeth Eisenstein's work *The Printing Revolution in Early Modern Europe* (2005). The book is a seminal historical account of the advent of printing as an agent of change in the communications revolution. Eisenstein is aware of network effects, and explains how books and printed matter provided the basis for new extensive networks of interaction. This approach is thus also suited to consider the impact of digital technologies.

Eisenstein (2005, 102) credits Marshall McLuhan's *The Gutenberg Galaxy: The Making of Typographical Man* (1962) with first spreading awareness of the possibility that printing had social and psychological consequences. McLuhan (1962, 31) predicted the networked "global village" of electronic interdependence and explored the effects of the movable type of press as well as the "trauma" of literacy caused by the introduction of the phonetic alphabet (McLuhan 1962, 22). *The Gutenberg Galaxy* aids the examination of the impact of enhanced literacy in the fifteenth century and how it compares to the digitally mediated fitness literacy or contemporary biohacking by introducing the

concept of the human extension of abilities through technologies. However, this enhancement of bio-functionality is only one aspect of what any new technology does. It also changes our environment, and when we change our environment, we change ourselves. The press was arguably the most influential of technologies in this regard. McLuhan (1962, 58) argues that the press's quick and easy reproductive capacity inadvertently caused uniformity and repeatability. McLuhan's view of the press as revolutionary technology is in league with my contention that the current fitness megatrend owes its increasing reach to development in digital technologies and cultures, which is comparable to the invention of the printing press as catalyst for the Reformation.

Electronic media has introduced simultaneity and instantaneity, and has converted humans from nomadic food gatherers into nomadic gatherers of knowledge. Since the invention of the internet, humans have extended their central nervous system globally to instantly connect every human experience (McLuhan 1994, 358). This enables contemporary specialists on platforms like YouTube to distribute knowledge into participatory user cultures. McLuhan (1994, xi) believes that "we shape our tools, and thereafter our tools shape us", which is interpreted in this study as: "we shape the internet, the internet shapes us".

Further historical information pertaining to print culture is drawn from *The Culture of Print: Power and the Uses of Print in Early Modern Europe* (1989) by Roger Chartier. This work consists of historical perspectives that are focal points of debate for historians and sociologists interested in the cultural transformations that accompanied the rise of modern societies. Chartier emphasises the contexts in which printed visual materials, such as newspapers and posters, were used in modern Europe. The author shows that festive, ritual, cultic, civic and pedagogic uses of print were social activities that involved deciphering texts in a collective way, with those who knew how to read leading those who did not (again comparable to fitness culture online). Gradually, these collective forms of appropriation gave way to a practice of reading privately and silently, by using the eyes alone, such as is common today.

French historians Lucien Febvre and Henri-Jean Martin detail the social or cultural impact of the introduction of printing in *The Coming of the Book: Impact of Printing*

1450-1800 (1976). This work contributes to the present study by chronicling the history of print, as it is a classic account of the rapid spread of books in Europe and includes the history of paper, print, fonts and book trade.

The Nature of the Book: Print and Knowledge in the Making (1998) by Adrian Johns covers the history of books in the two centuries after the arrival of the printing press in England. Johns focuses on the use of books in the history of scientific thought during this period and explores knowledge construction that is of interest to this study as well. Although the author stops short of addressing contemporary knowledge production, he does analyse the impact of early reading culture on the Protestant Reformation.

William Bernstein's *Masters of the Word: How Media Shaped History* (2013) focuses on communication history and the effect of language technologies on societies across millennia. He contends that the world has been changed, not just by new technologies but also through access to these technologies. Vernacular bibles gave rise to religious discord, but the Reformation only took off when a combination of cheaper paper and Gutenberg's printing press decreased the cost of books.

Further historical analysis is drawn from *Rebel in the Ranks: Martin Luther, the Reformation, and the Conflicts That Continue to Shape Our World* (2017) by Brad S. Gregory. The Protestant Reformation and the sharp rise in literacy since the 1450s are of interest here. Gregory (2017, 17) follows the progression of the invention of the printing press and the effect of an estimated one million copies of books that were printed by 1517.

Andrew Pettegree investigates the reasons for the success of the Protestant Reformation in *Reformation and the Culture of Persuasion* (2009). Pettegree's contribution to the present study lies in his exploration of the process of persuasion employed by Martin Luther, John Calvin and other reformers to effectively spread their message across Europe. Pettegree's work is a significant study of media and communication in many ways, since each chapter is devoted to a different medium that the reformers used to communicate their theological ideas, such as the sermon, visual images, pamphlets, and books. *Reformation and the Culture of Persuasion* seeks to "explore the process of persuasion by recognising this as a layered and complex process, proceeding in different

ways, and at different points in the political process by which states or cities made a choice of confessional allegiance" (Pettegree 2009, 6). Pettegree (2009) explains the process of persuasion as beginning with awareness, leading to identification and understanding and, finally, resulting in activism. This process can be applied to the lay conversion process of most social trends, including that of the contemporary fitness movement.

Anthony Giddens's influential book *The Consequences of Modernity* (1990) is essential to construing modernism and postmodernism. Giddens offers an interpretation of institutional transformations associated with modernity. The author defines modernity as referring to "modes of social life or organization which emerged in Europe from about the seventeenth century onwards and which subsequently became more or less worldwide in their influence" (Giddens 1990, 1). According to Giddens (1990, 163), the distinctive characteristics of our current major social institutions suggest that we are currently in a period of "high modernity". Consequently, the ramifications of modernity are increasingly radical and universal. The author presents a neat vision of where society is headed, which is a kind of cosmopolitan liberal individualism. Although there is an optimistic tenor to this book, Giddens spends some time discussing environmental problems as well as the anxieties produced by our "runaway world" (Giddens 1990, 151).

Walter Ong's seminal book *Orality and Literacy: The Technologizing of the Word* (2002) has lent this study perspective into oral and literate cultures. This prominent work explores the vast differences between oral and literate cultures, offering an account of the intellectual, literary and social effects of writing, print and electronic technology. In the course of his study, Ong offers historical insights into global oral cultures and examines the rise of philosophical and scientific thinking while also examining the influence of orality–literacy studies on literary criticism and theory, and on our understanding of what it is to be a human that is conscious of the self and the other.

The Square and the Tower: Networks, Hierarchies and the Struggle for Global Power (2017) by Niall Ferguson assist in contextualising historical cultural developments and determining the impact of communication technologies. Ferguson analyses historical

capsule summaries in order to contrast spontaneous, networked action (the square) with hierarchical control (the tower). Two core concepts flow from this book, one stated early on, the other only expressly stated late in the book. The first is that our networked age is not novel but that it is the second such age. From a historical perspective, networks are too often overlooked in favour of focusing on hierarchies of power. The second major contention is that networks with actual power are mostly anarchistic. Surprisingly, however, Ferguson concludes that the lesson to be learned from history is that trusting in networks to control the world is a recipe for anarchy. The key here is "control", because power systems are fundamental to Ferguson's work. This is a paradox worth taking note of here, as his own narrative acknowledges the hierarchies of totalitarianism: "The secret of totalitarian success was, in other words, to delegitimise, paralyse or kill outright nearly all social networks outside the hierarchical institutions of party and state" (Ferguson 2017, The Fall of the Golden International). However, he still concludes that hierarchy, authoritarianism and centralised control are better than the "anarchy" of distributed networks. Nevertheless, Ferguson contributes to this exploration of the effects of communication networks throughout history by analysing key players in these networks, such as Martin Luther.

1.5.2 Biohacking

Biohacking is the process of using technology to enhance the human body as an instrument, with the ultimate aim of enhancement through self-directed evolution. According to Alessandro Delfanti (2013, 115), biohacking emerged as developments in communication and information technology were made and large quantities of data were made available due to the success of open-source and interactive media. In this study, biohacking is evaluated in relation to the fitness megatrend. Alessandro Delfanti's definition of biohacking in *Biohackers: The Politics of Open Science* (2013) is utilised, alongside definitions from Dong (2018), Swain (2014), Sovijärvi, Arina and Halmetoja (2018) and Yetisen (2018).

Delfanti (2013, 1) describes biohackers as "life scientists whose practices exhibit a remix of cultures that update a more traditional science ethos with elements coming from hacking and free software". The author also determines the influence of hacking culture on scientific culture and so offers insight into biohacking as interdisciplinary

practice. This updates the traditional science ethos with ideas originating from free software and digital sharing, which ultimately changes the landscape of scientific production. The biohacker's moral belief is centred on contemporary values related to research and innovation, aimed at the development of contemporary capitalism (Delfanti 2013, 56).

Domesticating and Democratizing Science: A Geography of Do-It-Yourself Biology (2013) by Morgan Meyer expounds upon the democratising transformation undergone by gatekeepers of professional scientific knowledge in the contemporary age. The book considers the blurred boundaries between amateur and professional in contemporary biohacking culture and the democratising effect of DIY science.

Sociologist and media and cultural studies researcher Deborah Lupton is interested in bio-politics and digital and public health. Lupton's paper *Digitized Health Promotion: Personal Responsibility for Health in the Web 2.0 Era* (2013) directs this interpretation of biohacking to consider the implications of the digital health revolution that increasingly individualises health risks by promoting the adoption of self-monitoring and self-care technologies to manage personal healthcare. An overview of the quantified self phenomenon is guided by Lee (2014), Lupton (2015) and Neff and Nafus (2016).

The article *Biohacking Gender: Cyborgs, Coloniality, and the Pharmacopornographic Era* (2017) by Hilary Malatino provides this study with the fragmentation of biohacking into two subtypes. The first subtype is described as bodily manipulation that sees the body as an assemblage of non-human and human elements, whereas the second type is invested in transcending the limitations of the human body through medical, technological and nutritional methods (Malatino 2017, 180). Samantha Shinde and Oliver Meller-Herbert (2017) provide additional information on body modification via hardware implants.

Transparency and Selfhood: Utopia and the Informed Body (2002) by Marc Chrysanthou has also proved valuable in contextualising the DIY body project as related to healthcare. Jozef Keulartz and Henk van den Belt also consider DIY biology in the article *DIY-Bio – Economic, Epistemological and Ethical Implications and Ambivalences* (2016). Similar to biohacking, DIY-bio refers to the use of biotechnology

outside academic and industrial institutions or by the lay public. The authors contextualise the DIY movement (that is naturally of interest to the present study as well) as primarily intended for home improvement projects (Keulartz and Van den Belt 2016, 2).

1.5.3 Posthumanism and transhumanism

The notion of the posthuman is explored in Robert Pepperell's *The Posthuman Condition: Consciousness Beyond the Brain* (2003). Pepperell (2003, IV) employs the term "posthuman" to describe the end of the social development period we know as humanism. It refers to the profound transformation of the traditional idea of what constitutes a human being. The term posthuman refers to the intersection between biology and technology to the point that the two become one.

Katherine Hayles's influential book *How We Became Posthuman* (1999) similarly provides crucial understandings concerning the concept of posthumanism. Her posthuman view sees the body as the original prosthesis that can be manipulated, so that extending the body with other information processes such as biohacking is a mere continuation of this process. Posthumanism casts the human being so that it can be smoothly articulated with intelligent machines. There are no definite boundaries between bodily existence and computer simulation, cybernetic mechanism and biological organism, robot teleology and human goals, according to posthumanism (Hayles 1999, 2-3). The cyborg understands the human body as a machine, and since the industrial revolution, machines have had an increasing impact on everyday human practices (Lupton 2012). The two dominant types of cyborgs are therefore the reconceptualised posthuman body and the machine-dominated monster. By redesigning the human as an entity that can be "seamlessly articulated with intelligent machines", computation overshadows individualism as the focal point of the human identity (Hayles 1999, 34).

Sherry Turkle explores the way in which the relationship between humanity and computing transforms our self-awareness in *The Second Self: Computers and the Human Spirit* (2012). She investigates the development of the posthuman perception of embodiment that is of interest to this study and believes that technology influences what

we do and how we think. Turkle (2012, 285) describes the transformation thus: “Where we once were rational animals, now we are feeling computers, emotional machines.”

Transhumanism, in addition, has the same core principles as posthumanism but leans toward the extreme. Niklas Bostrom is a leading transhumanist philosopher and provides formal definitions for transhumanism in his documents the *Transhumanist FAQ* (2003) and *A History of Transhumanist Thought* (2005). Transhumanism is an intellectual and cultural movement believing in the improvement of the human condition through applied reason by developing accessible technologies focused on enhancing human psychological, intellectual and physical capabilities. Transhumanism is further construed through readings of Max More (2013) and Julian Huxley (2015).

Calvin Mercer and Tracy J. Trothen’s book *Religion and the Technological Future: An Introduction to Biohacking, Artificial Intelligence, and Transhumanism* (2021) presents the religious and ethical implications of extreme biohacking (such as merging computer technology with human biology, genetic modification and brain stimulation), and provides this study with a new perspective on the impact of emerging technological developments in transhumanist approaches to biohacking.

Bioethics specialist Michele Battle-Fisher likewise investigates body hackers in the article *Transhuman, Posthuman and Complex Humanness in the 21st Century* (2020). She explores the body as transformed by trans- and posthumanist technologies and provides perspectives on contemporary body philosophy that serve the aim of the current study.

Philosophical Posthumanism (2019) by Francesca Ferrando provides this study with in-depth definitions and discussions of the notions of the trans- and posthuman. Ferrando’s chapter, *The Body*, in *Post- and Transhumanism: An Introduction* (2014) similarly redefines the body through cybernetic and biotechnological developments.

Donna Haraway’s eminent feminist essay *A Cyborg Manifesto: Science, Technology, and Socialist-Feminism in the Late Twentieth Century* ([1981] 2016) considers cyborg theory as the fusion of boundaries between culture and technology, as well as animal and machine (Haraway [1981] 2016, 3). A cyborg is defined here as a “cybernetic

organism, a hybrid of machine and organism, a creature of social reality and of fiction" (Haraway [1981] 2016, 5). Cyborg theory hinges on a high-technology view of the body, describing it as a "utility-maximizing machine" and "biotic component or cybernetic communications system" (Haraway [1981] 2016, 22). She interprets the machine as part of the human embodiment (Haraway [1981] 2016, 32) and provides this research with a lens through which to explore the idea of fitness literacy as a cyborgian technology. It is thus argued here that fitness literacy is a form of cyborgism, since it is driven by both fact and fiction. For evidence of this contention, consider the masses of social media users partaking in digital fitness culture who have a fictitious ideal of what the body should look like. They then integrate technological regimes aimed to transform the body and make the vision into reality. Deborah Lupton's chapter *The Digital Cyborg Assemblage: Haraway's Cyborg Theory and the New Digital Health Technologies* (2015) is used as secondary source to relate Haraway's cyborg theory to contemporary healthcare technology. Additionally, *Body Drift: Butler, Hayles, Haraway* (2012) by Arthur Kroker provides a useful interpretation of posthuman subjectivity as construed by Hayles and Haraway.

1.5.4 Fitness literature

Fitness is commonly associated with strength, flexibility and cardiovascular endurance. Lived definitions include feelings of capacity and control, as well as perceptions of social norms and expectations (Smith Maguire 2008, 2). Jennifer Smith Maguire, Professor of Cultural Production and Consumption, provides an insightful account of the history of fitness in her book *Fit for Consumption: Sociology and the Business of Fitness* (2008).

Steven Riess's book *City Games: The Evolution of American Urban Society and the Rise of Sports* (1989) guides the historical analysis of the circumstances leading to the massive popularisation and development of contemporary fitness ideas in urban society.

The first historically remarkable fitness boom saw multitudes of previously sedentary individuals take up physical activity. King (2006, 48) observes that the body as an indicator of fit living (i.e., when fitness is readable on a body) became a status symbol in the 1970s and 1980s. An example of this popularity can be seen in fitness media

popular at the time, such as Jane Fonda's workout videos, which achieved global success. Interestingly, the popularity of the first workout videos was also supported by the new technology of the household videocassette recorder (VCR) that boomed since 1980. This is because the VCR opened new options for fitness training, allowing users to exercise individually, whenever they chose to (Martschukat 2021, The "right amount" of exercise since the Me Decade). Comparably, YouTube has caused another workout video trend online. Fitness enthusiasts currently have more tools available to control their health than ever before. One such example is self-tracking practices. However, the logic of perpetual tracking places commodification at the centre of the current fitness megatrend, making it the ideal vehicle for commercialism (Millington 2016, 192).

It might be that these digital self-measuring devices are giving individuals a way to translate the messages their bodies transmit; for example, the concept of 100 calories means little to someone not literate in fitness biohacking. Lupton (2012, 238) addresses issues such as how the idea of the cyborg (the human–machine hybrid) applies to theorise mobile health technologies and how mobile digital technologies may be used not only as body prostheses but also as interpreters of the body. Self-tracking technologies in preventive medicine represent a shift from – health is the responsibility of my physician to – health is a private responsibility (Swan 2013, 92).

Andreasson and Johansson (2014; 2018), Davies (2017), Hentges (2014), Martschukat (2021) and Millington (2016) aid the discussion of developments in fitness culture. Baudrillard deconstructs the impact of consumer culture in his book *The Consumer Society: Myths and Structures* (1998) and serves as a critical lens through which to interpret fitness practices.

Roberta Sassatelli's book *Fitness Culture: Gyms and the Commercialisation of Discipline and Fun* (2010) is the product of extensive participant observation of over 15 years of ethnography in western gyms and explores the relationship between the contemporary cultures of body discipline and consumerism. Sassatelli (2010, 25) notes that fitness gyms appeal to a mixed public, forming a shift in the idea of the gym as a subcultural passion to a mass leisure activity that is combined with popular culture.

Appearance and Identity (2008) by Llewellyn Negrin aids the analysis of postmodern embodiment throughout Chapter Five. Negrin (2008, 15) describes the postmodern body as an ideal site for investment that individuals use to construct an identity and a reliable sense of self, given the postmodern cynicism of traditional authority structures. Featherstone (2007) and Shilling (2005) also contribute to the analysis of contemporary bodily perceptions of interest to this study.

1.5.5 YouTube as digital platform

Fitness literacy is spread by professionals in the field of fitness (such as physiotherapists, biokineticists and personal trainers) who own popular SNS accounts that freely share physiological solutions or hacks to followers, contributing to the open science movement. The audience of subscribers hailing from all around the world establishes a digital forum which is aptly described as the YouTube University, blurring the traditional boundaries between professional and amateur health and fitness experts. Specialist advice and prescriptive health programmes are readily available to a growing number of followers who are interested and connected, not just to the selected elite able to afford regular personal consultation with various healthcare professionals. Biohacking is accordingly democratised via social media networks and sites. Social media biohackers become quasi-experts and assume the role historically reserved for highly trained specialists (such as doctors, dieticians and scientists). Susie Khamis, Lawrence Ang and Raymond Welling (2017) see this as the full extension of marketing logic and language into more areas of contemporary social life.

Pepperell (2003, 5) describe websites as natural extensions of the multimedia desktop because of the easily navigable environment of the web that offers contact with immense quantities of data, consequently producing a realm of information that is not connected to space and time. He continues to discuss online communities or meetings between thousands of physically remote individuals across the world as the combination of virtual representations and digital communications. More often than not, the dominant social effects of communication result from the collective impact of the media and the variety of ways in which individuals come into contact with the media in their daily lives (McCombs 2012, 11). Contact with the messages of the media ranges from incidental to deliberate exposure. For most individuals, their cumulative exposure to the

media over a week includes a variety of contact types. It is precisely the cultural impact of this regular consumption of fitness media that is of interest to this study.

With this analogy in mind, this research focuses on the elements which fitness literacy and literacy in general have in common. Many parallels can be drawn between the emerging collective intelligence of the biological workings and health of the body so popular on current social media platforms and the rise of literacy in western Europe during the Reformation, in the time of the first western printing presses. Knowledge about elite aesthetic sports such as bodybuilding becomes widespread, and a collective intelligence emerges from the collaboration. Collective efforts, competition and mass activity are thus made possible by social media platforms like YouTube.

Contextualisation of YouTube as a digital platform that enables participatory fitness culture is drawn from two editions of Burgess and Green's book *YouTube: Online Video and Participatory Culture* (2009; 2018), as well as Allgaier (2020), Akagi (2008), Bärtl (2018), Blum (2020), García-Rapp (2017), Jong and Drummond (2016), Khamis *et al.* (2017), Khan (2017), Montero Sánchez (2021), Strangelove (2010), Tiggemann and Zaccardo (2016), Tolson (2010) and Ratwatte and Mattacola (2019). The fitness megatrend has gained traction through social media platforms and serves as an example for the dismantling of knowledge monopolies (Khamis *et al.* 2017, 205). Therefore, YouTube is analysed as a participatory culture enabling the democratisation of information through perspectives discussed by Chau (2010), Jenkins (2006) and Rheingold (2013).

1.6 Overview of chapters

The first and introductory chapter of this study has discussed key terms and identified the scope and relevance of the enquiry. Terms discussed in Chapter One include biohacking, literacy and its relation to fitness literacy, the fitness megatrend and the role of YouTube as digital platform.

Chapter Two focuses on the origins of the transformative power of literacy and the democratisation of knowledge through the disempowerment of the gatekeepers of information since the invention of the printing press. Literacy is first explored as a

technology, followed by a historical contextualisation and analysis of early European print culture. Emphasis is placed on the history of modern self-awareness. Thereafter, McLuhan's ideas regarding the transformative impact of technologies such as print are investigated.

The fitness megatrend is unpacked in Chapter Three to deconstruct the movement and position fitness as a form of literacy. This chapter aims to provide a background for the globalised fitness culture by introducing relevant historical developments and related theoretical underpinnings.

Chapter Four focuses on the analysis of fitness literacy as a type of biohacking. The discussion of fitness literacy is extended here, and basic biohacking is evaluated in relation to the fitness megatrend. This chapter is devoted to biohacking; thus, philosophical influences such as cyborgism, posthumanism and transhumanism are explored before the practical applications of biohacking are discussed. Biohacking is analysed as part of contemporary popular cultural movements.

The study continues by defining YouTube as a digital platform for biohacking in Chapter Five. This chapter includes the application of the methodological framework to two respective case studies of fitness YouTube channels and discourse analysis of comments on popular biohacking videos. In conclusion, a comparison and discussion of the findings is offered.

Chapter Six consists of a conclusive summary of key arguments, findings and conclusions.

CHAPTER TWO: LITERACY AS A REVOLUTIONARY TECHNOLOGY

2.1 Introduction

Technologies contribute to radical changes in the cultural development, priorities and lifestyle choices of modern societies and individuals. In determining the impact of novel technologies such as YouTube on the public's fitness literacy, this chapter draws on influential understandings regarding traditional literacy. The chapter starts with a historical contextualisation of the printing press as the enabler of early western public literacy. By enquiring about the literacy revolution brought about by the press, this study aims to analogously explore how the concept of enhanced fitness literacy through biohacking is disseminated on SNSs to promote a similar transformation. As far as could be determined, the area of research regarding technological transformation has not previously been linked to the Reformation and digital biohacking culture in the manner undertaken here.

For most, literacy refers to reading and writing, and schooling is perceived as the tool for accomplishing it (Gates *et al.* 2009, 24). It is defined as the skills necessary to decode, encode and understand linguistic symbols and texts on a basic level (Gates *et al.* 2009, 26; Kaestle 1985, 13), and is driven by social processes that rely on communication and meaning (Gates *et al.* 2009, 26). Literacy has recently expanded to include areas such as media literacy, digital literacy and even emotional literacy (Gates *et al.* 2009, 26). Similarly, this research expands literacy to encompass fitness. Howard Rheingold (2013, 217) describes literacies as the intersection of the human brain, sociality and communication technologies. He views the alphabet as a social practice – where sociality meets "the augmenting power of technological networks". Literacy is therefore an essential method used by humans to build social structures, as it is used to "introduce systems and tools to other humans, to train each other to partake of and contribute to culture" (Rheingold 2013, 217). In short, this means that literacy intersects with technology and sociality and indicates that, when individuals learn the particular skillset of decoding and encoding knowledge, they are introduced to a community or culture (Rheingold 2013, 217).

Following a brief history of the impacts of printing and religious culture, I indicate how the modern self is constituted through literacy. Finally, literacy is explored as a form of self-extension in accordance with Marshall McLuhan's theories on collective knowledge production through technology.

2.2 The printing press and traditional literacy

The spread of literacy in the fifteenth century is considered one of the most transformative events in world history (Easton 2008, 47). Mass literacy of the public was advanced by ready access to the printed word, enabled by the development of the printing press. In this regard, Elizabeth Eisenstein, well known and respected for her historiographical research of print culture in western civilisation, opens her work *The Printing Revolution in Early Modern Europe* (2005) with an illustration, entitled "The Press Descending from the Heavens" (Fig 4). Eisenstein credits the frontispiece to originally being utilised by French bibliographer Prosper Marchand in his *History of The Origin and Early Progress of Printing* (1740).

Figure 4: Jakob van der Schley, The press descending from the heavens, 1739. Pen and ink, 19.5 x 15 cm. The Hague, Netherlands (Eisenstein 2005, Frontispiece).

The engraving depicts the embodiment of the printed word positioned on the clouds alongside a hand press, descending to the darkened earth, illuminated (perhaps metaphorically as well) by brilliant rays of light. Accompanying the press are Mercury (the messenger god of merchants) and Minerva (goddess of wisdom and war). Eisenstein (2005, xii) sees this as an example of how technology was exalted with associations to classical mythology.

Awaiting the descending trio is a tranquil gathering of five royally garbed matriarch figures, each representing a major European country. This bears witness to the birth of European identity, which is associated here with liberal progress and modernity

(Loughran 2014, 38). The technology of the press is first presented to Germany and thereafter to the Netherlands, England, Italy and France.[1] Each country's greatest printers are represented by the portraits offered to the viewer by the matriarchal figures, namely, Germany's Gutenberg, Fust and Schoeffer, Netherland's Laurens Koster, England's William Caxton, Italy's Aldus Manutius and France's Robert Estienne. This deliberate composition implies that publishers and printers glorified their pioneers, promoting them in a celebratory fashion (Eisenstein 2005, xi). Loughran (2014, 38) identifies the symbolic relationship between the populace and technology observed in the illustration as a critical moment in the transition from the medieval to modernity.

This artwork can be seen to epitomise the understanding of the revolution brought about by the printing press and the succeeding print culture. Ferguson (2017, 43) identifies the first modern "networked era" at the end of the fifteenth century, after the printing press was introduced in Europe. The second critical networked era of technological revolt dated from the 1970s (Ferguson 2017, 43), and coincided perfectly with the start of the fitness megatrend that is explored in Chapter Three. When considering the extensive history of technological progress in the west and its effects on social structures, the impact of the printing press can be related to the modern-day reformation caused by digital technologies. Just as McLuhan (1962, 158) views the printed word as representing "arrested moments of mental posture", Eisenstein's frontispiece is a symbolic presentation of the mentality of early printing culture. These "arrested moments" also relate to the ability to encode or "suspend" information and thoughts in text. Furthermore, the printing press is depicted here as a divine technology, mastered by "men in aprons rather than hoodies" (Murphy 2020, 23), alluding to print technology becoming widely utilised by technicians and not just practised in religious contexts.

The perception of printing as a divine gift to the mortal realm (reminiscent of Prometheus gifting humanity fire) is partly reflected by the assertion of John Foxe, a prominent English historian of the period, that the predecessor to Protestantism,[2] Jan

1 Since Gutenberg's invention in the fifteenth century, the technology spread across the entire western Europe within one generation (Buringh and Zanden 2009, 34).

2 Protestantism is one of three branches of Christianity, along with Roman Catholicism and Eastern Orthodoxy (Mercer & Trothen 2021, 236).

Hus, was unsuccessful[3] compared to Luther (1483-1546). According to Foxe, Hus failed because "God invented print" and there would have been no Reformation without it (Cummings 2009, 8-9), illustrating how humanity's technological progressions were regularly interpreted as a divine intervention instead of a mortal achievement.

Eisenstein (2005, 335) situates the printing press as an "unrecognized" revolt that has been changing the world since 1450. The invention of printed communication makes this period essential to the history of human culture, even though the literate modernity easily takes the written word for granted, despite the fact that literacy is (and has been) necessary for the evolution of consciousness (Ong 2002, 171). Eisenstein (2005, xv) analyses the cultural reaction to technology and studies the lasting, unintentional after-effects of the invention of the printing press, marking the period as "the point of no return" for the collective psyche of human history (Ferguson 2017, [Chapter 16] When Gutenberg Met Luther). She recognises a gradual but direct relationship between the growth in book production and an evolution of early mass culture. As a result, modernity was shaped by the effects of printing and publishing on cultural history, and, as the emerging reading public directed greater focus to the individual, the self-reflecting person was formed through literacy (Bhaskar 2013, 2). Walter Ong likewise links the history of the development of modern human consciousness to the progress made by the technological innovation of literacy, printing and later by electronic technology (Ong 2002, 171; The Walter J. Ong, S.J., Center for Digital Humanities 2020). Literacy thus expanded modern society's vocabulary and information systems, and later played a key role in the mechanical revolution and industrialisation (McLuhan 1962, 3).

Eisenstein is convinced that the world will never be the same post-Gutenberg. The ability to own books and read them silently and privately was the result of many years of technological evolution. The consequence of everyday people becoming more efficient in interpreting and sharing words and pictures is often overlooked, because we

3 Hus was burnt at the stake by the Catholic Church. Without Gutenberg, Luther may also have been executed as a heretic (Ferguson 2017, When Gutenberg Met Luther).

cannot imagine a time before the technology of printing, just as we are unable to conceive a life without the basic technology of fire at our disposal.

Human societies were initially formed by oral communication and became literate much later. Ong (2002, 2) traces the origin of Homo sapiens back 50 000 years, and the invention of script to only about 6 000 years ago. It is evident that the power of communication ties us into societies and that speech first formed consciousness. On this, Ong writes: "It is the oral word that first illuminates consciousness with articulate language, that first divides subject and predicate and then relates them to one another, and that ties human beings to one another in society." Yet even as speech amplified self-reflection, writing transformed human consciousness more intensely (Ong 2002, 9, 77) by enabling the modern privatisation of the self and advancing the development of modernity's "doubly reflexive self-awareness" (Ong 2002, 169). It is exactly this self-reflexive self-awareness and the individualisation of the modern self that would eventually enable the occurrence of the fitness megatrend. The gradual development of self-reflexivity is further discussed in the section concerning literacy and the modern self.

According to Ong (2002, 82), literacy causes alienation from the physical environment and makes people think differently about reality (Ong 2002, 9). Therefore, although writing does promote interpersonal interaction, it also causes a sense of disembodiment by amplifying the sense of self. Ong (2002, 174) describes writing as "consciousness-raising". Biohacking literacy likewise causes the literate individual to construe a different reality than if they did not consume educational fitness videos on YouTube. Simply put, literacy implies a sense of disembodiment in the written word as compared to orality, which is more embodied since it is grounded in speech.

However, despite all the positive effects of the printing press, there is a downside to the invention as well. In this regard, Murphy (2020, 24) identifies the printing press as being responsible for slaughter and chaos as well as liberation and enlightenment. In effect, the printing press transformed religion, politics and science by reorganising cultural and power structures, through shaping individual thinking and creating democratic societies.

2.3 History of print technology

Before 1000 BCE, writing and reading were used solely by rulers to govern populations, effectively advancing the scribe to the equivalent of a high-tech entrepreneur who utilised the then-new technology of literacy to gain influence and wealth (Bernstein 2013, 15). Formidable physical and intellectual barriers to literacy in the pre-Gutenberg world excluded almost everyone but the upper class and their scribes from significant political influence. Religion provided elites in power with their greatest source of political strength, as only a minority could read and write in preliterate societies. The illiterate was amazed by the power of literacy, and supernatural properties were often dedicated to the literate (Bernstein 2013, 7-8). This is comparable to the pre-SNS era where fitness experts are regarded as exceptional, with "being born with good genes" accounting for their unachievable-by-laypersons physique.

Although China and Korea were first to invent the printing press, the technology was kept for the exclusive use of eastern rulers (Chartier 1989, 1). Ferguson (2017, When Gutenberg Met Luther) contends that the fifteenth century's democratisation of the printing press in western culture marks Gutenberg's invention as unique achievement. Establishing his first press in approximately 1450, Gutenberg generated an economic surge, and many skilled Germans soon also mastered the technology of printing to meet the widespread demand and to save on costs related to centralised production. Consequently, the technology of the printing press spearheaded the circulation of the written word on a massive scale after production cost and time decreased (Chartier 1989, 1-2).

The printing industry was profit-motivated and soon caused the gatekeepers of information to be rendered obsolete. Within a few decades of the introduction of the printing press, almost every substantial European town possessed at least one printing press (Murphy 2020, 23). Access to printed material had massive cultural and economic effects on populations of the fifteenth to sixteenth centuries. Cities with a printing press developed between 20% and 80% faster than cities without the technology, and capitals with more than one press were most likely to convert to Protestantism (Ferguson 2017, When Gutenberg Met Luther). The printed word was crucial in cultural movements, as arguments calling for political reform were published in pamphlets, newspapers and

books, which served as vehicle and catalyst for political, religious and cultural revolutions (Ferguson 2017, [Chapter 20] Networks of Revolution). Books as a means of communication appeared in exponentially increasing numbers, changing practices of devotion, knowledge production and entertainment. The increased literacy of laypeople made the containment and censoring of ideas problematic for the church and rulers of the time.

Historiographer Roger Chartier explores print culture in *The Culture of Print: Power and the Uses of Print in Early Modern Europe* (1989). He views the mechanisation of the reproduction of writing and pictures as a seedbed for new habits and actions. As the demand for print increased in early modernity, a network of specific practices occurred, and can be delineated as the culture of print. Books redefined people's relation to power and relationships within communities. New technology for text reproduction brought profound transformation to public and private domains of life.

Murphy (2020, 24) asserts that "when people can publish whatever they want, they do", implicating that the printing press standardised availability of information to all and allowed the development of post-truth.[4] This led to the public demand for alternative book genres such as romance novels, erotica, recipe books and many more previously unknown publications. Bhaskar (2013, 5) maintains that the publishing is not a passive medium, but that it shapes and sometimes even controls societies and "carries forward our sciences and powers our culture". As such, the religious and political disruption of the Reformation in Europe was an unintentional enabler for the Scientific Revolution, Enlightenment and many more transformative movements (Ferguson 2017, When Gutenberg Met Luther).

Lucien Febvre prefaces *The Coming of the Book: Impact of Printing 1450-1800* by stating that "the printed book was one of the most effective means of mastery over the whole world" (1976, 11). However problematic this imperialist notion of "mastering" the natural world has proved to be, the book created "new habits of thought" in the lives of every person willing and capable to think for themselves (Febvre and Martin 1976,

4 Post-truth refers to the absence of shared objective standards for truth and indicates the rise of "alternative facts" (Illing 2018).

11). Febvre and Martin (1967, 10) further maintain that the printed book was not only a "triumph of technical ingenuity, but also one of the most potent agents at the disposal of western civilisation in bringing together the scattered ideas of representative thinkers". In other words, the printed word enabled the quick and inexpensive (compared to earlier times) consolidation of ideas and research in all fields. The printed word gives thoughts and concepts reach, coherence and accessibility, and so empowers the transmission of ideas (Febvre and Martin 1976, 10).

In his autobiography, *Reminiscences of a Literary Life* (2010), bibliographer Thomas Frognall Dibdin compares the history of the printing press to that of literature. He describes print as influencing every aspect of human knowledge, enabling corrections to earlier, erroneous scientific ideas (Dibdin 2010, 273-274). Literary history has become the history of books, including English medieval and Renaissance works such as Shakespearean plays, poetry by Milton, Wyatt and Spencer, as well as histories like those by Foxe (Lerer 2007, 454). The printed version of the English Bible,[5] introduced in the mid-fifteenth century, is generally regarded as the most critical literary production in western society (Cummings 2009, 6). It was produced in a creative period of transitions, just after the invention of gunpowder and portable firearms.

Canadian media expert Marshall McLuhan (1962, 184-191) argues that people are "levelled in their capacities and performance" through mass literacy. This investigation is similarly interested in analysing and interpreting the standardisation of improved health and physiological performance that is owed to the availability of body-hacking content on contemporary SNSs.

5 The increase in translations and production of Bibles prompted the involvement of "lay-people in the production process, trading and readership" of the Bible (Van Duijn 2013, 276). By the time Luther articulated his convictions in writing, the Gutenberg revolution had already taken hold. Lay readers became captivated with additions to vernacular Bibles and accounts of Catholic corruption (Bernstein, 2013, 6). As such, laypeople acquiring access to communication technologies lead to political opposition, as is evidenced by the printing press destabilising the Catholic Church (Bernstein 2013, 12). Modern-day Protestant communities still define themselves largely by the collective and individual experience of reading scripture, and religious knowledge is a concentrated site for dialogue surrounding the role and impact of reading in particular (Johns 1998, 384).

2.4 Literacy and religious culture

This study is not concerned with observing a preference toward any theological ideology, but is instead interested in the internalisation of ideas and culture through technological developments. The ensuing investigation of the impact of literacy on the propagation of beliefs necessitates a brief discussion of the events known as the Reformation or the Protestant Reformation (more or less from 1517 to 1648) and the development of printing press technologies that led to it.

The Reformation can be defined as the religious uprising against Catholic dogma and hierarchy by a network of "enlightened" Christian believers, which, after years of brutal anarchism, established the Protestant Church (Ferguson 2017, When Gutenberg Met Luther). Cummings (2009, 5), Ferguson (2017, When Gutenberg Met Luther), Johns (1998, 408) and Ong (2002, 175) are in accord that the Reformation was a direct result of the increased literacy of the masses brought about by the printing press, fundamentally changing religious observation, principal beliefs and interpretation of scripture.

This inquiry relates the impact of increased literacy during the fifteenth century leading to the Reformation, the contemporary fitness revolution and the increased fitness literacy brought about by SNSs. The printing press is acknowledged as a context generator for the Reformation and can be interpreted as the first instance of a mass networked culture that was distinctive of modernity.

Studies of early modern attitudes confirm that Protestants believed they had a unique connotation to the printing press (Eisenstein 2011, 44), portraying the printed word as the "weapon" that challenged Catholic misrule and giving energy to the snowballing ideological cause (Eisenstein 2011, 45). Buringh and Zanden (2009, 33) agree that Protestantism appears to have had a strong impact on mass literacy.

The Catholic Church was placed in a difficult position during the vernacular "pamphlet warfare" (Eisenstein 2011, 52) that ensued after the invention of the press. Writers of the time referenced other texts and so created unprecedented public debate in which readers participated. This was starkly in contrast with Catholic congregation members

listening passively to sermons or going to confession. Catholic apologists' publications were forced to defend their position of airing religious dialogue "in front of" a lay public and accentuating lay compliance over learning. This succeeded in spreading the very ideas the Catholic Church wanted to purge (Eisenstein 2011, 45). Ferguson (2017, When Gutenberg Met Luther) assigns the reason for Protestantism's unique prolonged resistance to repression by the Catholic Church as remarkably strong network structures established through the technology of the printing press.

Protestants' acceptance of automatic machine developments contributed to their continuous and proactive integration of modern technologies such as the printing press and radio, to the great benefit of distributing their ideologies (Gay 2018, 134). Martin Luther regarded printing as greatly benefiting the spread of religious ideas, leading to his publication of religious texts and the vernacular Bible. This transpired and affected religious culture already in the fifteenth century, well before the Reformed sixteenth century. Luther's challenge of Catholic orthodoxy was made possible by the press, and his impact on the Reformation was greatly amplified by the extent of his publications. He posted his famed 95 theses in 1517 and sold more than 300 000 printed copies in three years. This can be compared to going viral in modern-day SNS terms (Murphy 2020, 24). German printers created almost 5 000 editions of Luther's works in the sixteenth century, and he was involved with another 3 000 publications. Almost all of Luther's publications were vernacular, as an alternative to the elitist Latin of the papacy, further increasing the accessibility of his own publications (Ferguson 2017, When Gutenberg Met Luther). Luther became a prominent sixteenth-century author; however, his publications revolutionised culture and communication far more than his theology (Bernstein 2013, 14; Cummings 2009, 9; Ferguson 2017, When Gutenberg Met Luther). Simply put, it was more the fact that Luther could publish via the printing press that revolutionised culture, and not so much his theology that affected the Reformation.

In his book *Reformation and the Culture of Persuasion*, Pettegree (2009, 18) discusses religion as it relates to reformation in language and texts, using the Reformation as starting point for the early culture of writing. Converts to Protestantism were "disproportionately urban and literate" (Gregory 2017, 90-91), as a result of the new emphasis that was placed on education in everyday Protestant lives. Interestingly, there

is an analogy to be drawn to the YouTubers who follow biohacking fitness trends, as they too are mostly urban and thus susceptible to fitness literacy. Education was regarded as the path to understanding text-based Protestant teachings. Subsequently, Gregory (2017, 74) attributes Sweden's exceptionally advanced literacy rates by the end of the seventeenth century to the close relationship between schooling and religion in the country at the time. Until now, print technology, literacy and the related religious movements have been historically contextualised. The impact on the development of a modern self-perception is explored in the following section.

2.5 Literacy and the modern self

Sociologist Anthony Giddens defines modernity in *The Consequences of Modernity* (1990) as "modes of social life or organisation which emerged in Europe from about the seventeenth century onwards and which subsequently became more or less worldwide in their influence" (Giddens 1990, 1). Modernity is viewed as the connection of local and global culture and mind-sets in ways inconceivable to traditional societies, which affects almost every person on the planet (Giddens 1990, 20). The very notion of modernity is a contrast with tradition (Giddens 1990, 36). For that reason, modernity abolished traditional social order and prompted transformation from earlier modes of everyday private human lives to a new connected world. Naturally, there are continuities from the traditional in the modern, but the transformations occurring over the span of the last four centuries have been so drastic and widespread in their effect that our knowledge of earlier periods of transition is limited in interpreting these various transformations (Giddens 1990, 4-5). Giddens (1990, 6) writes: "As different areas of the globe are drawn into interconnection with one another, waves of social transformation crash across virtually the whole of the earth's surface." He is referring here to the characteristics of social institutions associated with modernity as being remarkably rapid in their global extension, thus creating social links despite geographical locations, as exemplified by the global spread of the fitness culture through SNSs.

Systemic capitalist production was and still is crucial to organisational developments in the advancement of modernity. Both the notion of the nation-state and systematic capitalist production are rooted in aspects of European history and have impacted the

world because of the power they generated (Giddens 1990, 174). Free enterprise and entrepreneurship generated the power for ideas to cross the globe where no traditional social forms managed to do, while also remaining free of global development trends (Giddens 1990, 174). Modernity is therefore universalising in terms of its global impact as well as in terms of the reflexive knowledge fundamental to its dynamism (Giddens 1990, 175).

Reflexivity is a fundamental and distinguishing feature of all human action. Giddens (1990, 36) calls this the "reflexive monitoring of action", which emphasises the compulsive nature of the processes involved. Self-reflexivity is defined as the process of reflecting on one's own story from several perspectives, taking into account the systemic privileges and barriers of overlapping social systems such as sexism and racism (Mercer & Trothen 2021, 236). As such, modern social life is about reflexivity for the sake of reflexivity and constantly strives toward that which is novel. On this, Giddens (1990, 38) writes: "The reflexivity of modern social life consists in the fact that social practices are constantly examined and reformed in the light of incoming information about those very practices, thus constitutively altering their character." A growing reading culture has prospered in modernity and augmented this characteristically human reflexivity, leading to widespread societal development:

> It is often said that modernity is marked by an appetite for the new, but this is not perhaps completely accurate. What is characteristic of modernity is not an embracing of the new for its own sake, but the presumption of wholesale reflexivity – which of course includes reflection upon the nature of reflection itself (Giddens 1990, 39).

This means that modernity has an obsession with reflection on what is new and is always looking for something new to reflect on. Trends (as demonstrated by the fitness megatrend) are examples of this uniquely modern proclivity. The reflexivity of modernity thus involves the routine alteration of social practices and the ongoing examination and reformation of knowledge in the face of *new* information (Giddens 1990, 38). Self-reflexive behaviour is further discussed in Chapter Four and Chapter Five.

2.6 Literacy as self-extension

The introduction of new digital technologies has supplied possibilities for interpretative comparisons to old technologies, thereby increasing awareness of the contemporary media environment and bringing popular media theorist Marshall McLuhan's research back into focus. In his most influential works, *The Gutenberg Galaxy: The Making of Typographic Man* (1962) and *Understanding Media: Extensions of Man* (1994), he stresses the interconnectedness of technology and humanity throughout history and analyses the role of tools, such as the printing press, in the shaping of human perception in the contemporary era (McLuhan 1994, xxi). In his view, the introduction of printing, media and other similar tools were active forces that shaped the human anthology in unpredicted ways (McLuhan 1994, 43).

McLuhan sees developments in technology as enabling the development of human consciousness across an industrialised world that undermines both space and time to create a "global village" of electronic interdependence. This village is a metaphor for the phenomenon of global interconnectivity via technology that effectively "recreates the world in the image of a global village" (McLuhan 1962, 31). McLuhan (1994, 149) describes the global village as a "planet reduced to village size by new media". This "shrinking", or what McLuhan (1994, 350) calls "electric implosion", of planet to village is a result of speed or the simultaneous occurrence of events (Marchessault 2005, 218). The global village, in other words, signifies a "simultaneous happening" in which time and space are suspended (McLuhan and Fiore 2005, 63) by new technologies of instantaneous transmission (Marchessault 2005, 208). Simply put, the village signifies the constant production and consumption of media by global audiences, effectively shrinking the planet by connecting it electronically. Without this interconnected and international community, widespread cultural trends would not be able to gain or keep momentum. It is important to note that this global village or "cosmic consciousness" is not interpreted as a utopia by McLuhan, and that the merger between virtual and physical space would have been viewed as a dystopian environment by Jean Baudrillard (Marchessault 2005, 213).

Nevertheless, McLuhan understands the media as "belonging to a living changing environment" and to an international context (Marchessault 2005, 203). This is because

the media functions as the technological simulation of collective consciousness by extending our senses (McLuhan 1962, 31; 1994, 3-4). And, since technologies function as physical extensions of human bodies and form invisible environments (Marchessault 2005, 202), the media (as extension of the senses) transforms the environment and induces new behaviours and perceptions (McLuhan and Fiore 2005, 41). The media thus forms an invisible environment we occupy but are blind to, since everyday technologies surrounding us become part of our rituals and fade to the background, only to be brought back into focus when broken (Strate 2017, 245). McLuhan argues that these self-extensions are also amputations, as the part of the body that is extended must be numbed – or amputated – in order to successfully integrate the artificial extension. In effect, this technological amputation is the removal and replacing of the corporeal function by the media as a type of prosthetic device (Strate 2017, 251).

Extension implies that all technologies serve to enhance and extend the human body. McLuhan (1994, 90) writes: "All technologies are extensions of our physical and nervous systems to increase power and speed." For example, electronic technology has externalised the nervous system and brain functions (McLuhan 1994, 247). Since the advent of electricity, and more so with the internet, we as humans have extended our nervous system globally by translating our lives into information, thereby connecting every human experience into a networked whole or single universal consciousness (McLuhan 1994, 61, 358). Therefore, technologies are extensions of the physical, social and intellectual functionalities of humanity and affect "the whole psychological and social environment" (McLuhan 1994, 4), which again implies the networked structure of the technologised humanity. It is clear that the human nervous system and the "wired planet" are fundamental to McLuhan's belief that the media could produce a level of unity across the world (Marchessault 2005, 205).

Similarly, literacy is a technology and therefore a form of self-extension. As an extension of the "visual faculty, intensified perspective and the fixed point of view" (McLuhan 1994, 172), print technology shaped a new kind of person (McLuhan 1962, 174). McLuhan (1994, 300) sees literacy as permeating every phase of communal life while functioning according to the principles derived from print technology, namely, "continuity, uniformity, and repeatability" (McLuhan 1994, 300). It is argued here that

fitness literacy as technological self-extension creates a standardised digital fitness culture and produces a new type of health-conscious and increasingly self-reflexive individual.

Another major contention of McLuhan is that the media can depict an image which influences the recipient's self-image and expectations. He believes that "we become what we behold" and that "we shape our tools", after which "our tools shape us", similar to the printing press shaping societies after its introduction (McLuhan 1994, xi). For this research, McLuhan's argument can be interpreted further as: "we shape the internet, the internet shapes us". This study focuses on the way the internet influences the shaping of users' bodies and fitness experiences through increased fitness literacy and biohacking.

According to McLuhan (1994, 15), both the French and American Revolutions took place under pressure created by printed media. The current fitness megatrend similarly owes its increasing reach to development in digital technologies and cultures, and is comparable to the invention of the printing press as a catalyst for the Reformation. As discussed earlier, electronic media, the precursor of digital media, introduced the simultaneity and instantaneity of information (McLuhan 1994, 351). It converted humans from nomadic food gatherers into virtual nomads and gatherers of knowledge. The press similarly created the modern individual after the fall of information gatekeepers and the rise of the first instances of social networks.

2.7 Conclusion

The impact of new technologies on literacy in different areas, in this case on fitness literacy, can be understood by drawing parallels with the increase in traditional literacy as initiated by the development of the printing press. Mass literacy of the public was precipitated by ready access to the printed word, afforded by the printing press.

The definition of literacy increasingly reflects the capacity to use technology for collecting and communicating information. Advancements in technology increase the possibility of healthy living, visually mediating the ideal body and activities. It provides non-specialists with the means to independently manage their well-being. The modern-

day fitness trend emerged when developments in digital technology made great amounts of data accessible through an individual's smartphone or personal computer. Thanks to the widespread impact of interactive SNSs, the former layperson becomes literate with regard to managing a healthy body in ways that were not possible earlier.

This chapter established the printing press as a transformative technology, and explored the notion of literacy and its link with early religious cultures and modernity. McLuhan provided a lens through which contemporary technologies such as social networks could be viewed as extensions of the self. The following chapter provides background to the popularisation of fitness culture.

CHAPTER THREE: THE FITNESS MEGATREND

3.1 Introduction

This chapter aims to provide a background for the globalised fitness culture by introducing key historical developments and related theoretical underpinnings. In the previous chapter, literacy was introduced as being bolstered by the invention of the printing press, which transformed western culture and enhanced the modern self-perception. Ready access to the printed word, afforded by the press, precipitated mass literacy of the public. Today, a similar transformative revolution is taking place in the fitness industry due to the prevalent impact of increased literacy that concerns the human body as shaped by contemporary ICTs.

This study contends that the popular fitness ideology that is of interest to this chapter is spread and enhanced through SNSs such as YouTube. SNSs appear to transform contemporary perceptions of the human body by stocking accessible mega-platforms with easily accessible pedagogical health media. Users' fitness literacy is advanced in ways similar to the historical enhancement of lay literacy after the development of the printing press. Popular fitness accounts on YouTube essentially facilitate self-experimentation with biohacking and DIY sports medicine, in pursuit of the ideal fit body, by sharing fitness and self-enhancement practices with a global audience.

In this chapter, the notion and evolution of fitness and self-actualisation through the instrumentalised body are explored. Urbanisation and the rise of sedentary lifestyles, as well as commercialism, are considered as the roots of contemporary fitness culture.

3.2 The evolution of fitness

This section discusses fitness and its development into a cultural phenomenon. It consists of the shifting definitions of fitness and health while situating fitness as a method of self-actualisation. Fitness is a complex and multifaceted term and is best understood through an assemblage approach. It is a mixture of personal states of being; therefore, the goals and conditions differ among individuals, groups and fitness practices in different environments across the world (Hentges 2014, 14-15; Sassatelli 2010, 14; Smith Maguire 2008, 2).

Exercise has a self-reflective function similar to meditation in that participants experience "holistic sensations" of a combination of "action and awareness" and an intensified mindfulness of embodiment (Sassatelli 2010, 122). Fitness is thus a fluid concept that is connected to the needs, social circumstances and associated uncertainties of each particular era (Smith Maguire 2008, 25). Functionally, fitness indicates the ability to perform physical work effectively and without excessive exhaustion, reminiscent of the nineteenth-century evolutionary theory of natural selection (Sassatelli 2010, 30). Fitness also signifies the physical state produced by training and indicates the capacity to adapt to physical effort, since it stimulates heightened functional capacity in a manner that allows for an enhanced quality of life (Hentges 2014, 13).

Fitness is closely related to health (which signifies the absence of disease), and links lifestyle and health. Health requires "permanent work on oneself" (Martschukat 2021, Health, fitness, and fatness in neoliberal times) in order to prevent losing one's vitality and physical ability (Martschukat 2021, The "right amount" of exercise since the Me Decade). As such, fitness is a dynamic condition that requires constant work (Figure 5). Wiest *et al.* (2015, 22) claim that the relationship between health and fitness is a product of historical and contextual forces that make fitness a necessary component of health. This relationship informs neoliberalist bio-political surveillance strategies, which are also investigated.

Figure 5: Piacquadio, Andrea. Group of women exercising, 2020. Accessed 9 September 2020, https://www.pexels.com/photo/group-of-women-doing-exercise-inside-the-building-3775566/.

Medically, physical fitness refers to muscular strength and endurance, body fat mass, flexibility and cardiovascular condition. These factors can be measured through physical performance tests to determine functional organ capacity in response to selected exercises. The collected data is compared to established standardised measurements. Fitness is therefore related to regular engagement in physical activity through exercise (Hentges 2014, 13; Sassatelli 2010, 30; Smith Maguire 2008, 2).

Fitness was already popularised in the eighteenth and nineteenth centuries (Figure 6) (Martschukat 2021, “Fit or fat?”), when the notions of “liberalism, competition, and Darwinism” were promoted (Martschukat 2021, Health, fitness, and fatness in neoliberal times). Liberalism was linked to the individual liberty and self-responsibility that emerged with modernity, and to Darwinism, which denotes the ability of organisms to compete and survive the struggle for existence. The combination of these concepts influenced a productive cultural dynamic for fitness-related issues in the nineteenth century. Since the emergence of Darwinism, the notion of physical fitness as a requirement for success and survival in a competitive global environment has been thus associated (Martschukat 2021, Fitness, Darwin, and the invention of inescapable competition). Darwin consequently grounded competition in biology, ensuring that the

social and biological sciences would become increasingly integrated in the following decades (Martschukat 2021, Fitness, Darwin, and the invention of inescapable competition). However, Darwin did not construe fitness as a dynamic condition that is "actively brought about" by an organism through self-work. Instead, he understood it as a static state where the "fittest was the most apt" (Martschukat 2021, Fitness, Darwin, and the invention of inescapable competition).

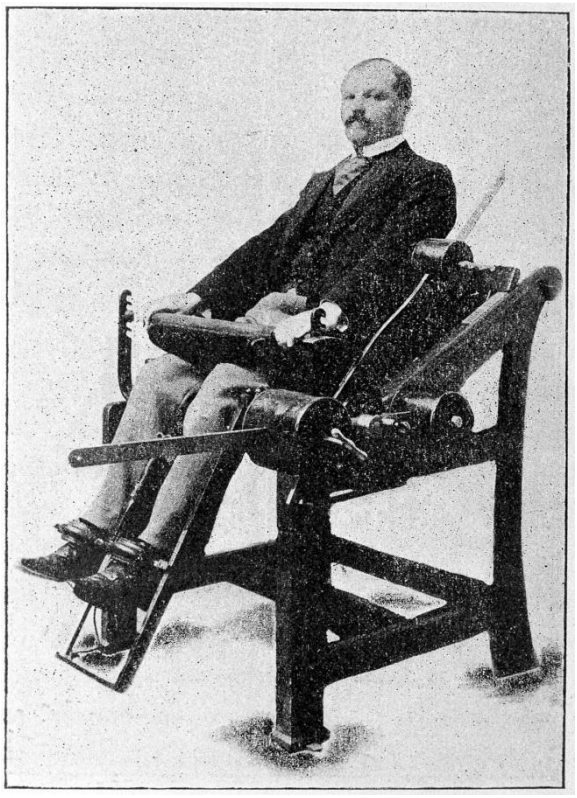

Figure 6: Apparatus for exercising the thighs, 1899. Accessed 12 June 2021. https://jstor.org/stable/10.2307/community.24727632.

In other words, he understood fitness as a static state and not the being's performance potential as influencing its survival (Martschukat 2021, Fitness, Darwin, and the invention of inescapable competition). In the second part of the nineteenth century, physiology, which aimed to understand the body, its potential and performance, grew to prominence as a major global discipline. During this time, the notion that bodywork should adhere to scientific guidelines gained momentum and was then pursued in accordance with the guidelines and nutritional science theory of the time. Exercise and food had to be precisely measured, recorded and coordinated. It was claimed that the

same rules of life applied to the average person and an athlete. Thus, in a competitive culture, the premise was established that everyone should exercise regularly to stay healthy and obtain the best outcomes (Martschukat 2021, Fitness, difference, and political participation).

When considering the notion of fitness, it is clear that the middle of the nineteenth century was a period of critical transformation in the view of the body. The definition of fitness changed: Where it had long been considered to refer to an organism or object's "fitness for purpose", or a person's suitability for a certain activity or position, the definition of fitness evolved to self-achieved physical performance enhancement (Martschukat 2021, "The eternal fitness of things"?).

Fitness also complies with certain societal expectations, and is culturally associated with a specific appearance. Phenomenologically perceived definitions of fitness consist of feelings of control over the body, reinforced by the perception of others that a body is fit and healthy. Fitness is portrayed in modern-day consumer media as being associated with youth and beauty (Smith Maguire 2008, 2). In contemporary society, the body became a medium for social control, enabling a person to realise economic and political objectives (Baudrillard 1998, 136).

Currently, the predominant way of relating to the body is to represent it as a prestige item or as an instrumental object to be maintained in terms of functionality. Medical and pharmaceutical services are linked to compulsive narcissistic investment to enhance the body as a tool for social mobility. Fitness and beauty products and services both manipulate the sign function of the body on display. Beauty is regarded as a form of capital, as it is a sign at bodily level defining a person as a member of the elite. Consequently, the body is "mined" as a symbol, visibly signalling health, beauty and happiness (Baudrillard 1998, 131-132).

The widespread fascination with being slim is not always positive. According to Baudrillard (1998, 143), constantly striving to a more attractive body can be seen as a form of violence, since the body is "violently vitalized" as a sacrifice to idealised beauty. In the past, health was related to biological survival; however, it is now a social

imperative associated with status. Simply put, the fit body becomes a prestige display in consumer societies (Baudrillard 1998, 138-139).

In *Fit for Consumption: Sociology and the Business of Fitness* (2008), Jennifer Smith Maguire investigates the changing definitions of exercise and contemporary fitness practices during the nineteenth to twentieth centuries. The definition of fitness has been shaped by historical notions of the body's abilities and the goals and methods it is subjected to in order to become physically enhanced (Smith Maguire 2008, 23). Demanding physical activity was once a necessary and inescapable element of everyday life, as opposed to the deliberate leisure practice it has become in modern societies (Davies 2017, 8). This is due to the increasing technological advancement and inactive work environments and lifestyles in urban centres around the world. Smith Maguire (2008, 2) maintains that "the contemporary value conferred on the fit body cannot be separated from the rise in the West of a largely sedentary way of life". This statement compels the consideration of fitness alongside global urbanisation.

The introduction of twentieth-century household technologies such as vacuum cleaners, dishwashers and washing machines changed physical culture, and with it, the definition of fitness (Smith Maguire 2008, 1-2). Fitness is increasingly seen as a relative state related to a degree of competence to endure specific conditions. The physical capabilities that bear most social value change with social conditions such as peace to war, urban to rural lifestyles, and manufacturing-oriented to service-oriented economies. Ideas of fitness are recycled as time passes. For example, an individual's power and willpower become important to a population at war; therefore, Smith Maguire (2008, 23) also defines fitness as battle-readiness during times of conflict.

Smith Maguire (2008, 3) analyses how individuals are encouraged by consumer culture to evaluate and "work" on their bodies through the use of fitness media, gyms and personal trainers. Although she concentrates her research on fitness culture in the United States of America (USA), central Swedish sociology researchers Jesper Andreasson and Thomas Johansson (2018, 301) agree that it is reasonable to discuss fitness culture as a global revolution or boom (Millington 2016, 1184; Smith Maguire 2008, 3). The fitness industry's remarkable international development can be marked as

one of the most swiftly advancing fields in the international consumer market, led by the USA (Andreasson and Johansson 2018, 301; Sassatelli 2010, 15).

3.3 Fitness as tool toward self-extension

The complex definition of fitness has been established above. Next, fitness is explored as a self-actualising technology. To contextualise self-extension via technology in relation to self-actualisation, a comparison of the terms is necessary. Abraham Maslow (1954, 150) describes self-actualisation as "the full use and exploitation of talents, capacities, potentialities, etc. Such people seem to be fulfilling themselves and to be doing the best that they are capable of doing." The Cambridge Dictionary (2021) defines self-actualisation as an individual's aspiration to use all their potential. This coincides with the contention of the body as a tool toward self-actualisation in fitness culture. On the other hand, self-extension is not always seen in a positive light. McLuhan's idea of human extension via technology does not necessarily correspond with self-actualisation, as McLuhan (1962, 158) is not completely positive about extensions via technology. He even refers to the "self-amputation" of the human body via technologies, implying that technology can inhibit optimal bodily capability in certain contexts.

Fitness is often described as a neoliberal project that is superficial and part of an individualistic culture, advancing rationales similar to the beauty industry and focusing on individuals and their self-actualisation (Smith Maguire 2008, 35). Baudrillard (1998, 134) ranks the body as the "finest consumer object" that is imbued with the most connotations in the contemporary consumer-centred culture. In advertising and mass media, the body is thus continuously presented as "capital" and a "fetish" or consumer object, proving that it is has become a "deliberate *investment*" in both the economic and physical sense (Baudrillard 1998, 129, original emphasis). The body no longer stands in contrast to the soul, but has rather inherited its ideological function (Baudrillard 1998, 136). Baudrillard perceives the body as becoming the new "*object of salvation*" (Baudrillard 1998, 129, original emphasis), meaning that the individual's salvation is effected through the body and no longer via the soul. In the past, puritan ideas concerning predestination wanted to convince people that the body was unimportant, and that only the soul mattered. Today, there is a massive effort in the opposite direction

– convincing people of the importance of their bodies (Baudrillard 1998, 129; Smith Maguire 2008, 26). The body has therefore become a new religious outlet.

The global growth of urban environments worldwide caused appearance to become more important, since it could be utilised as a means of upward social mobility. In *The Consumer Society: Myths and Structures* (1998), Baudrillard states that bureaucratic control in urban systems simultaneously harasses and glorifies the body "as its real possibilities are atrophying". In other words, it is more difficult to develop the body's physical potential in urban environments, as it is limited by the urban system and spatial arrangement. Therefore, actualised bodies are rarer and are consequently glorified by the same urban contemporary system suppressing them. The body is managed, manipulated and consumed as an object and a signifier of social status (Baudrillard 1998, 100, 131).

3.4 Fitness as capitalist venture

Since the 1970s, capitalist ventures promoted fitness products as tools to be implemented to realise physical self-improvement as a source of social power and individual fulfilment (Smith Maguire 2008, 40). This stimulated a market for personal trainers offering teachings and products to shape an enhanced body and a more attractive identity. The nineteenth-century ideology of fitness as a shaper of citizens through physical activity was overtaken by the twentieth-century formulation of fitness as a technology toward individual social mobility through self-improvement and beauty, as imbedded in the bodybuilding industry (Smith Maguire 2008, 36-37). Bodybuilding was rooted in the "leisure boom" that followed post-war wealth in the west, leading to the mass consumerist culture of the west. The rise of this newfound affluence, consumerism and public interest in overall health quality was stimulated by technologies that entered the mass market, such as the private television set. Television converted physical activities into "public spectacles" rather than the mere individual–team undertakings they had been before (Smith Maguire 2008, 37-38).

Contemporary fitness culture is centred on the commercialisation of equipment, venues and guidance associated with certain forms of physical activity (Millington 2016, 1197). Exercise is now seen as a lifestyle choice, status activity, cure for social ills and tool for

individual improvement. It has been unlinked from fitness as nationalist development, perhaps because of the growth of McLuhan's global networked village in the contemporary era. Today, fitness is not a method of societal improvement as it was with the sporting ideology of the nineteenth century that is discussed in the next section. Rather, it is perceived as an advancement of the self. While team sport is for enjoyment, exercise (mostly done alone) is a technology toward personal improvement, an economic contribution and means of social mobility or investment in "body capital". The main rationale of fitness is instrumental in the sense that it is perceived as a tool that can be applied against contemporary social and individual problems (Smith Maguire 2008, 40).

Fitness is subject to negotiations, during which participants challenge often conflicting demands created by consumerist culture and the service economy. According to Smith Maguire (2008, 20), people's body image is reflected to them through the lens of products and services, and consumption is promoted as the primary arena in which consumers make and remake their bodies. Through consumption, people are free to choose, to create and control themselves. Essentially, this means that fitness as commercial leisure industry promotes solutions to empowerment, self-improvement, social status and health matters. The choice "to make the most of oneself" can thus be executed through continual financial investment in self-care (Baudrillard 1998, 14; Smith Maguire 2002, 462).

In a period where health has developed as a personal obligation, looks and performances can also be work-related requirements. Free time is devoted more and more to the continual effort of self-improvement. Fitness culture is a good example of how many individuals have sought to shape their bodies and selves to become "fit for consumption" (Smith Maguire 2008, 3). Throughout the twentieth century, individual fitness was upheld by participants in the fitness culture as a tool for attaining self-improvement and self-actualisation. This is opposed to the view of fitness as merely being an instrument toward collective societal improvement (Smith Maguire 2008, 2-3).

The following section explores the historical phases of the global development of fitness to further contextualise the cultural movement, explaining the evolution of the

fitness culture to modern participation in the contemporary fitness hype, fuelled by social media.

3.5 A history of fitness

To understand how the age of fitness has come to be, the following exploration pertains to the history of physical culture. However, since it is not the purpose of this study to provide a full historical account of international physical culture, this is a condensed overview. Furthermore, because the USA is still the global leader in providing commercial fitness services (Smith Maguire 2008, 3), a predominantly western history of fitness culture is used as setting for the following historical analysis of fitness.

Around the close of the twentieth century, both modernity and fitness began to shift or peak in crucial ways. This was demonstrated in the emergent paradigm of the body's malleability during this time. Working on the body has become even more important in postmodernity, because bodywork is viewed as work on the social self (Martschukat 2021, Introduction: The age of fitness).

Globalisation of the fitness culture has led to uniform training techniques and methods, body ideals and body philosophies (Andreasson and Johansson 2018, 302-303). The global development of fitness culture can be categorised into three phases (which have already been hinted at previously). The first phase in the development of fitness culture occurred in the late eighteenth and early nineteenth century. This phase marked the development of the modern roots of fitness culture, as evidenced by the development of bodybuilding during these times that can be linked to changes in urban American society (Andreasson and Johansson 2018, 302; Sassatelli 2010, 29). The circumstances that led to the massive popularisation and development of contemporary fitness ideas in urban society are considered in sports historian Riess's book *City Games: The Evolution of American Urban Society and the Rise of Sports* (1989). Riess focuses on the relationship between sports practice and urbanisation in New York.[6] He provides an

6 New York was the first large city in the USA and had a unique composition in terms of physical size as well as density and affluence in comparison to rest of the world. Riess (1989, 14) sees New York as foreshadowing developments that would later occur elsewhere in the world.

inclusive history of urbanisation that is helpful in understanding the international fitness phenomenon and succeeds to define fitness as a form of body literacy.

In the early nineteenth century, American cities became more and more unhealthy, immoral and dangerous. The increase in general wealth and the closer proximity of rich and poor in the city space magnified class divisions. Epidemics regularly broke out in overcrowded urban areas, crime by poor male youths skyrocketed, and municipal support and sanitation gradually worsened (Riess 1989, 26). In reaction to declining urban well-being, sport was promoted as a cure for the urban pathology near the end of the Industrial Revolution. The popular press, social and health reform movements and physicians all promoted physical exercise as a cure for the social problems of the day. Sport promised morality and strength for the middle class while undertaking to turn the working class into healthy, fit, respectful and cooperative citizens (Maguire 2008, 27).

The realities of urban life and the often harsh and unreliable status of medical diagnosis and treatments caused preventative self-help treatment methods to gain popularity. Substandard living conditions and social degradation cost many lives and confirmed the need for the reformation of values and lifestyle in urban systems. During the second half of the nineteenth century, the negative symptoms of sedentary living, mass immigration and congested urban living conditions were combatted with exercise, framed as a rational leisure activity. The ideological connection between physical activity, health and individual and social progress acted as a catalyst to find solutions to problems caused by the rapid growth of cities (Maguire 2008, 26-27).

Whereas rural villages were typically interdependent living spaces, social life in urban systems was significantly different. Urban life grew exceedingly individualistic and created the need to establish new social and cultural connections to network and ground urban dwellers. The positive sport ideology condemned the antisocial nature of popular pre-modern sporting traditions and offered organised sport as an alternative to the backward lifestyles of rural societies. The sports philosophy encouraged individualism and self-discipline as well as offering alternatives to immoral entertainments (Riess 1989, 30). Urban sport was therefore rationalised and justified as “new agencies of social control”, since participants in “clean” sport developed enhanced individual morality (Riess 1989, 28; Smith Maguire 2008, 26). This is also why exercise still forms

a key part of military training, schools' physical education programmes, medicine practice, religious ventures and the dieting industry (Smith Maguire 2008, 2).

Organisations such as the Young Men's Christian Association (YMCA) embodied the new positive sport ideology to aid young men in adjusting to urbanisation (Figure 7). They were committed to the YMCA's motto: "Fitness: physical, social, mental, and spiritual" (Davies 2017, 69). The association originated in Britain in the nineteenth century under conditions of escalating urban populations and industrialisation. The positive sports creed of the YMCA grew into the sporting boom of the late nineteenth century and legitimised sport among middle-class households. Similarly, gymnastics was promoted to women by the start of the nineteenth century with the same objective (Maguire 2008, 28).

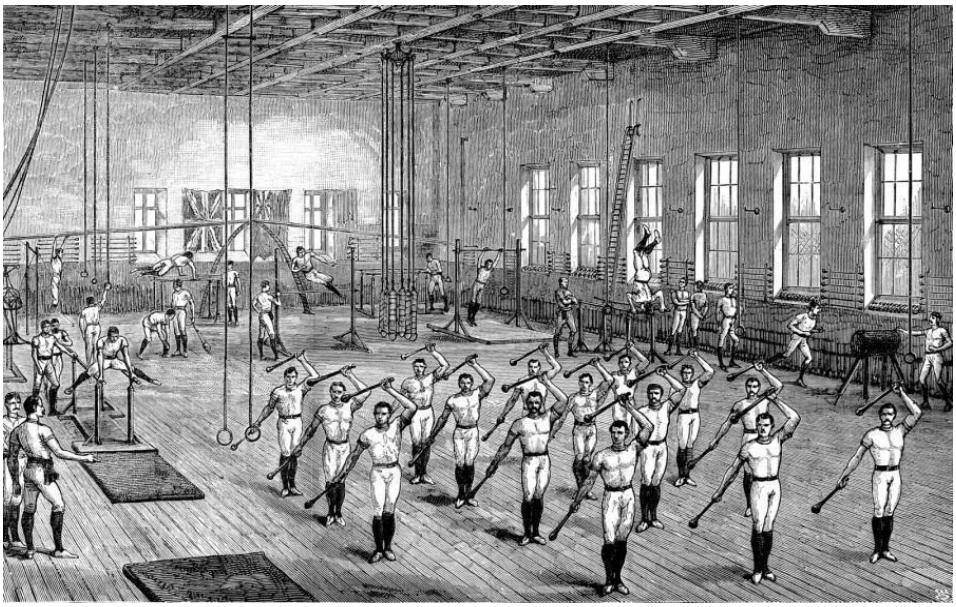

Figure 7: Young Men's Christian Association (YMCA) gymnasium, 1888, wood engraving, London. Accessed 28 October 2020, https://cdn.britannica.com/23/188423-050-A436EB47/gymnasium-wood-engraving-Young-Mens-Christian-Association-June-16-1888.jpg.

The second phase of the global development of fitness culture occurred in 1946, with the formation of the International Federation of Bodybuilding and Fitness. According to Andreasson and Johansson (2018, 302), a bodybuilding empire was created through fitness magazines, gym franchises and bodybuilding competitions (Figure 8). This is an

example of how self-management, individual health and performance were increasingly emphasised after the economic expansion in the west after the Second World War (Martschukat 2021, Fitness and consumer culture).

Figure 8: Le Querrec, Guy. France 1979. At the Former Trade Union Congress Hall: "La Mutualité". International Federation of Body Building World Championship. Body Builders Warming up before the Beginning of the Competition. Accessed 12 June 2021. https://jstor.org/stable/10.2307/community.9847967.

In the late 1970s, commercial fitness culture boomed and the fitness movement first experienced an explosion of public involvement. Popular interest in self-improvement, as well as political and economic focus on personal responsibility, drove this trend (Millington 2016, 1185). A performance and body obsession that continues to this day had seized the western world (Martschukat 2021, "Fit or fat?"). Physical fitness came to be institutionalised during this time and became a commodity that attracted increasing public awareness. Both genders were now involved in fitness culture, and associations representing masculine working-class bodies were increasingly transformed by mass participation of men as well as women in the fitness hype. Smith Maguire (2008, 4-5) proposes that the fitness industry has been shaped by three specific commodities since the 1970s: health clubs, lifestyle media and personal training.

The gym[7] has been around since the eighteenth century (Martschukat 2021, The "right amount" of exercise since the Me Decade). However, the commercial health club emerged in the 1970s, stimulated partly by advanced awareness of and interest in group exercise such as aerobics as well as leisure services and products aimed at the body's exterior as suggestive of social status. Gyms offered the growing middle-class market a service-oriented place devoted to achieving a fit body. These environments included various forms of physical activity, exercise machines and notions of class prestige and gender inclusion, which had been absent in earlier working-class gyms (Maguire 2008, 10; Sassatelli 2010, 30). Urban spaces of the late 1970s saw an increase in commercial recreational centres rebranded from gym to health or wellness club, which sought to add an impression of luxury to the originally masculine and competitive gym (Sassatelli 2010, 12). The commercial gym has staged itself as the appropriate place to achieve the ideal bodily condition of fitness through the performance of specialist techniques and the use of specialised equipment.

Through the 1980s, public interest in bodybuilding increased immensely. The combination of aerobics and bodybuilding resulted in the expansion of fitness from subculture to mainstream lifestyle culture by the 1990s. Jane Fonda is generally credited with creating the workout video genre, which was a key component of the burgeoning fitness trend and was made possible by the invention of the VCR. Fonda released her debut fitness video in 1982 (Martschukat 2021, The "right amount" of exercise since the Me Decade). Comparable to YouTube, the VCR opened up new options for fitness training as it enabled people to exercise at home whenever they chose to, and there was no pressure to look good while doing so (Martschukat 2021, The "right amount" of exercise since the Me Decade). Baudrillard (1998, 131-132) and Sassatelli (2010, 30) both observe that sexual attraction directs the contemporary notion of the body and impacts its recurrent use in commercial fitness media, serving as the background for contemporary fitness culture.

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7 The term "gym" was originally related to "gymnasium" and is defined by the Cambridge Dictionary (2021) as any space with equipment supporting the performance of physical exercises to both gain and maintain fitness. Most fitness participants refer to their clubs using the word "gym", which means that even in large fitness clubs, the central training space is indicated as such (Sassatelli 2010, 12).

The third stage of the development of fitness culture is described as the furthering of different training techniques, namely "multidimensional fitness gyms" (Andreasson and Johansson 2018, 303) and increasingly individualised and gender-inclusive spaces. The 1990s marked the emergence of personal training, a new type of service that was offered at health clubs. It was established by gyms as a specialised and personalised service aimed at the middle-class public. Personal trainers assist clients during exercise sessions and aim to enhance their fitness education and motivation in one-on-one sessions. Through them, the health club distributes and justifies the ideological assumptions underpinning healthism and benefits from selling medicalised "information and technologies" to fitness participants (Wiest *et al.* 2015, 24). Personal trainers in gyms can thus be understood as pedagogical biotechnological tools that enable the optimisation and medicalisation of the body (Wiest *et al.* 2015, 24). Virtual trainers are enabled through SNSs to teach fitness as a tool toward self-enhancement, regardless of geographical location or even access to a gym. In some cases, the commercial gym has been rendered somewhat obsolete in the sense that digital networks overwhelm the location aspect of fitness culture, as they are virtually (and not physically) mediated by trainers.

Participation in fitness practices led by personal trainers most often consists of repetitive exercises, and ongoing "emotional work" is implemented by fitness professionals to aid and motivate clientele to sustain health practices. Participants and trainers are therefore engaged in a constant "negotiation of meanings" during training (Sassatelli 2010, 15). It is through the process of engaging with trainers and consuming fitness media that fitness participants simultaneously become consumers and producers of wellness culture. Participants are involved with the realisation of the social validity of fitness. They establish the social value of the fit body and its accompanying lifestyle, in addition to validating fitness as a mode of self-improvement (Smith Maguire 2008, 5, 58). Simply put, fitness gyms are generally considered as the main location where the fitness of the body is prosumed (simultaneously consumed and produced). In other words, gyms can be construed as sites of prosumption where producers and consumers participate in developing fitness culture (Millington 2016, 1195; Sassatelli 2010, 11).

By the turn of the millennium, the gym culture of the 1990s was increasingly transformed into a fitness industry supportive of muscle hypertrophy practices, promoting health ideals (Millington 2016, 1186; Sassatelli 2010, 171). The fit body had effectively substituted body decoration as powerful signifier of status and character, and fitness gyms became known as places where such bodies can be created. Although the concept of the fit body is fluid, Sassatelli (2010, 30) emphasises that gyms are at the core of the fitness culture, functioning as the site for negotiating its meaning. These non-competitive environments are centred on recreational exercise practices, intended to enhance physical form and health (Sassatelli 2010, 13; 2018, 1).

Fitness culture includes various fitness commodities and media, such as fitness training aids that range from magazines and workout videos to fitness equipment for home-based individual use. It expands further than the individuals who actually train regularly, since the broad market for fitness culture commodities (especially sportswear fashions) is supported by casual consumers and not just fitness participants. Negrin (2008, 14) states that, in the postmodern era, image and appearance, or identity, is created through the consumption of products and services, such as clothing. These mediums encourage a certain vision of the ideal fit physique while offering advice relating to physical activity and food regimes as advocated by medical professionals, celebrities and trainers (Sassatelli 2010, 14; 2018, 1).

In Sassatelli's (2010, 11) view, the subjective effects of fitness training discipline are both active and passive, giving subjects new abilities as well as subjugating them to new systems of power. Sassatelli believes that these conflicting, subjective interpretations are constantly occurring in modern-day consumer culture, because participants in fitness training have to be simultaneously resourceful and dedicated, keen and dependable, independent and cooperative.

The body is accordingly portrayed as a continuous project in which the individual must invest with fitness media, self-monitoring, self-improvement, self-care or bodywork to enhance their body's appearance and health (Sassatelli 2018, 2; Smith Maguire 2002, 463). The body and its fitness are therefore heavily pursued by institutions promoting "self-enhancing" products and services. These institutions continually focus on clients

averting lifestyle diseases, promising active consumers the reward of greater societal status (Baudrillard 1998, 131-132; Smith Maguire 2008, 4).

The movement toward individualising health responsibilities in the last 30 years coincides with the decline of social welfare (O'Neill 2020, 14) and the rise of neoliberal logic, in which everyday life is increasingly defined by the free market. This is demonstrated by the progressive commercialisation and individualisation of health and the side-lining of collective interests (Wiest *et al.* 2015, 22).

Neoliberalism is a socio-political system that perceives humans as "market actors subject to competitive conditions" (Martschukat 2021, Health, fitness, and fatness in neoliberal times). Neoliberal healthism monitors and disciplines bodies through "complex pedagogical processes that ultimately benefit private enterprise" (Wiest *et al.* 2015, 24). The aim of this self-investment is to exhibit visible results which could enable individuals to be acknowledged as productive members of society. The relationship between the individual and society depends on the individual's success regarding self-work leading to the optimisation of their "human capital" (Martschukat 2021, Health, fitness, and fatness in neoliberal times), signalling a capacity for sound decision-making and a sense of self-responsibility (Martschukat 2021, Eating "right" since the Me Decade).

It is evident that traditional ideas of the body in servitude have been overtaken by ethics of consumption, instructing successful individuals to put themselves in the service of their bodies instead. The duty to take care of the body is seen as similar to the duty an individual has to cultivate the mind, since it is viewed as a "mark of respectability" in consumer culture (Baudrillard 1998, 40). Modern subjectivity positions the self as the owner of their body, who decides to utilise self-discipline as technology to gain "pleasure, independence, self-worth or simply to apprehend subjectivity" (Sassatelli 2010, 22). Fitness participants recognise their involvement as disciplined practice and leisure activity that may improve their lives in more than one area. Discipline is therefore at the core of contemporary and commercialised fitness culture, and originated because of enhanced knowledge of and investment in the body through extensive positive disciplinary techniques (Sassatelli 2010, 11).

Smith Maguire, like Baudrillard, maintains that serious participants in the fitness consumer society have to "recycle themselves" regularly, lest they fall behind. Bodily, corporeal or physiological recycling is promoted through the rediscovery of the body through diets, self-care and medical check-ups (Baudrillard 1998, 100). Rediscovery of the body or the physical and sexual liberation thereof is necessary after a "millennium of puritanism" (Baudrillard 1998, 129). The rediscovery, actualisation or liberation of the body in the contemporary age can be achieved through objectives such as exercise, hygiene and make-up. Consumers thus have to stay up to date, in the same way software requires regular updates. Moreover, there is a deep-seated belief that health has to cost something, and therefore practices such as overspending on health products are perceived as "ritual and sacrificial consumption" rather than medication (Baudrillard 1998, 140). In capitalist society, the concept of private property also applies to the body in terms of a person's social use and mental interpretation of the body. This justifies the methodical economical and physical investment in the body (Baudrillard 1998, 129).

3.6 The role of gender in fitness culture

The transformation of fitness culture from masculine activity to mass recreational activity took place during the early stages of globalisation (Andreasson and Johansson 2014, 92; 2018, 302-303). From the beginning of the twentieth century, working-class men in many western countries initiated the increase in spaces dedicated to physical recreation or bodybuilding and sought forms of exercise that were free of political control. These practices were aimed at body strengthening and muscular hypertrophy; as a result, they engaged the interest of an extensive urbanised masculine membership. These places were not aimed at enhancing public health but existed to meet the local men's need to socialise and exercise together, thus affirming their masculinity among peers and advancing their physiques with the use of basic equipment, such as free weights. The first bodybuilding gyms emerged as spaces for physical leisure that was not focused on the health of the general public. Instead, these spaces gratified the desire of working-class men to improve their bodies, verify their masculinity and have fun away from work and domestic environments.

Bodybuilding is characteristically interested in attaining an exaggerated physique that is contrasted with historical sports ideologies of the first half of the twentieth century that

emphasised a human body whose muscle development was most importantly functional. The ideal of the lean, fit body had replaced the idealised image of a muscular, bodybuilding body by the start of the twenty-first century. The newly coveted lean body ideal has become more balanced and moderate in its pursuit. Gender-inclusive fitness practices, which increased during the 1980s, influenced the ideal notion of the fit body. Although still muscular, the ideal body type to strive for through fitness training became more androgynous and moderately sculpted (Andreasson and Johansson 2018, 303). Bodybuilding initially reflected the dominant masculine aspects of the gym; however, according to Sassatelli (2010, 29), new exercise practices of bodily engagement occurred in the early 1970s, most notably aerobics.

The profoundly institutionalised leisure culture of modern society initiated the combination of physical education, dance, popular music and fashion to attract the participation of middle-class women. Celebrity icons such as Fonda (Figure 9) marketed aerobics to women seeking a slim and somewhat muscular appearance, and influenced the feminisation of fitness culture (Sassatelli 2010, 29). Despite the biological differences of sex (size, strength, height, build, shape), fitness goals do not necessarily need to be gender-specific, as strength, balance, flexibility and cardiovascular endurance are signs of fit bodies, irrespective of gender. Instead, it is western culture that is gendered (Hentges 2014, 18). Fitness culture encourages women especially to pursue personal wellness by planning for a healthy lifestyle and to take responsibility for their personal health challenges (O'Neill 2020, 14). The relationship between gender and fitness is further investigated in Chapter Five.

Figure 9: The Denver Post, Jane Fonda (on stage) leads a class of more than 200 persons through a strenuous workout Friday at the Regency Hotel, 1982. Accessed 20 September 2020. https://www.gettyimages.com/detail/news-photo/jane-fonda-on-stage-leads-a-class-of-more-than-200-persons-news-photo/837975450?adppopup=true.

3.7 Conclusion

This chapter sought to define a workable definition of fitness before exploring it as a self-actualising tool. Urbanisation, the development of the fitness industry, gym culture and the evolving role of gender in the fitness culture were examined to contextualise the present-day fitness megatrend.

Fitness culture has initiated a new perception of the body and contemporary self-identity, and has been gaining traction in conjunction with increasing mass urbanisation. The digital era further boosts the free circulation of body-knowledge through SNSs because of the social nature of physical culture and a universally shared state of embodiment. This can be compared to the spread of lay literacy through the invention of the printing press.

As embodiment is globally relatable regardless of language or location, SNSs have democratised fitness culture and introduced specialist body hacks to an international consumer market. Health, salvation and the perfectible body are now the responsibility

of the individual, which justifies the keep-fit exercise programmes that have transformed the cultural characters of urban life, religion and health. In the following chapter, embodiment and fitness biohacking as a form of literacy are explored, along with the philosophical movements of cyborgism, posthumanism and transhumanism that influence people's view of the fit and healthy body and the perception thereof in networked societies.

CHAPTER FOUR: BIOHACKING

4.1 Introduction

This chapter focuses on the analysis of fitness literacy as a form of basic biohacking. Biohacking is a form of DIY optimisation of personal performance and health by transforming the body with science, technology and a "deep" understanding of diet and physiology (Sovijärvi, Arina and Halmetoja 2018, 6). Although this study does not focus on the extreme form of body modification in which hardware is implanted into the body to facilitate certain technological functions (Shinde and Meller-Herbert 2017, 909), the extreme form of biohacking is discussed as contextualisation for biohacking. The lowest and most "natural" tier of biohacking is of interest here, specifically using bio-literacy to shape the body by way of particular movements and nutritional hacking.

In Chapter Two, I explored the democratisation of knowledge and the disempowerment of the gatekeepers of information since the invention of the printing press, which is comparable to the democratising transformation undergone by gatekeepers of exclusive scientific knowledge in the contemporary age (Meyer 2013, 118). Practitioners of DIY biology rely heavily on internet platforms, or more precisely Web 2.0,[8] to share information and instructions, and connect with other people likewise interested (Delfanti 2013, 32-33). The key motivation for the networks of websites devoted to DIY biology is to provide a platform enabling and encouraging people to freely disclose their knowledge, experience and innovations. Web 2.0 as a participation-driven network therefore has a prominent role in the emerging alternative scientific economy that sustains and is sustained through biohacking (Meyer 2013, 127).

Biohacking is described by Malatino (2017, 180) as the practice of manipulating biology through engaging with medical and technological developments. There are two types of biohacking. The first type is engaged in bodily manipulation and understands the body as an assemblage of non-human and human aspects. The second type is

8 Web 2.0 refers to the collective technological changes in the way web pages were created and used that advanced beyond the static pages of earlier websites (Quesenberry 2019, 340). The SNS YouTube is an example of a Web 2.0 platform.

invested in techno-progressive ideas of transcending the limitations of the human body through medical, technological and nutritional methods, ultimately in an attempt to overcome the weakness of mortality (Chrysanthou 2002, 472; Malatino 2017, 180). The extreme form of biohacking refers to an increasingly popular form of bodily modifications, in which technologies are implanted or otherwise integrated to facilitate a specific technological function. The primary motivations of the movement include increasing scientific literacy, technological exploration, open-source research, personal data collection, and cosmetic and physical enhancement (Yetisen 2018, 744).

The ways in which human embodiment is understood in contemporary society are of critical importance and are considered with cyborgism, posthumanism and transhumanism as theoretical frameworks contributing to cognising biohacking. Both forms of biohacking, namely, body manipulation (basic biohacking) and body modification (extreme biohacking), are rooted in different understandings of cyborg embodiment. The first form is also invested in posthuman ethics, defined by Cary Wolfe (2010, xv) as a historical moment of the decentralisation of the human by its engagement with technology. The second form is underpinned by the transhumanist goal of "transcending the bonds of materiality and embodiment altogether" (Wolfe 2010, xv). The case studies in the next chapter fall into the scope of Malatino's first type of biohacking as bodily manipulation and correspond with posthuman ideas about embodiment. Posthumanism also informs practices of self-actualisation that overlap with health literacy.

As this chapter is dedicated to biohacking, a theoretical background of philosophical influences is established before biohacking and its applications are discussed. The chapter is concluded by a discussion of basic biohacking as a mental tool or instrument contrived through literacy about diet and exercise regimens shared by bio-enthusiasts on various SNS channels, enabling control over the body and transforming it to a higher form of being.

4.2 Posthumanism

To interpret the umbrella term that is posthumanism, the notion of the human, body and the embodied self are explored during the course of this chapter. The word "human" is

derived from Latin *humanus*, of the etymological origin *humus* meaning earth or soil, and for that reason, the notion of "earthly beings" has come to be (Ferrando 2014, 214). Posthumanism emerged thorough the deconstruction of the human (Ferrando 2014, 219), which has historically been a flexible term (Ferrando 2014, 222). Advancements in digital technology have led to redefining the human body, and therefore, the term "human" is yet again under review, making the notions of the post- and transhuman popular subjects for philosophical and scientific consideration. The relocation of the self into virtual bodies and digital identities means that physicality as the primary site of social interactions is no longer necessary (Ferrando 2014, 213). Thus, a new self-conception has been developed that is flexible, able to transform – and posthuman by definition.

Technology is synonymous with the biological reality of the human being, distorting the traditional divide between nature and culture. The notion of posthumanism implies the history of humanity, but its recent relevancy also forces reflection on the implication of the term "human". Humankind has been decentralised by posthumanism (Ferrando 2014, 223), marking the end of the "human-centred universe" (Pepperell 2003, 171) that believed humanity to be superior and unique. However, as humanist notions are deeply rooted and have inspired many since ancient times, humanism will probably not be abruptly terminated. It is foreseen that the evolution toward posthumanity will gradually transform people's thinking to replace traditional humanism with new philosophies (Pepperell 2003, 171).

Posthumanism does not consider the material environment as separate from the biological human body, as opposed to the humanistic view, which made a clear distinction between humans and their surrounding domain. Consequently, where humanists saw themselves as distinctive beings in a conflicting and competitive relationship with their environment, posthumans believe their selves to be embodied in an inclusive technological world (Pepperell 2003, 152).

Robert Pepperell describes the societal shift from a predominantly humanistic ideology to the posthuman era in *The Posthuman Condition: Consciousness Beyond the Brain* (2003). He is interested in the traditional construct of the human being at the intersection of biology and technology as well as western perceptions of human nature

and ability. This perspective focuses on aspects such as the uniqueness of the self, the division between human and non-human beings on earth, and the notion that only a brain can constitute consciousness. Pepperell (2003, 172) emphasises the various implications of new technologies, the choices accompanying these technologies, and the impact on future human development. He maintains that humanity cannot be understood separately from the technological surroundings and the wider technological environment which empowers it.

Posthuman theory considers the human being as part of technology as much as it is part of the natural habitat and its genes. Historically, humanity has distributed its consciousness or "selves" through an assortment of ways. The content of the human mind and thoughts can be encoded in some material substrate such as writing, images or video material, and physical abilities can be enhanced through the use of tools or extensions. Human nature is thus seen as extensionist, pro-technological or artificial (Pepperell 2003, 152). This is why the course of human development is not limited to genetics but to the contemporary human's technological and cultural environments. Pepperell accurately summarises it by the following statement: "If life can run more efficiently and become "fitter" in collaboration with mechanical systems, then it will do so. By the same token, if humans can exist more effectively by acquiring further machine-like enhancements, then it will do so" (Pepperell 2003, 171). This means that humans will integrate technology into their everyday lives whenever there is effectivity to be gained from it.

4.2.1 Posthuman embodiment

On the subject of posthuman versus human embodiment, literary critic N. Katherine Hayles (1999, xi) writes: "Here, at the inaugural moment of the computer age, the erasure of embodiment is performed so that 'intelligence' becomes a property of the formal manipulation of symbols rather than enaction in the human lifeworld." She argues in her critique of the elimination of embodiment in the digital era that posthuman embodiment is therefore free of influences such as gender, sexuality and class. In essence, the new, posthuman body that develops is aided by scientific discoveries and has "an improved vocabulary for understanding what is happening to its subjectivity, perception, and memory as it is fast-processed through the digital matrix" (Kroker 2012,

63). In other words, posthuman subjectivity is the ideological reflex of digital technology (Kroker 2012, 74). Turkle (2005, 18-19), exploring how computation affects our self-awareness, asserts that technology influences not just what we do, but also how we think. It alters people's perceptions of themselves, one another, and their relationship with the rest of the world. This development of the posthuman perception of embodiment is of interest to this section.

Hayles investigates embodiment as visible or tangible human form in the information age in her book *How We Became Posthuman: Virtual Bodies in Cybernetics, Literature, and Informatics* (1999). Although she also does not see the posthuman as "antihuman or apocalyptic" (Hayles 1999, 288), she subscribes to a more nuanced and different type of posthumanism than Pepperell. To her, posthumanism is a critique of humanism in the enlightenment sense as the posthuman breaks away from exclusively western and pre-modernist ideas regarding human identity and consciousness to become part of an inclusive, collectivist whole (Hayles 1999, 2-3). However, she does not want to get rid of humanism completely, just a certain definition of what it means to be human. Hayles believes that other versions (or visions) of the posthuman can be created, which will be beneficial to the continued existence of humanity and other organic or artificial life-forms with whom humans share their "selves" and their surroundings (Hayles 1999, 291).

Hayles (1999, 283) identifies the posthuman as a replacement, as well as successor, of the traditionally limited human being, implying the end of the current concept of humans as "autonomous beings exercising their will through individual agency and choice" (Hayles 1999, 286). In essence, this implies collectivism in the future of humanity, which is noteworthy to this exploration of the dissemination of specialist bio-knowledge in the digital era.

Although there are many articulations of the concept of posthuman embodiment, it most often symbolises the unification of intelligent machines and humans. According to Hayles (1999, 287), the posthuman entails "not only a coupling with intelligent machines but a coupling so intense and multifaceted that it is no longer possible to distinguish meaningfully between the biological organism and the informational circuits in which the organism is enmeshed".

Posthuman embodiment becomes inseparable from extensions or integrated technologies (Hayles 1999, 35). This articulation of human and technology lessens the separation between human and non-human, as well as between "bodily existence and computer simulation", cybernetic instruments and biological organisms, and artificial intelligence and human goals. The posthuman signifies the fusion of cybernetic and organic in "flesh" and "spirit" to create the entirety of embodiment and psyche (Hayles 1999, 3). However, this articulation is not a harmonious becoming of one. Implants and prosthetics are painful procedures, and the fusion of human and machine is a complex and painfully embodied process; it is not a harmonious utopia but an embodied process of blood and flesh.

Posthuman constructs originate from structures of culture, embodiment and technology. Hayles (1999, 34) sees the concept of posthuman as appearing "when computation rather than possessive individualism[9] is taken as the ground of being, a move that allows the posthuman to be seamlessly articulated with intelligent machines". In short, she views "the construction of the tool as a prosthesis" as pointing to the posthuman (Hayles 1999, 34). In the digital age, YouTube is considered a popular source to access easily consumable body enhancement information geared toward a body-instrument with enhanced functionalities and effectiveness.

Hayles (1999, 3) defines the body as the original prosthesis which all humans learn to manipulate in such a way that the extension or replacement of the body by other prosthetic devices is actually a natural part of the developmental process of every human being. She understands this process as related to "natural" human development. She writes: "The posthuman view thinks of the body as the original prosthesis we all learn to manipulate, so that extending or replacing the body with other prostheses becomes a continuation of a process that began before we were born" (Hayles 1999, 3). This leads to the assumption that humans are inherently artificial and that the extension

9 It is worth noting that there may be a link between this individualism and the type of individualism created by the printing press.

of the body with processes such as biohacking is related to the technological proclivity of humanity.

4.3 Transhumanist theory and human transcendence

The natural human life cycle is said to be "solitary, poor, nasty, brutish, and short" (Hobbes 1651, 78). This raw state is the main driving force behind the transhumanist interest in self-actualisation (Huxley 2015, 15). Transhumanism, or extreme "human enhancement", refers to a movement that relies on the use of emerging technologies to augment the body's potential (Mercer & Trothen 2021, 239). The term "transhumanism" was coined in 1957 by biologist Julian Huxley (Ferrando 2014, 221) and is a life philosophy, an area of study and an intellectual and cultural movement (More 2013, 4). Transhumanists "seek the continuation and acceleration of the evolution of intelligent life beyond its currently human form and human limitations by means of science and technology, guided by life-promoting principles and values" (More 2013, 3). The objective is therefore to alter aspects of the human condition regarded as "undesirable", such as illness and aging (Mercer & Trothen 2021, 20). Transhumanist methods include the use of technology to pursue physiological and psychological enhancement (Ferrando 2014, 221).

The movement, along with posthumanism, first emerged in the 1980s and 1990s through the work of philosophers such as Max More and Nick Bostrom, and shared similar topics (Ferrando 2014, 221; Mercer & Trothen 2021, 20). The difference is that the transhuman is actively preparing to become posthuman, with full understanding of all possible self-enhancements and the consequences of becoming posthuman before proceeding with transition, whereas the posthuman is a being of exceptional "physical, intellectual and psychological states" (Battle-Fisher 2020, 4). This means that, at some point, the enhancements may be extreme enough that the human may evolve completely into the transhuman (Mercer & Trothen 2021, 21).

Transhumanism is a continual process of implementing technology in lieu of "seeking a state of perfection" (More 2013, 5). Transhumanists are interested in the fullest manifestation of humanity's evolution, whether on individual or species level (Ferrando 2014, 221). The transhumanist pursuit is thus the evolutionary self-actualisation of

humanity (Huxley 2015, 13) by the removal of cultural, biological and psychological limits to development (More 2013, 5). The ultimate goal of extreme biohacking is similar to that of transhumanism, although transhumanists are interested in "radical transformation" (Ferrando 2014, 221), whereas the type of biohacking that is of interest to this study is a low-level influence of the body and does not consist of integrating radical techno-inventions. Instead, basic knowledge-based hacks such as influenced choices in diet, exercise and sleep through the consumption of specific SNS content are considered here.

Transhumanism has humanism at its root (Bostrom 2005, 2-3), and as the humanist understanding of the human being persists, transhumanism can be identified as a type of "ultra-humanism" (Ferrando 2019, 33; Mercer & Trothen 2021, 239). It moves beyond humanism "in both means and ends" (More 2013, 4). Where humanism relies on educational and cultural sophistication to progress humanity, transhumanists seek to apply technology to overcome mortal complications. The movement has confidence that humanity can learn to change its evolution in advantageous ways by harnessing technological developments and becoming more than human (Bostrom 2005, 25; Ferrando 2019, 30; More 2013, 4).

4.4 The cyborg as posthuman embodiment

A cyborg, short for "cybernetic organism," is a being that has been merged with artificial technology to extend the organism's capacity. However, the cyborg is not just for science fiction imaginings, since we have already evolved into primitive cyborgs by integrating technology with our biology through processes such as wearing eyeglasses, getting vaccinated and implanting artificial joints (Mercer & Trothen 2021, 11).

To understand the cyborg, seminal sources, such as the essay *A Cyborg Manifesto: Science, Technology, and Socialist-Feminism in the Late Twentieth Century* ([1981] 2016) by cyborg scholar Donna Haraway, are analysed for recurrent themes of technologically assisted evolution and transcendence. Haraway's study is now considered a key postmodern text and pioneer to the digital humanities and posthumanism. The concept of the cyborg is motivated by theorists concerned with the consequences of technology for human embodiment. Haraway considers individuals in

contemporary western societies as cyborgs because of their interaction with technology in such an integrated manner that it blurs the divisions between polarities such as human and technology (Haraway [1981] 2016, 14). At the same time, the cyborg is also a metaphorical concept for political action and has been prominent in research pertaining to human and nonhuman sociology, science, technology and cultural studies (Lupton 2015, 567).

The term "cyborg" was first used in 1960 by engineering researchers when writing about the possibility of a cybernetic organism that can adapt its embodiment to survive in extreme environments such as space travel. Haraway implemented the cyborg to signify a hybrid of machine and organism that is "a creature of social reality as well as a creature of fiction" (Haraway [1981] 2016, 5). Two types of cyborgs can be distinguished. The first is the material cyborg created by the "military-industrial-entertainment complex" or the science fiction-type cyborg: human–machine with a medicalised body that is configured as the new standard by the use of technologies. The second type is the metaphorical cyborg or the "production of fiction", which is the politically upsetting contradiction of stereotypes and dualisms (Lupton 2015, 570). The cyborg is therefore presented as a solution to the limiting dualisms inside which we still understand bodies and technologies (Haraway [1981] 2016, 67). The double meanings of Haraway's cyborg (the literal and the figurative implications) aid in understanding the potential of the digital cyborg assemblage to better human health with medical treatments. At the same time, the notion of the cyborg creates an awareness of the way these innovations can pressure and stigmatise certain social classes or persons. Discourses on the digitally engaged individual indicate that those who take up digital health initiatives are seen as "ideal citizens". This is because health-conscious citizens are less of a financial risk for the state healthcare system in developed countries. Those who do not lack the information or ability, but simply do not participate, are viewed as not properly "incentivized" or "activated" (Lupton 2015, 573).

Haraway ([1981] 2016, 9) introduces the construct of the cyborg as having ideals of a genderless, race-less, more collective and more peaceful civilisation that is completely joined with technology to create a collective consciousness with unlimited access to

information. Like the posthuman, the cyborg signifies an acute transformation in human identity. Hayles (1999, 2) writes:

> Central to the construction of the cyborg are informational pathways connecting the organic body to its prosthetic extensions. This presumes a conception of information as a (disembodied) entity that can flow between carbon-based organic components and silicon-based electronic components to make protein and silicon operate as a single system.

Information is thus transformed into a disembodied object that is exchanged between the organic and artificial elements to produce an integrated new system. The cyborg is born through science, created as a new earth-dweller that blurs the boundaries between human, animal and machine. According to Haraway ([1981] 2016, 9), the cyborg "would not recognize the Garden of Eden; is not made of mud and cannot dream of returning to dust". In other words, the cyborg is not a creature created by God (which Haraway sees as a myth of the Garden of Eden) but a making of humanity and, specifically, the military. In summary, Haraway breaks away from a creationist perception. The cyborg thus disregards western humanist ideas of personhood and upholds a disembodied world of information (Haraway [1981] 2016, 9).

A cyborgian society is not structured by the polarisation between public and private, but instead creates a union of consciousness that carries information throughout the entire network. Haraway is optimistic that this network of beings with shared knowledge may create constructive political changes, since cyborgs can see "from both perspectives at once". This could reveal possibilities inconceivable from a single vantage point (Haraway [1981] 2016, 15). The cyborg, which is a form of posthumanism, is thus portrayed as a solution to political problems worldwide.

This study understands fitness literacy as a type of cyborgism that does not distinguish between fact and fiction, exemplified by fitness culture participants imagining an ideal version of the human body and choosing to apply technological regimes to the body to make the ideal vision a reality.

4.5 Biohacking

Biohacking is a niche form of DIY biology in which non-professionals try to modify and improve their bodies through technical manipulation of biological systems (Dong

2018, 10; Swain 2014). A human being functions optimally when in a "harmonious relationship" with the environment, which is a prerequisite for good quality of life (Roa and Vargas 2016, 112; Sovijärvi, Arina and Halmetoja 2018, 8). Mercer and Trothen (2021, 230) define biohacking as "changing our biological selves, including neurology, biochemistry, physiology, and other physicalities through science and technology for enhancement purposes". Considerable consequences for biohacking ourselves come with rapidly increasing self-improvement therapies and technologies.

Evidence of mainstream biohacking can be found in the popularity of psychotropic and performance pharmaceuticals and medicines as well as cosmetic surgeries (Mercer & Trothen 2021, 9). It is clear that various degrees of human enhancement could be achieved through biohacking, depending on the extremity or level of the method used. Extreme biohacking generally involves devices that are implanted into the body toward extending physical capabilities. An example of a popular modification at this level of biohacking is implantable magnets allowing one to feel electromagnetic forces through tactile sensation (Yetisen 2018, 744). Low-level biohacking comprises less-invasive methods such as dieting and exercise. This study is focused on the latter form of biohacking to differentiate from radical techniques, even though all biohacking methods share the objective of transforming the biological self. This study contends that the popularity of DIY YouTube fitness videos is also an example of popular biohacking practices, since the fitness trend necessitates the underlying self-education phenomenon that is aimed at achieving greater bio-knowledge to control the body and that is taking place via digital technologies.

Body hackers are bound together through hackerspaces or shared physical spaces, shared philosophies and shared experiences or interests. Being structurally connected to people in the movement enhances the likelihood that hacking ideas are reinforced. Persons living inside this connected environment are "living as posthumans" (Battle-Fisher 2020, 4). Biohackers view the body as flexible and identity as malleable, and biohacking is a therefore a form of posthuman enhancement.

In order to better understand biohacking, it is perhaps useful to first provide some pointers about the context in which it occurs. Health is continually privatised in the postmodern era. This privatisation positions the problem of illness and health at the

level of the individual, and increases the value of health (Chrysanthou 2002, 477; O'Neill 2020, 4). Accordingly, self-diagnosis among the lay public includes over-the-counter diagnostic tests, computerised health assessments and DIY genetic tests, and is an important part of consumer health culture (Chrysanthou 2002, 469). Social and cultural transformations are structured around technologically mediated information systems that are characteristic of postmodernism. An example of this is the way that easy access to updated health resources on the internet results in patients often knowing more about their condition than their general practitioner (Chrysanthou 2002, 474).

Biohacking has applied the DIY framework to the personal body project. The rise of the body as a project can be traced to the middle-class view of the body as the ultimate DIY project and also as the ultimate investment (Chrysanthou 2002, 471; Smith Maguire 2007, 5). The privatised body project is linked to a postmodern trend that coincides with the emergence of the information society and the combination of "health information, medical technology, health consumerism and self-screening" (Chrysanthou 2002, 469). Because of the growing global middle class, this DIY body project has been rapidly popularised, and is demonstrated by fitness content trending on SNSs.

The DIY movement, of which biohacking forms a part, became popular in the 1990s and was primarily intended for home improvement projects (Keulartz and Van den Belt 2016, 2). There are many DIY initiatives within different technological domains today in which non-professionals establish themselves increasingly as makers[10] and hackers[11] (Keulartz and Van den Belt 2016, 16). Although the public perception of the term "hacking" has become synonymous with breaking into computer systems, in actuality, hacking is synonymous with tinkering (Keulartz and Van den Belt 2016, 6). In other

10 Maker culture is a technological extension of DIY culture that overlaps with hacker culture and involves either making new technologies or tinkering with old ones. Makers are synonymous with tinkerers, finding their lives enriched by "creating something new and learning new skills"; the movement is driven by the internet (Doughtery 2012, 11-12).

11 A hacker solves problems via computers. The hacker community ethic is summarised by Steven Levy in the following six points: "1. Access to computers – and anything which might teach you something about the way the world works – should be unlimited and total. Always yield to the Hands-On Imperative! 2. All information should be free, 3. Mistrust authority – promote decentralization, 4. Hackers should be judged by their hacking, not bogus criteria such as degrees, age, race, sex, or position, 5. You can create art and beauty on a computer, 6. Computers can change your life for the better" (Levy 1984, 27-33).

words, hacking should also be interpreted as repairing, tampering, fiddling and even playing. Biohacking also has an affinity with the maker movement that represents an expansion of hacker culture, which values ideas of openness and decentralisation (Delfanti 2013, 138; Keulartz and Van den Belt 2016, 2).

In essence, the biohacking movement is aimed at achieving "independence, individualism and rupture with the status quo" (Delfanti 2013, 131), just as the book culture and printing press cultivated individualism and independence. The production of scientific knowledge has been transformed, which in turn influences the relationship between the market, public communication, society and the sciences. The "new" media provides some scientists with visibility and public dimension, and transforms the production processes of knowledge and the way it is shared, legitimised and discussed (Delfanti 2013, 131).

Biohacking strives to boost the affordability, flexibility and accessibility of scientific equipment toward enhanced health and seeks to democratise scientific knowledge, since it is shared in a collective knowledge economy, making biology accessible to the layperson. This inclination toward democratisation causes the boundaries between amateurs and professionals to blur in contemporary biohacking culture (Meyer 2013, 117-118). The key aspect of DIY biology is that it is a private undertaking and is not limited to laboratories (Delfanti 2013, 131). In other words, the process is similar to the portable books produced by the printing press that substituted formal institutions. SNSs are consequently reconfiguring the boundaries between amateurs and experts, scientists and laypeople, and academic and professional institutions and homes.

Hacker culture has cross-influenced several facets of knowledge production, and therefore places a growing emphasis on peer production within open science politics. This is due to the free and open contribution of volunteers, participatory processes of governance and availability of the outputs. The new generation of transparent activities and development drives a reorientation of the opportunities that individuals have to engage directly in the production and management of information and knowledge (Delfanti 2013, 137). On the subject of unconventional knowledge production, Keulartz and Van den Belt (2016, 2) state that "features [such] as transparency and openness, participation and sharing, co-production of experts and lay people, grassroots

entrepreneurship et cetera add up to something like a novel, alternative paradigm of knowledge production outside of the academia and industry walls". This statement again indicates the hacker's emphasis on decentralisation and open-source information, and is comparable to the effect of the printing press on knowledge production. Digital fitness culture makes use of open-source practices and shares fundamental values with biohacking. Fitness as an aspect of this open-knowledge paradigm is of interest to this study. The concept of digitised health and self-tracking as biohacking is discussed next.

4.5.1 Self-tracking and digital health

People have been tracking personal occurrences or goals with tools such as diaries for centuries. Self-tracking is a consequence of the self-reflexive nature of humanity, as discussed in Chapter Two. In the digital era, there is an upsurge in self-directed tracking, as supported by the 42 million plus fitness trackers that would have been sold per year by 2019, as predicted by Neff and Nafus (2016, 107) in 2016. People are increasingly interested in tracking their biometrics as smart watches and personal devices are becoming more personal (Swain 2014). These technological devices are used to track hours slept, steps taken, calories consumed and medications administered (Figure 10). However, Neff and Nafus (2016, 23) state that people mainly track physical activity, food and weight, which implies the worldwide popularity of the fit-body project as well as the cultural value placed on self-optimisation (Neff & Nafus 2016, 31). Self-tracking is situated as a biohacking method in this investigation.

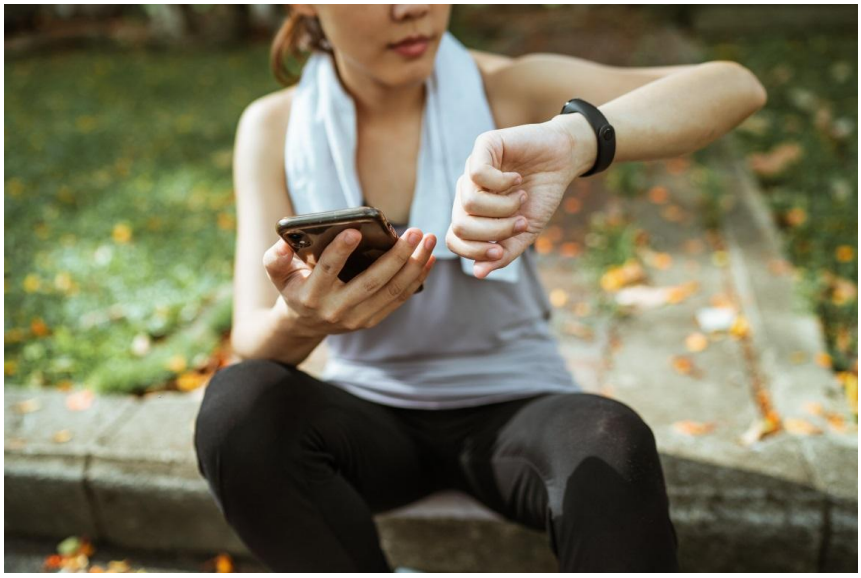

Figure 10: Subiyanto, Ketut. Woman using devices for pulse controlling, 2020. Accessed 20 September 2020. https://www.pexels.com/photo/crop-woman-using-devices-for-pulse-controlling-4428992/.

The rise of what has been dubbed the “quantified self” trend has been fuelled by the lower cost and expanded availability of wearable devices and tracking applications (Lee 2014, 1032). The quantified-self movement entails personal data tracking, and is an emerging hobby that identifies trends in data across time, searches for basic patterns and compares variations between conditions. Variability, correlation and experimental design are among the mathematical, statistical and scientific ideas touched upon (Lee 2014, 1036).

DIY biology is commended for its potential democratisation of science and for empowering the middle class educationally, culturally and economically. An example of this is that this method of biohacking enables direct access and tools to interpret personal biological data (Meyer 2013, 118). Several bodily operations can now be observed, recorded and translated into data by employing these new digital health technologies. The data is also easily transferred to a digital database and thereafter interpreted using algorithms to produce statistics and present the data visually (Lupton 2015, 567).

These emerging health technologies provide users with ways to overcome current and potential illnesses by providing them with greater self-knowledge through data. This is based on the notion that self-tracking leads to the capacity to see a problem, which enables the ability to act (Neff and Nafus 2016, 24). Self-monitoring devices bring the body into the limelight as part of the quest to discipline the mortal body. These devices make it possible to "see" inside the body and track its autonomous activities. Medically, the digital cyborg assemblage that the body becomes and the ever-present tracking devices follow the body's signs and signals, and its habits. These technologies constantly remind users of the biological activities of their bodies by supplying data produced by their movement, heart rate, blood pressure or glucose levels. The self-tracking movement therefore stimulates a self-reflexive hyper-awareness of the body and its vulnerabilities, as well as its capabilities and feats (Lupton 2015, 574).

The revolution of digital health concerning health promotion practice, or what Lupton refers to as "digitized health promotion" (2015, 575), places renewed attention on personal responsibility for well-being. Health risks have become highly individualised and are regarded as manageable and controllable in the discourses and activities of digitised health promotion, as long as laypeople follow the necessary technology to assist in self-monitoring and self-care. Digital health technologies are thought to aid in the reduction of healthcare costs by potentially solving socioeconomic problems through control of the body and knowledge of its innermost workings. Digital health privileges the rational and "activated" consumer, who shares qualities with the enlightened modern subject, and prioritises personal well-being and makes use of new technologies that are supportive of health tracking. By "quantifying" and "digitising" their bodies, digitally active persons conform to the ideal neoliberalist individual who voluntarily undertakes health duties without being forced (Lupton 2015, 575).

Self-tracking focuses on preventative health practices and self-care (Lupton 2013, 15). Self-knowledge is part of this framework as an integral component of taking responsibility for optimising individual health. Self-tracking systems can also exchange information with several SNS audiences. SNS users and health fundis will post their everyday statistics to their followers on SNSs and encourage them to join in the practices of self-examination and self-surveillance.

Digital health technologies are often depicted as empowering self-enhancement technologies, able to resolve issues by supplying consumers with information and thereby increasing the body's ability to control itself. Self-tracking often includes praising consumers of these self-tracking systems and health-promoting products for being responsible, capable and illness-free subjects (Lupton 2015, 575).

4.6 Conclusion

A new perception of the body and the contemporary self-identity has been gaining traction since mass urbanisation started increasing globally. Posthumanist and transhumanist theories have led to an expanded and enhanced view of the body. Fitness culture has thrived because of this. The digital era enhances the diffusion of fitness literacy and body-knowledge through the social aspects involved in physical culture which can be compared to the spread of lay literacy after the invention of the printing press.

Since embodiment of the posthuman concept can be shared internationally regardless of language or location, SNSs have democratised fitness culture and specialist body hacks to more consumers. Virtual trainers are enabled to teach fitness as a tool toward self-enhancement and realisation of the ideal body, no matter the location of an individual.

In the postmodern era, health, salvation and the perfectible body are the responsibility of the individual and cannot be ascribed to predestination. This notion justifies the fitness megatrend that has transformed the culture and character of urban life, religion and health. Given the contemporary movement of public health and medicine toward digitising the body, it is now an indispensable part of individual embodiment and postmodern society.

In the next chapter, I explore SNSs as enabling enhanced fitness literacy and endorsing a contemporary perception of embodiment. Chapter Five also contains case studies and a discourse analysis to establish the impact of YouTube as a digital fitness literacy platform.

CHAPTER FIVE: YOUTUBE AND SELECTED FITNESS VIDEO CHANNELS AS BIOHACKING

The globalisation of SNSs has unlocked new opportunities for international communication, leading to enhanced biohacking knowledge among the virtual lay public. As discussed in earlier chapters, this analysis compares the printing press and SNS platforms, for both are tools that mediate literacy. This chapter relates to YouTube as SNS and aims to move beyond general observation through the application of the methodological framework to two case studies of fitness YouTube channels and discourse analysis of audience comments on biohacking-related videos. Finally, the findings are compared and discussed.

5.1 Introduction

Fitness is intended to protect, promote or maintain health and well-being and at the same time aims to prevent disease and disability. Exercise has long been prescribed as preventive medicine, as physical activity improves mood and well-being, along with decreasing the risk for many health conditions, including obesity, high blood pressure, high cholesterol and diabetes (Veiga *et al.* 2009). Health and fitness YouTube videos can thus be viewed as promoting the wellness of users and aiding in the prevention and cure of diseases. The aim of this research is to demonstrate how access to the internet and fitness-promoting SNSs contribute to enhanced quality of life among the global public.

To achieve the research aim, this study has followed a theoretical and exploratory approach, using qualitative methods which are applied to multiple case studies and discourse analysis in this chapter. The theories and ideas covered in the previous three chapters provide a foundation for the interpretation of the case studies.

Selected fitness channels from YouTube are used to establish a comparative analogy between the lay literacy that followed the invention of the printing press and the development of fitness and physical literacy resulting from the free access to specialised information resulting from the development of the internet. This research seeks to determine indicators of expanding fitness literacy through the analysis of visual and

textual strategies employed by popular YouTube fitness videos. A set of individual case studies are presented to illustrate the connection between user comments posted on videos with high levels of engagement as indicators of the audience's fitness literacy.

Hitherto, a discussion and analysis of the seminal works contributing to biohacking and digital culture as part of fitness literacy among the lay public has been provided, to ultimately structure a comparison between the impact of the printing press and contemporary SNSs such as YouTube on societal behaviour. While different forms of biohacking can be found on various online platforms (Delfanti 2013, 36), YouTube retains an active fitness community consisting of more than 8 000 fitness channels (YouTube 2020b). Therefore, this chapter concentrates on YouTube as a pedagogical platform for fitness education in particular. User engagement is analysed to determine aspects of biohacking, thereby either refuting or supporting the role of fitness literacy toward self-actualisation in the digital age.

During the first week of 2020, views of videos in the fitness community increased by more than 30% compared to the same period a year before. In 2019, uploads of fitness videos increased by 18%, while fitness videos received 27% more views (YouTube 2020b). The fitness megatrend has accumulated great momentum via the online availability of information and motivational resources, especially on SNSs. Online social environments such as the comment sections on YouTube videos act as a platform for discussions and interaction with YouTube hosts as well as other users. This specific zone has been selected as an appropriate site to focus investigations to determine fitness literacy and participation in biohacking.

This chapter firstly entails a background contextualisation of YouTube as representative of SNSs, before introducing case study subjects, namely, the two YouTube fitness channels Athlean-X and Blogilates. An analysis of the discourse collected from the comment sections of the respective case studies' most popular fitness videos on YouTube is conducted, in order to determine the manner in which biohacking and fitness literacy contribute to self-actualisation in each case. Finally, the key findings concerning fitness literacy are considered.

5.2 Background contextualisation of YouTube

As already indicated, this study focuses on the sociocultural impact of audio-visually mediated fitness content presented on YouTube as a social networking platform that connects, informs and influences masses of users, contributing to the spread and growth of the fitness megatrend across the globe. The objective is not to explain the purpose of YouTube or to list its numerous features and applications, although the most crucial technical functionalities are included in the following contextualisation.

YouTube creates a highly dynamic and competitive environment (García-Rapp 2017, 241) which is built around consumerist logic and a culture of "broadcasting the self" (Burgess and Green, 2009, 29; Khamis *et al.* 2017, 205). It is primarily a commercial initiative owned by Google and dedicated to online video sharing (Allgaier 2020, 3). Internet users can watch YouTube videos unrestrictedly, but only YouTube registered members are permitted to upload and interact with videos via ratings and comments (Strangelove 2010, 19).

As a digital platform, YouTube offers myriad functionalities besides uploading and video viewing that encourage both active and passive user engagement (Khan 2017, 237). It creates an online social community where users can interact by commenting, subscribing, rating and sharing personal video responses. Among other functionalities, users are able to share or embed content (Burgess and Green 2009, 2) which can be viewed and responded to by other users. Not only are views important, but so are channel subscriptions, which add up and help to establish a channel's credibility and status on the site (García-Rapp 2017, 229).

Subscribers are an important part of YouTube, forming a social network that mostly consists of a devoted audience. The energy and time dedicated by the audience represent "sustained attention" and equate to the commercial and social worth of a channel (García-Rapp 2017, 241). YouTube is referred to as a "cultural archive of media content" (Burgess and Green 2009, 87), a "network of creative practice" (Burgess and Green 2009, 61) and a "repository of shared experience" (Strangelove 2010, 39). YouTube is therefore a SNS that does not produce content so much, but acts more as a distributor of user-generated content (UGC), including text, images, videos and reviews

created by members – making it a frontrunner in contemporary participatory culture (Burgess and Green 2009, 10), which is discussed in the next subdivision. Creating a platform for sharing UGC allows for the democratisation of information outside the industry, government and professional sphere (Allgaier 2020, 3), much in the same way that the spread of literacy and ideas of self-actualisation were established in the Reformation, greatly assisted by the innovation of the printing press.

YouTube started as a humble business venture, seeking to provide a "community that connects users to videos, users to users, and videos to videos" (Burgess and Green 2018, Origins). Today, YouTube is acknowledged as an integral element in shaping digital culture globally (Allgaier 2020, 4; Burgess and Green 2009, 1). YouTube continues to grow and currently has one-third of the internet as active users, accumulating to approximately one billion hours watched daily (YouTube 2020a). On mobile devices alone, the YouTube network reaches more Americans than any television network, in the USA or internationally, can achieve (YouTube 2020a).

YouTube has developed much since the site was created by tech entrepreneurs Chad Hurley, Jawed Karim and Steve Chen in 2005 (Burgess and Green 2009, 1). Originally, the cyber service was aimed at lessening the technical challenges of lay users wanting to share videos digitally. The platform initially offered a simple, integrated interface supporting video uploads and streaming which required little technical skill, a standard web browser and limited internet connectivity. YouTube has since become a key global outlet, revolutionising UGC and allowing consumers to upload their videos, text, images and reviews to the platform, from where it is then served to far-reaching audiences. The mass popularity of UGC and the ability to watch mainstream media content on a SNS have made YouTube widely popular (Burgess and Green 2018, Origins).

YouTube's socio-technical system functions as a standardised platform inclusive of amateurs, experts and corporations alike. The role of expert was historically reserved for trained specialists such as doctors and scientists, but the "interactive and conversational media in the Information Age" caused the dismantling of knowledge monopolies (Khamis *et al.* 2017, 205). It is worth considering the printing press as compared to YouTube at this point; whereas the printing press enabled widespread participation in

reading, providing access to information that in the past had been limited to a select minority and increasing literacy, YouTube facilitates an even more intense level of access to information and user engagement. The increase in subscriptions to original content-sharing websites in recent years confirms their significant role in contemporary life. Virtual spaces and information-sharing networks such as YouTube enable community engagement in public discourse and the widespread acquisition of new skills (Chau 2010, 65).

Self-branding[12] plays a prevalent role in the success of channels on SNSs. The concept of self-branding is embedded in the postmodern individualism of the twenty-first century, informed by the individual's knowledge, experience and philosophy (Blum, 2020). Close observation of fitness YouTubers confirms their use of personalised, branded biohacking methods to attract followers and inspire their increased commitment to fitness and individual enhancement.

Users' engagement with online fitness content establishes YouTube as an educative tool toward the enhancement of fitness. To further contextualise YouTube as a digital platform, next it is explored through the lens of participatory culture.

5.2.1 Participatory culture

Without an exploration of YouTube as a unique enabler of participatory culture, this study would be incomplete. The platform has been aptly described as a "participatory culture enhancing environment" (Burgess and Green 2009, 10; García-Rapp 2017, 232; Montero Sánchez 2021, 111) with the ability to engage peer participation and co-creation through bottom-up structures of professional and amateur visual culture and popular idiom (Burgess and Green 2009, 6; Montero Sánchez 2021, 111; Strangelove 2010, 152; Sumiala and Tikka 2015, 6). The platform's technical and social capabilities support the formation of a participatory culture among its user community (Chau 2010, 67). Montero Sánchez (2021, 111) believes that the participatory and transformative

12 Self-branding is also known as personal branding, and entails the development of an online public image for economic and cultural capital benefit (Khamis *et al.* 2017, 191).

practice stems from the way users engage with video material on the network created by YouTube.

Online user engagement is defined as an individual's interaction with media, a multidimensional concept that comprises the actions, thoughts and emotions of the user. Engagement is a user-initiated action that leads to the co-creation of value. All "clicks" or user engagement metrics are considered as attention on YouTube, which is valuable in itself on the platform (García-Rapp 2017, 232). For the purpose of this study, engagement can be defined as the digital participation of users, as well as content viewing and consumption of participatory media content (Khan 2017, 237).

Obviously, participatory media obtain value and power through the participation of many users. The audience form a public following to the presenter of a fitness channel, as well as a market through their ability to connect to each other. When amplified by information and communication networks, SNSs enable the widespread, fast and low-cost coordination of group activities (Rheingold 2013, 218), of which the formation and interaction of the online fitness community is a good example. Participatory culture describes the relationship between the user and digital technologies, and the change in power relations between professional and amateur media production (Sumiala and Tikka 2015, 6). Jenkins (2006, 259) views the development of skills to share and collaborate online as essential to creating informed citizens and participating in "knowledge cultures" that are free from the formal education milieu. According to Rheingold (2019), SNSs like YouTube enable the formation of personal learning networks and "communities of practice".

YouTube is used for entertainment as well as for social interaction, such as seeking and offering information, which makes it a significant site from a research viewpoint (Khan 2017, 237). The communication system between video host and community, by way of commenting, makes YouTube the ideal source for research on the cultural impact of SNSs on fitness literacy. As this study is directed at assessing fitness literacy through analysing users' interaction with biohacking video content, user engagement is of particular interest here.

By blending video content and user interaction, YouTube can present fitness content in a distinctively interactive form (Ratwatte and Mattacola 2019, 3). YouTube offers a participatory culture in which users can interact and learn from each other. It promotes a hybrid of media creation and social networking, and provides a participatory environment in which to create, collaborate and share media (Chau 2010, 65-66). Thus, the combination of commercial media culture and opportunity for self-expression has established YouTube as an important site within participatory networks (Burgess and Green 2018, Origins).

As with the printing press, contemporary SNSs like YouTube are tools and platforms that mediate literacy. The way in which the press enhanced lay literacy during the Reformation is comparable to the way in which YouTube enhances bio-literacy via health-related videos. This contention is substantiated by the fact that the internet is commonly used to access health information, and YouTube is generally viewed as a platform to learn about things by watching DIY tutorials (Khan 2017, 237). The role of videos as a pedagogical tool in health education has been well documented and justifies the view of YouTube as a digital platform contributing to fitness literacy and biohacking (Akagi 2008, 58) in a way that is very similar, for the sake of this argument, to the impact of the printing press on laypeople's literacy in the sixteenth century.

Howard Rheingold, a social critic and theorist specialising in the internet and social media, reflects on SNSs as intensifying all aspects of human social behaviour by augmenting the power of human sociality. SNSs are described as effective amplifiers for collective action, contributing to literacy by connecting sociality and technology (Rheingold 2013, 215-217). On the subject of literacy, it is best to quote Rheingold directly:

> The alphabet did not cause the Roman Empire, but made it possible. Printing did not cause democracy or science, but literate populations, enabled by the printing press, devised systems for citizen governance and collective knowledge creation. The Internet did not cause open-source production, Wikipedia or emergent collective responses to natural disasters, but it made it possible for people to act together in new ways, with people they weren't able to organize action with before, in places and at paces for which collective action had never been possible (Rheingold 2013, 217).

E-literacy is a prerequisite to produce a participatory culture (Jenkins 2006, 259; Rheingold 2013, 218). There are ample examples of the possibilities of participatory culture on YouTube, emphasising its role in the modern-day development of new forms of digital literacies granting individual access to a particular culture. A similar kind of digital literacy is needed in the mobile and multimedia environment for the use of social media networks to be productive and to nurture an original and focused interpersonal connection. Literacy is at the core of humanity's ability to share systems and technologies with each other, teaching others to participate in a given culture (Rheingold 2013, 217).

Jenkins (2006, 257) contends that the power of participation does not lie in destroying commercial culture, but in amending and expanding it, adding diversity of perspective, and then recirculating it back into the mainstream media. He believes that amateur media production introduces cultural diversity and enables a form of postmodern cultural collaboration via SNSs.

According to Chau (2010, 68-72), participatory culture can be encouraged in five ways:

- Firstly, low barriers to creative expression and public engagement create accessibility, which allows entry into a community. This is especially true for YouTube, as video channels are accessible to everyone. This allows engagement in the fitness culture even without a YouTube account. Users may gain new skills as they explore communities and participate in activities. The low entry barrier allows peripheral participation (from watching videos but not contributing other than increasing the view count to registering a free account and commenting and rating video clips). These activities account for the bulk of user engagement and are vital to the YouTube community's operations. Feedback motivates content creators to create more videos, and is essential to the way videos are circulated within the community.
- Secondly, participatory cultures have strong support for creating and sharing projects. As YouTube is mainly a content-sharing website, sharing is part of the collective discourse occurring on the platform. YouTube gives precedence to its

members' sense of belonging and identification with the community, as it ultimately parallels platform loyalty.

- Thirdly, a sense of informal mentorship is present in participatory culture and can be seen in the large corpus of how-to video tutorials on the platform. This method of mentorship is informal and provides opportunities to learn about the body and its biological technicalities, as is the case in this study.
- Fourthly, participatory culture necessitates a belief that contribution to the community is important. Any degree of user participation – from watching a video to producing content – contributes to the community, since viewings boost video promotion by the YouTube algorithm. In addition, view counts are displayed below every video so that visitors and content creators can publicly see the upload's level of interaction. Comments and ratings by registered users are also shown below each video.
- Lastly, a sense of social connection is key to participatory culture networks. This principle is well illustrated by the way that YouTube users are registered and given a personal profile, contact list, and subscriptions list to keep track of new uploads by subscribed-to hosts (Chau 2010, 71).

5.2.2 Democratising information

Throughout this study, the impact of the printing press on early modern Europe has been analysed in comparison with the digital democratisation of information, such as is well exemplified by the occurrence of contemporary online fitness culture. The following section further unpacks the ongoing democratisation of information and expert knowledge through YouTube. The role of popular educational biohacking tutorials on YouTube is explored as SNSs amplify the awareness of fitness culture by visually mediating the ultimate body and its practices.

YouTube not only democratised but also customised information and made it conveniently accessible for a massive audience. An increasing amount of fitness information, available as easily accessible, entertaining and attractively packaged videos on YouTube, contains biohacking practices to be consumed for bio-literate means.

However, YouTube is a volatile object of study because of the platform's dynamic nature and constantly changing informative resources and organisation, offering a large and highly diverse archive of video content (Burgess and Green 2009, 6). As a distribution platform, YouTube makes the products of commercial media more accessible, challenging the reach of traditional mass media. It is commended as a platform for UGC, providing a channel for rebellion against the prevailing expensive and often exclusive forms of commercial media (Burgess and Green 2018, Studying YouTube). The element of rebellion links to the democratising "revolution" caused by the printing press that still transforms social architecture to this day. As with the printing press, the potential reach[13] of YouTube grants individuals access to information, making it more conveniently accessible and transforming the flow of information to sidestep the traditional gatekeepers and disassemble knowledge monopolies (Khamis *et al.* 2017, 198).

According to Jenkins (2006, 258), the adoption of novel media technologies reinforces a "democratic urge" that enables more people to produce and disseminate media. This blend of old and new media creates a merging culture through the interaction of amateur and professional media. In this postmodern cultural phenomenon, citizens and consumers become key players when they recognise their capacity in a participatory culture (Jenkins 2006, 259-260).

Tolson (2010, 285) believes YouTube to be a form of "post-television", where discourse hierarchies are non-existent and one network is open for ordinary people, media professionals and celebrities alike. The only social hierarchy on YouTube is viral popularity, which cannot be institutionally predetermined as in the case of television. Although the YouTube homepage does provide a framework with selected links, it is the user, and not an institution, that constructs and customises the viewing experience of UGC on YouTube (Tolson 2010, 285).

Stephanie Jong and Murray Drummond (2016, 767) explain how SNSs permit the immediate transmission of health and fitness ideals and ideas, but warn that the virtual

13 "Reach" refers to the number of unique viewers of a post (Quesenberry 2019, 336).

population should expect commercially biased online accounts. They suggest that YouTube users should be critical with regard to digital health literacy, enabling them to differentiate between misleading information and scientifically proven facts.

Jong and Drummond (2016, 763) found that participants in online fitness culture thought it to be a good method of sourcing health information that motivated exercise and diet regimes, promoting users' interest in applying the information garnered online. SNSs serve to motivate healthy behaviour by offering disciplinary and regulatory strategies to ensure fit and healthy bodies (Jong and Drummond 2016, 766).

5.3 Analysis of case studies

The following table summarises information regarding the two most popular biohacking videos collected from the most-subscribed-to female and male fitness channels shared in the span of a year (from January to December 2020). According to statistics by Bärtl (2018, 16), 85% of views on YouTube are concentrated on just three percent of all channels. This would mean that Blogilates and Athlean-X are particularly dominant fitness channels and therefore well-positioned to reflect literacy in online engagement such as comments on extremely popular YouTube fitness videos. Furthermore, García-Rapp (2017, 234) suggests that a channel's "legitimacy within the community" is verified by its number of subscriptions, which further substantiates the use of most-subscribed-to fitness channels for this analysis.

As the theoretical framework of this study draws on the critical reading of the interaction between human and technology, posthumanism and fitness trends such as biohacking, the following analysis focuses on users' comments on the respective YouTube channels to find and interpret visual and textual elements and strategies that are reflective of biohacking and augmented bio-literacy. The case studies' channels act as examples of popular biohacking practices on YouTube, where fitness participants come together to enhance their fitness literacy and gain knowledge to be applied toward producing a fit body.

Table 1: Statistics of YouTube videos selected for analysis

Video name	Date published	Duration	Views	Likes/ dislikes	Comments
Blogilates Video 1: "20-minute Waist Whittler Cardio Pilates Workout | 7 Day Ab Challenge (do this video every day)" (Blogilates 2020a)	2020-05-03	24:53	2 304 039	43k/ 315	5 177
Blogilates Video 2: "How to Reduce Bloating Quickly – Causes of Bloating and Tips to Debloat Fast!!" (Blogilates 2020b)	2020-09-16	13:37	1 245 780	42k/ 544	1 297
Athlean-X Video 1: "Get a '6 Pack' in 22 Days! (HOME AB WORKOUT)" (Athlean-X 2020a)	2020-04-02	7:04	12 238 169	371k/ 7.4k	11 960
Athlean-X Video 2: "How to Lose 'Stubborn' Belly Fat (GONE IN 4 STEPS!)" (Athlean-X 2020b)	2020-05-24	15:30	3 095 081	99k/ 2.2k	4 456

5.4 Blogilates

To generate knowledge about the impact of SNSs on the fitness trend, high-impact fitness channels on YouTube are analysed as basis for theoretical elaboration and generalisation to other cases. The following summation analyses the Blogilates YouTube channel as case study according to the main themes identified in the literature study, namely, literacy, posthumanism and biohacking, as apparent in visual and textual elements of the Blogilates channel. Blogilates is first contextualised as a YouTube channel, whereafter a discourse analysis of the comment threads from the two most-watched video uploads on the channel during 2020 is conducted.

5.4.1 Background contextualisation

Cassey Ho is an American certified fitness instructor and entrepreneur (Figure 11). She has been teaching group fitness classes and Pilates for almost a decade. Her fitness routines consist of a fusion between Pilates movements and choreographed dance

routines (Blogilates Inc. 2009). She uploaded her first video to Blogilates in 2009 and currently hosts the most-subscribed-to female fitness channel on YouTube, with over 4.78 million subscribers in 2020 (YouTube 2020b). Ho has also published a how-to fitness manual in print as well as online, designs active wear fashion, and has various diet plans and workout programmes for "body transformation" that promise "phenomenal" results (Blogilates Inc. 2009; YouTube 2020b). In other words, she guarantees the participants or followers of her biohacking programmes a desirable body (i.e., a body that is slim and toned).

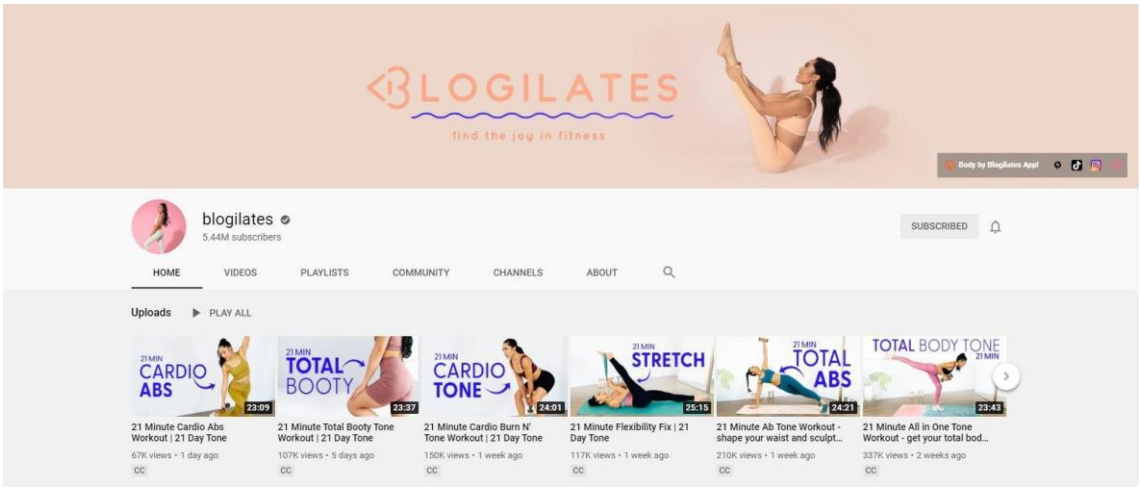

Figure 11: The Blogilates YouTube channel homepage, Blogilates YouTube channel, January 2021. Screenshot by author.

The Blogilates landing page (Figure 11) serves as a visiting user's introduction to Ho's video content. She presents herself as a personal trainer specialising in DIY fitness guides, as can be seen in the thumbnails[14] of workout videos targeting various body parts. Her video thumbnails also reinforce her self-branding by repeatedly using her body as focal point, since the backgrounds are plain and the text is typically linked to body parts with arrows, reminiscent of labelled biological illustrations.

In most visual representations of Ho, she demonstrates various exercise movements, signifying discipline or control of the body through workout regimes and also conveying the ideal body and its capabilities to the viewer. She therefore uses her fit

14 A video thumbnail is a still image serving as a preview image for a YouTube video (Knott, 2017).

body as “business card” for commercial gain. The main purpose of these still video previews is to entice users to watch her videos, or in this case, to prompt biohacking participants to find out how to control (or hack) specific and typically “problematic” body parts.

There is a distinct marketing angle in Blogilates’s use of thumbnails, as Ho exclusively wears her own range of trendy workout clothing as advertisement for her clothing company. The colourful outfits she exhibits are contrasted against the blank backgrounds, adding emphasis and visual importance to the clothing. She uses herself as mannequin or model for her “athleisure” clothing, which is associated with the body as commodity that can be used to display coveted consumer items (Negrin 2008, 14). Paradoxically, the postmodern appearance has become less expressive of the individualist identity and more “depersonalised” (Negrin 2008, 10), as clothing becomes more like a uniform signifying a specific identity and cultural construction (Negrin 2008, 13). It is therefore possible to “purchase” a fit identity, as the aesthetic nature of the channel emphasises appearance as identity formation. This new self-concept has emerged with consumer culture (Negrin 2008, 9) and emphasises the presentation of the self through grooming and body maintenance techniques such as active lifestyles and bodily renewal, which are linked to social mobility and personal transformation (Featherstone, 2007, XV). This contemporary self-conception also serves as a theoretical underpinning of the Blogilates YouTube channel. The promotion of bodily regimes and reflexive influencing of the project of the self is typical of the aestheticisation of the self that is prevalent in postmodernity (Featherstone 2007, 64; Negrin 2008, 13). The body is thus a self-reflexive project, as exemplified through controlled food intake or diets (Negrin 2008, 9) that are promoted by the YouTube channel in question. The Blogilates channel therefore reflects and actualises the postmodern self-conception and body project.

The characteristic inwards-turning of postmodernity is evident in the focus which Blogilates places on individual transformation, which is symptomatic of the general disillusionment with traditional authority structures such as religious and political systems. Ho promotes the body as a site for investment upon which postmodern individuals can forge an identity or which they can use as foundation for constructing a

reliable sense of self since this decline of "transpersonal meaning structures" (Negrin 2008, 15).

Since the Blogilates channel is free to watch and conscribes to open-source knowledge, values and the participatory culture of YouTube, it serves as a marketing platform for Ho's clothing business and fitness programmes. The Blogilates channel uses soft, feminine colours (gradients of peach and pink) to appeal to female audiences by associating the brand with traditional feminine gender norms. The imagery is focused on displaying Ho's body at highly strategic angles and in favourable lighting to appear as ideal to the fitness consumer as possible, akin to how photos are retouched for publication in magazines. The body Ho promotes is thin and fit, able to move and stretch.

The Blogilates profile picture (Figure 11) is not focused on Ho's facial features but rather chooses to show her body again (from her knees to her head). This could be interpreted as an opportunity taken to showcase the true reason for the channel, as it is not focused on Ho as individual, which could be achieved by accentuating facial features, but rather on the ideal represented by her fit body.

Ho uses the slogan "find the joy in fitness" to summarise her health standpoint to visitors. That is to say, she promotes DIY action by directing the visitor toward individual action via the verb "find", indicating the private discovery of the pleasure in fitness practices. Ho's slogan reflects emphasis on the hedonistic "joy" of cultivating a specific appearance through "fitness" (Negrin 2008, 10).

The Blogilates channel encourages eating in a specific way (as can be seen in Figure 12's clean eating video playlist) or behaving in a manner that conscribes to fitness culture ideals. Thus, she promotes fitness literacy among her viewers through the visuals (such as the thumbnails, profile picture and cover image) on her channel, and supports a certain tightly controlled appearance through biohacking behavioural patterns.

Fitness challenges are immensely popular in the fitness paradigm, as can be noted in the video titles (Figure 11) such as the Blogilates 21-day tone regime. Ho engages

participation in biohacking programmes where she acts as the virtual mediator of fitness culture values, as discussed in Chapter Three. The common idea that it takes 21 days to form a new habit is propagated by contemporary self-help professionals – Ho included. Although actually it has been proven to require a *minimum* of three weeks to form a new habit, three weeks is widely perpetuated as "short enough to be inspiring, but long enough to be believable" (Clear 2014, 2-3).

Above and beyond the 21-day format enabling the YouTuber a three-week video series that makes planning content easier, Ho promotes the habitual or consistent disciplining of the body and "challenges" subscribers to join her for daily DIY group workouts in the privacy of their homes.

Ho focuses on sharing economical and easy recipes or nutritional information (Figure 12) to enhance the accessibility of regimes to the global middle- and lower-class public. She encourages monitoring food intake and uses marketing trigger words such as "fat flushing", "anti-aging" and "detox" to increase clicks by visiting viewers, as well as introducing the biohacking efforts of interest in the videos.

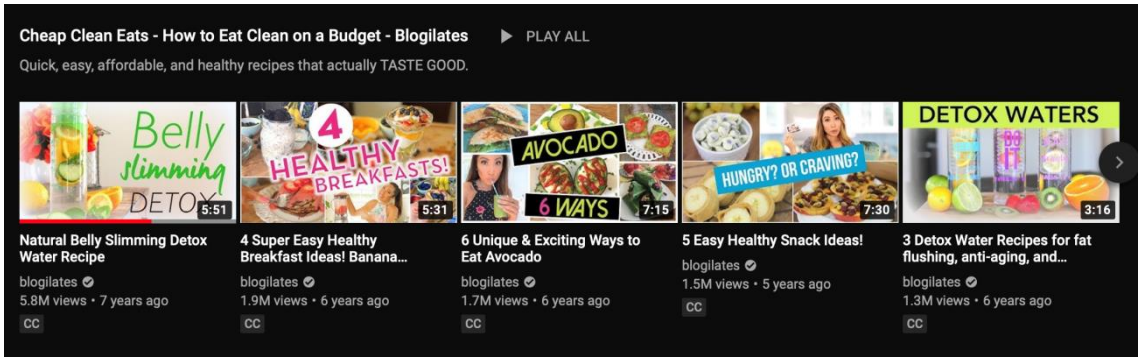

Figure 12: Suggested video playlist: "Cheap Clean Eats – How to Eat Clean on a Budget", Blogilates YouTube channel, 2021. Screenshot by author.

5.4.2 Video 1: "Waist Whittler Workout"

The video is framed throughout by a clean and modern living room interior (Figure 13); this choice of background creates reliability for the viewers at home, especially during Covid-19 quarantine periods. The domestic background contextualises the workout as a DIY practice and is related to the DIY movement increasing the popularity of home

workouts. Ho introduces her seven-day challenge focused on the abdominal muscles, and dedicates the workout specifically to “shedding the fat” and “making those muscles pop in your abs”. The abdomen is the focal point of the episode, as the specified goal of the workout video is to decrease the size of the abdomen and show more of the muscle underneath it. Ho supplies a downloadable document on her website for viewers to check off completed workouts and stay on track with the programme. This again links with the DIY movement, and a printable schedule enables easier adherence to the biohacking regime at individual level. Ho promises that viewers will “feel and look stronger by the end of the week” and asks viewers to take before-and-after pictures to compare results in seven days. She also encourages viewers to tag her on various SNSs with the handle #7DayAbChallenge and invites viewers to commit to her seven-day challenge (Blogilates 2020a). These UGC images are used for commercial purposes, and Ho uses the most contrasting weight-loss transformation photographs as advertisements to sell future programmes and legitimise her pre-made programmes to new clients.

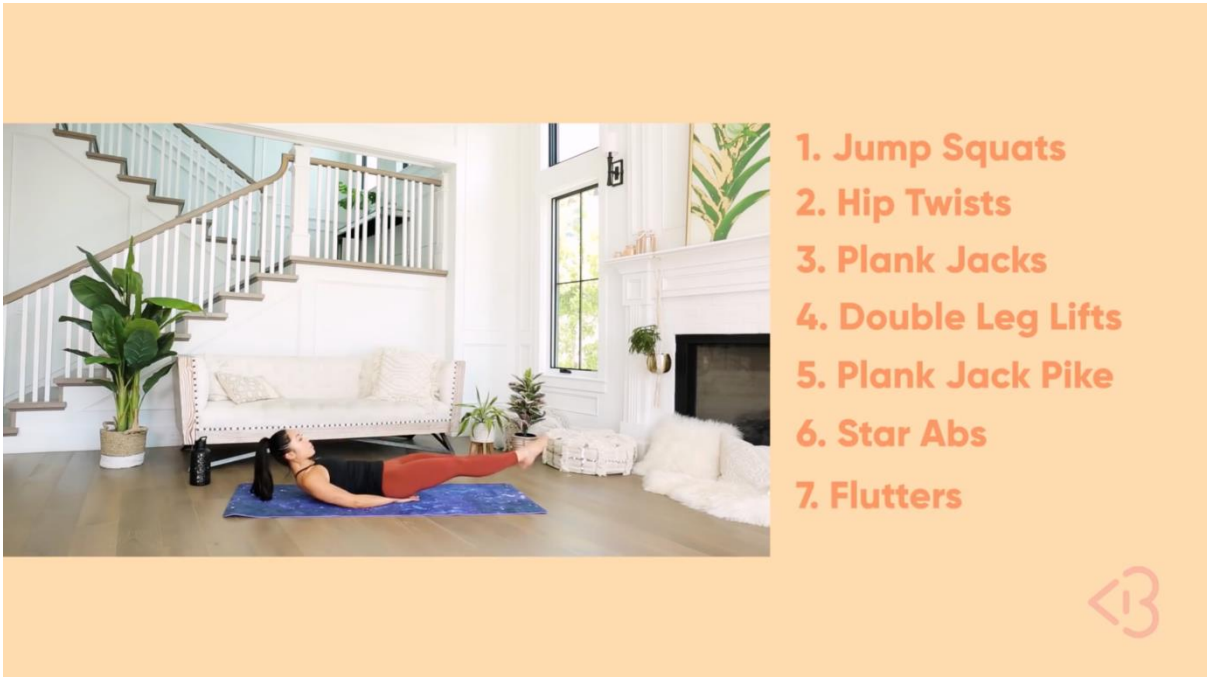

Figure 13: Cassey Ho in “20-minute Waist Whittler Cardio Pilates Workout | 7 Day Ab Challenge (do this video every day)”, Blogilates YouTube channel, 2020. Screenshot by author.

Ho demonstrates several exercise movements and modifications during three rounds of exercises aimed at fatiguing the core muscles and delivering desirable results. She encourages viewers to choose the level of difficulty that will "push you to your limit". This suggestion of sacrifice or pain in exchange for results again signifies the disciplining of the body as an instrument. For most of the video, Ho actively encourages viewers to continue with the workout while demonstrating the ideal pace and correct form by explaining how certain muscles can be best engaged. This is another example of the most-effective biohacking method that is communicated to the audience.

She talks positively to the imaginary community or viewers throughout the video. In order to hold the audience's attention during the workout and create a feeling of interactivity, Ho rarely stays quiet for more than a few seconds. Ho's constant commentary may also ward off the demonetisation[15] of her video according to YouTube guidelines, in cases when the background music is copyrighted material. At the end of the session, Ho congratulates the audience for completing the exercises "with" her, instructs the viewers to repeat the video workout daily for seven days and reminds them to share a picture (or produce UGC) on social platforms so that "we can inspire a bunch of people to get fitter and stronger and happier too" (Blogilates 2020a). This is relevant to the idea of open-source and participatory culture interested in sharing knowledge and sheds light on the channel's aim to enhance viewer literacy.

5.4.3 Text 1: User comments on "Waist Whittler Workout"

The following conversation has been collected from the comment section of the video discussed above:

> *A: I did this challenge, and saw results. I took one rest day between days 3 and 4, and changed my diet a little. I still had a cookie or maybe a serving of white rice/pasta each day – cuz (sic) I just love chewy cookies lol, I just reduced how much of it I would normally eat. I didn't take measurements, but I could see my*

15 Demonetisation affects participants in the YouTube Partner Program. This programme allows creators to share revenue from advertisements. However, when videos infringe upon rules such as copyright, video content could be removed and stripped of revenue (YouTube 2021).

abs poking out more, and they feel more "tight" now even though I'm not flexing them. And the strengthening exercises like hip twists, star abs etc. definitely felt easier. Thanks Cassie:) This is going to be a go-to routine for strengthening my abs.

B: Thank u:)) this was really helpful to motivate! Did this work quickly and did u do anything else at the same time? I've been drinking lots of water and eating clean but I cant (sic) seem to lose weight easily😔

A: @B You're welcome:) I did it for one week, and I saw results, so I guess it worked quickly. I didn't do other workouts. However the way I look did not change drastically. My weight didn't change much, if at all lol. But my upper abs were more defined, and my tummy looked a bit more flat. Even up til (sic) now (December) my body still looks like how it did when I finished the challenge the first time. And I'm able to do all 45 seconds of plank jacks! I could not do that before. I normally try to drink 64oz of water, and eat veggies, whole grains instead of white [b]read, white rice. But sometimes I like to just eat those things anyway, which is why I mentioned it in my first post. I just ate less of those than I normally would, and ate more of the complex carbs. My goal then wasn't to lose weight though. I hope this helps a bit (Blogilates 2020a).

5.4.4 Analysis of Text 1

These comments were casually produced by participants of the virtual seven-day abdominal workout challenge created in the Blogilates "waist whittler" workout video. *User A* initially reports her biohacking techniques and fitness regime by sharing an encouraging comment with the Blogilates community ("*I did this challenge, and saw results*"). The post or interaction is intended as an update of *User A*'s fitness progression since following Ho's health advice. *User A*'s motive for the communication is therefore sharing her progress concerning the physical transformation she has accomplished ("*the strengthening exercises like hip twists, star abs etc. definitely felt easier*" and "*but I could see my abs poking out more, and they feel more 'tight' now even though I'm not flexing them*"). She also shares the biohacks she implemented, as inspired by Ho's information ("*I just reduced how much of it I would normally eat*"). This indicates that Ho assumes the role of dominant communicator. *User A* thanks Ho personally ("*Thanks Cassie*") for enabling the changes she sees in her body tone as well as the exercise routine, which she incorporated into her personal training regime ("*This is going to be a go-to routine for strengthening my abs*").

Another member of the fitness community responds to *User A*'s personal health review following the Blogilates workout challenge. *User B* finds *User A*'s comment relatable and potentially valuable to her own body project ("*Thank u:)) this was really helpful to motivate!*"), and proceeds to ask the successful participant for more information concerning the biohacks that delivered her reported results ("*Did this work quickly and did u do anything else at the same time?*"). *User B* is struggling to bring about bodily changes ("*I cant (sic) seem to lose weight easily*") even though she attempted to apply the hacks ("*I've been drinking lots of water and eating clean*"). Presumably, this is why *User B* has turned to YouTube for educational input (or to become bio-literate) and found *User A*'s feedback useful toward achieving her physical goals. The motive for *User B's* communication is therefore finding help and support from other members of the Blogilates community.

After the question from *User B, User A* posts a reply in an attempt to aid *User B* by providing more details, referring to her personal experience, describing her own physical results and food intake, giving additional clarification surrounding her results ("*My weight didn't change much, if at all*") and a more detailed account of the bodily transformation she experienced ("*my upper abs were more defined, and my tummy looked a bit more flat. Even up til (sic) now (December) my body still looks like how it did when I finished the challenge the first time*"). *User A* describes her individual eating routine as an example which *User B* may find helpful ("*I normally try to drink 64oz of water, and eat veggies, whole grains instead of white [b]read, white rice. But sometimes I like to just eat those things anyway, which is why I mentioned it in my first post. I just ate less of those than I normally would, and ate more of the complex carbs*"). By providing more detailed biohacking information, it is clear that *User A* has an understanding of what should be done to produce a healthy, lean body and increase her physical abilities ("*I'm able to do all 45 seconds of plank jacks! I could not do that before*"). *User A*'s advice to *User B* indicates an understanding of natural biohacks toward an enhanced body. Therefore, the inference can be made that *User A* possesses basic biohacking literacy skills. This is implied in her knowledge of the subject matter of biohacking – her initial comment being of such a nature that another, less successful biohacker sought advice after seeing *User A*'s positive feedback of the Blogilates program. A lower level of fitness literacy is indicated in this discourse by *User B* as she

asks for specific advice and displays a willingness to learn, which may lead to improved fitness literacy and physical control.

5.4.5 Video 2: "How to Reduce Bloating Quickly"

This clip is also set in Ho's aesthetically pleasing living room (Figure 14), where she is seated on a couch throughout the clip. She initiates the video by defining stomach bloat (the uncomfortable swelling of the abdomen caused by eating particular foods or overeating) and offers treatment options for this common condition (Blogilates 2020b). Ho covers the relevant biology regulating digestion and then lists reasons why gas might be trapped in the bowels, such as eating too much and too fast, or eating foods that create more gas than others (see Figure 14). These nutritional instructions are fine examples of biohacking practices, as increased scientific knowledge results in effective solutions for biological system malfunctions. In other words, the body hacking Ho teaches to masses of viewers perpetuates awareness of the body and its systems and reveals how "it" can be hacked through literacy.

Ho touches on diseases that make digestion more difficult for the body and then transitions to the difference between bloat and abdominal fat specifically. She shows a picture of her own (flat) stomach alongside another photo of an overweight woman's torso. It is worth noting that both these body parts are displayed without heads as a comparison for the viewer, indicating an instrumentalist view of the body since it is split from its corporeal unity. The body is therefore perceived as a tool, and a site that determines social status.

Ho continues to explain how viewers can self-diagnose the cause of their bloating (revealing DIY treatment practices prevalent in postmodernity), and elaborates extensively on the difference between having excess abdominal fat and just being bloated. Thereafter, she provides the audience with tips and techniques to solve bloating. Techniques include food journaling, deep breathing, colonic massage, increased core strength or a visit to a physician in case the bloating is caused by something other than nutrition issues. Ho discusses the viewer's individual fitness and journey of discovery and continues to provide the audience with tips on losing body fat, stating that it is primarily about a consistently healthy and balanced lifestyle and

sticking to the regime she created. Ho refers followers to the 90-day meal-plan guide she sells on her website, which offers fixed meal plans that have been created in collaboration with a registered dietician. This ready-made programme or routine is an example of the regimes that are promoted toward controlling the body and its diseases. She concludes by reminding viewers that they have the power to change their physical state and motivating the audience to "look in the mirror and love yourself" (Blogilates 2020b). There is a strong call for the need to transform the body, even though the Blogilates channel simultaneously promotes self-acceptance. Ho shares in-depth hacks on altering the body into the ideal feminine ideal, which is thin and only lightly muscled. The active and constant encouragement toward physical transformation, or transformation of identity, is based on the postmodern idea of the body and biology as malleable (Negrin 2008, 13).

Figure 14: Cassey Ho in "How to Reduce Bloating Quickly – Causes of Bloating and Tips to Debloat Fast!!", Blogilates YouTube channel, 2020. Screenshot by author.

5.4.6 Text 2: User comments on "How to Reduce Bloating Quickly"

This quotation has been collected from the comments of the video discussed above:

Blogilates: What foods make you bloated? For me it's dairy, gluten, and added sugar! To debloat, I spend the next day drinking lots of water and filling up on lean protein, veggies, and fruits! Exercise helps too of course!

C: I was bloated every day so I tried cutting gluten out of my diet. Now I feel and look much better ☺

D: Food high in fiber like certain vegetables, lettuce for example, legumes like beans and nectarines, probably because of the high sugar I guess. And everything else bloats me too, but not so much as [t]he mentioned things. I don't get bloated by things that are easily digestable like refined flour or cereal, sugar or dairy.

E: I found out that I have celiac disease and gluten was making me bloated because of all the side effects. If you are prone to feeling tired, sluggish and have issues with bloating it is worth asking your doctor to check for this! I can't tell you incredible i felt after a few weeks of changing my diet and cutting out the food that was harming my body for good!

F: Thank you for sharing your knowledge! I like the food diary idea and deep breathing:) (Blogilates 2020b).

5.4.7 Analysis of Text 2

This comment thread has been initiated by Ho and is pinned to the top of the comment section to engage viewers and direct discourse in the comments by supplying a relevant subject for further discussion. Ho's motive for communication is thus to direct users' conversation around the health topic handled in her video. She engages viewers for feedback on the causes of their bloat ("*What foods make you bloated?*") and their personal trigger foods ("*For me it's dairy, gluten, and added sugar!*"). Ho then provides readers with a summarised list of possible treatments for a bloated stomach ("*To debloat, I spend the next day drinking lots of water and filling up on lean protein, veggies, and fruits! Exercise helps too of course!*"). This placement of her comment as the starting point for conversation on the video reinforces Ho as the dominant influence in the subsequent social interactions.

I have selected four (*Users C-F*) replies to Cassey's comments that are illustrative of different levels of understanding of biohacking methods. Note that the replies to this particular comment are meant to engage Ho as the knowledgeable specialist on the subject and do not necessarily intend to elicit comments from other audience members.

User C replies to Ho and reports difficulty with frequent bloating ("*I was bloated every day*") before adjusting their diet and solving their digestive issues by recognising problem foods and taking action with regard to the foods ("*I tried cutting gluten out of my diet*") with successful results ("*Now I feel and look much better*☺").

User D shares their problem foods ("*Food high in fiber like certain vegetables, lettuce for example, legumes like beans and nectarines*") and makes an effort to explain why nectarines would affect their body negatively ("*probably because of the high sugar I guess*"). *User D* then states that "*I don't get bloated by things that are easily digestable like refined flour or cereal, sugar or dairy*", which partly contradicts the hypothesis regarding nectarines, in particular, causing their bloat ("*because of the high sugar*"). Nonetheless, this comment displays awareness of food intake, and *User D* tries to pinpoint foods that cause bloat and to possibly relieve abdominal swelling with basic biohacking.

User E is not solely replying to the pinned Blogilates post, but is also addressing fellow members of the Blogilates fitness community with similar difficulties and interests. She shares her personal struggles with digestion-related illness ("*I found out that I have celiac disease*") and experiences with bloating as a side effect thereof. *User E* encourages other community members to test for coeliac disease if they experience lethargy along with frequent bloating ("*If you are prone to feeling tired, sluggish and have issues with bloating it is worth asking your doctor to check for this!*"). *User E* attests to the positive transformation she had following the exclusion of gluten from her diet ("*I can't tell you incredible i felt after a few weeks of changing my diet and cutting out the food that was harming my body for good!*").

User F is grateful to Ho for sharing her knowledge regarding digestive functions ("*Thank you for sharing your knowledge!*") and reiterates that she found food journaling

and deep breathing techniques advantageous ("*... I like the food diary idea and deep breathing ...*").

5.4.8 Final comments on Blogilates

I have contextualised Blogilates as a YouTube channel and analysed it as a case study to determine the impact of digital technologies on the fitness megatrend in terms of enhanced lay literacy. Central themes of literacy, posthumanism and biohacking are reflected in the visual and textual approaches taken by Blogilates. An analysis of the visual elements used by the channel has been conducted, followed by a discourse analysis of comments on popular biohacking videos. Overall, comments on Blogilates videos are reflective of different degrees of fitness literacy concerning biohacks, including nutrition and exercise regimes. Blogilates viewers perceive Ho as an informal mentor, and their comments frequently reflect appreciation toward her for sharing fitness related information. It is clear that Ho is accepted as an authority figure on YouTube, as she assumes the dominant role in influencing social attitudes and mental processes of the audience.

The visual and textual strategies indicate that Blogilates acts as a spearhead of the postmodern body project on YouTube by mediating the body as a prestige possession to keep beautiful and competitive. Further conclusions include that Ho promotes the body as a site for both financial and psychical personal investment (Baudrillard 1998, 129), creating a sense of self that is independent of religious and political structures. However, the perfect body may perhaps be interpreted as a new "religion". Furthermore, Ho acts as a virtual mediator of fitness culture values and practices by sharing fitness information directed at transforming the body into an ideal, or fitter, shape. Repeated emphasis on transformation through diet and exercise programmes supports the postmodern self-perception of the body as pliable and identity as flexible. Blogilates has been found to encourage disciplined eating and behaviour to align with fitness culture ideals. Through discourse analysis, it has been determined that the Blogilates channel generates and actively supports the fitness literacy of its audience.

In summary, Blogilates advances a controlled and socially mobile physical appearance through the implementation of biohacking regimes that are shared and motivated by

participatory culture values. Participation is enhanced, according to Chau (2010, 68-72), through accessibility (a fundamental element of YouTube as digital platform), active community contribution and social connection (demonstrated by user comments), informal mentorship (as facilitated by Ho), and encouraged project sharing (mostly in the form of shared transformation photographs). This channel is therefore established as a prime example of popular biohacking practices on YouTube, where the fitness culture encourages participants to increase their fitness literacy and to transform their bodies as an instrument toward greater self-actualisation.

5.5 Athlean-X

Athlean-X is a particularly impactful fitness channel on YouTube and is contextualised hereafter by the thematic interpretation of visual and textual elements demonstrative of the enhanced fitness literacy of a cosmopolitan global audience. This section comprises an analysis of the graphic approaches utilised by the Athlean-X channel as case study, focusing on the relationship between humanity and technologies, with posthumanism and fitness trends as forms of biohacking. Lastly, a discourse analysis of comment threads from the two most popular video uploads by Athlean-X in the year 2020 is presented to assess the potential pedagogical impact of the videos on viewers.

5.5.1 Background contextualisation

Jeff Cavaliere is a physical therapist and the creator of the Athlean-X YouTube channel, which had over 9.6 million subscribers in 2020. He uses his channel to educate audiences on everything from common exercise mistakes to ways of correcting posture (YouTube 2020b). Figure 15 is an example of a favourite method of explanation, branded “muscle markers” by Cavaliere, to illustrate to viewers the anatomy and mechanical functionalities of various muscles and demonstrate how to effectively hack specific muscles.

Figure 15: Jeff Cavaliere in "The PERFECT Leg Workout", ATHLEAN-X YouTube channel, 2019. Screenshot by author.

Cavaliere is the well-known head physical therapist and strength coach of a national American baseball team. He completed a master's programme in physical therapy and a bachelor of science at a top university, and works as an author and lecturer on sports training, injury prevention and rehabilitation. He applies his knowledge of anatomy and biomechanics to create the "complete and functional athlete" through nutrition and exercise regimes that he has "simplified for the masses" to enable them to also change their bodies. Cavaliere promotes various training and nutrition programmes that are focused on "reaching peak performance and maximising all that the body has to offer" (Athlean-X 2018). It is clear that Cavaliere shares in the characteristic inward-turning of postmodernity. He endorses the body as an ideal site for investment where individuals can construct an identity or a reliable sense of self, given the postmodern cynicism of traditional authority structures (Negrin 2008, 15).

Cavaliere further regards the body as a malleable tool to be transformed to be as mechanically effective and socially mobile as possible. Social mobility is desirable since the archetypal fit body has become commodified, and economic value is thus linked to its functioning and appearance (Shilling 2005, 109). Baudrillard (1998, 131-132) writes that the body is a "narcissistic cult object" and the epitome of consumed and manipulated objects; he views beauty and eroticism as major social tactics used to

elevate the body. Featherstone (2007, xxi) likewise describes the body as a "vehicle to the consumer culture good life" or the enabler of pleasure that must be maintained and improved. The body is accordingly viewed as a visual indicator of the self that is maintained through grooming and presentation.

The Athlean-X landing page (Figure 16) introduces Cavaliere's nude torso as the outcome or proof of the legitimacy of his biohacking regimes. His fit body is utilised as a form of marketing tactic on the cover image of his channel. In the background, several images of video thumbnails are visible. Interestingly, most of the tiled thumbnails contain textual calls to action such as "Try this!" or "Fix this!", branding Cavaliere as a guru or mentor. The purpose of his channel can be summarised as guiding viewers to biohack a lean and strong (muscular) physique through DIY scientific methods. The open-source inclination of YouTube's participatory culture is again evident in the active sharing of specialist information and hacks, as demonstrated by the cover image and thumbnails.

Figure 16: The Athlean-X YouTube channel home page, Athlean-X YouTube channel, 19 January 2021. Screenshot by author.

Similar to the Blogilates channel, the Athlean-X profile picture is cut to include Cavaliere's hips, torso and head. This can be interpreted as indicating a focus on the hard lines of Cavaliere's fit body (notice that the saturation of the image increases the visual contrast at the small scale of a profile picture), instead of the YouTuber's facial

features. This suggests that the channel is less about Cavaliere as individual and more about sharing biohacking literacy toward enhanced self-actualisation, or essentially, sharing and selling the ideology of losing fat and gaining muscle through learning certain techniques.

Athlean-X uses the slogan "putting the science back in strength", indicating, in a rather unspecified context, that science was absent from earlier strength training methods, and that Cavaliere contributes to the YouTube participatory culture by teaching professional-level bio-information directed at enhancing physical power. Furthermore, the channel name "Athlean-X" refers to the ideal X-shape[16] body that is popular in bodybuilding as professional sport. The name could also refer to the extreme body, or in other words, the extreme body literacy of the lean athlete (Ath-lean).

The thumbnails on the rest of the channel (Figure 16) feature strictly controlled male bodies and text condensing the video themes for easy reading. Like Blogilates, Athlean-X repeatedly promotes videos centred on "fat burning" and a "flat stomach". However, Cavaliere focuses on exercises aimed at hypertrophy ("massive gains" and "bigger shoulders") to shape the ideal male body, in contrast to the female body that is ideally kept as small as possible. This indicates gender-centred standards of the ideal body within fitness culture.

Figure 17 features a collection of videos in the series titled "Sore in 6 Minutes" that is targeted to increase muscular response to exercise stimulation. The six-minute time cap of the workout series suggests that the intended viewer possesses a limited amount of time and pinpoints the target market as busy postmodern urbanites who value instant gratification and effectivity highly. Additionally, the thumbnails all present closely cropped angles of Cavaliere's body, showcasing the anatomy subjects discussed in the respective videos. The removal of the head, or centre of thought and identity, signifies that the body is disconnected from thought and a mere instrument that is controlled and

16 The 'X' shape physique is the ultimate physique for many bodybuilders. It is described by Turpin (2020) as consisting of: "wide shoulders, a narrow waist, and large legs, creating almost literally an 'X' shape out of the body".

submitted to a regime of bio-literacy. The body is therefore perceived as a project to be restructured and sculpted (Simonsen 2000, 7).

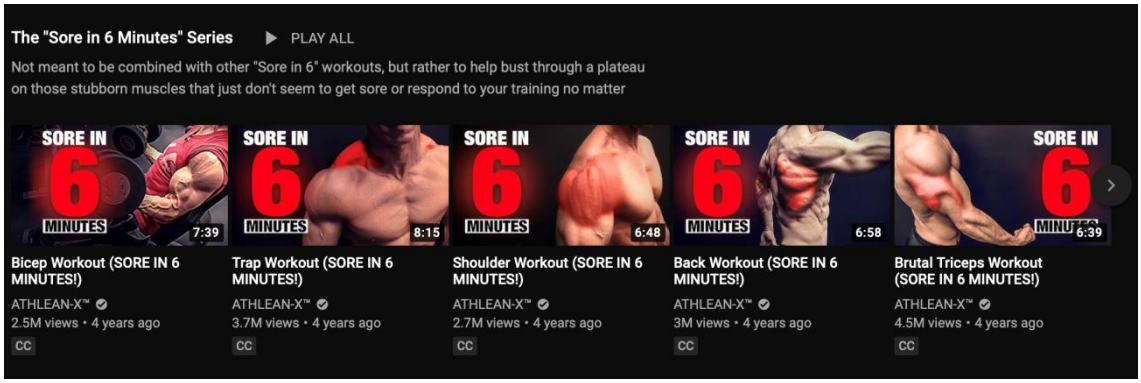

Figure 17: The Athlean-X YouTube channel home page, Athlean-X YouTube channel, 1 May 2021. Screenshot by author.

During the 2020 quarantine periods, the popularity of home gyms skyrocketed, motivating the Athlean-X home workout playlist promoted on the Athlean-X channel home page (Figure 18). These workouts are again geared toward hypertrophy and fat loss as stimulated in domestic environments (as opposed to the gym), and are aligned with the DIY trend. Again, all thumbnails are focused on Cavaliere's body as primary subject matter and focal point. Cavaliere constantly addresses potential workout mistakes, as evident in textual statements such as "never do pull-ups like this", "avoid mistakes!" and "bad idea". This approach reflects Cavaliere's no-nonsense mentorship style and work to retain the interest of new fitness participants who fear that they are performing exercises ineffectively and are thus forgoing muscle development by not being fitness literate. This playlist is essentially aimed at dispelling myths and mistakes to provide a more effective and injury-free fitness journey. In short, the carefully arranged video playlist is meant to have pedagogical value and to encourage an instrumentalist view of the self; it also promotes biohacking toward the perfect body and upholds the body project as providing a form of self-actualisation.

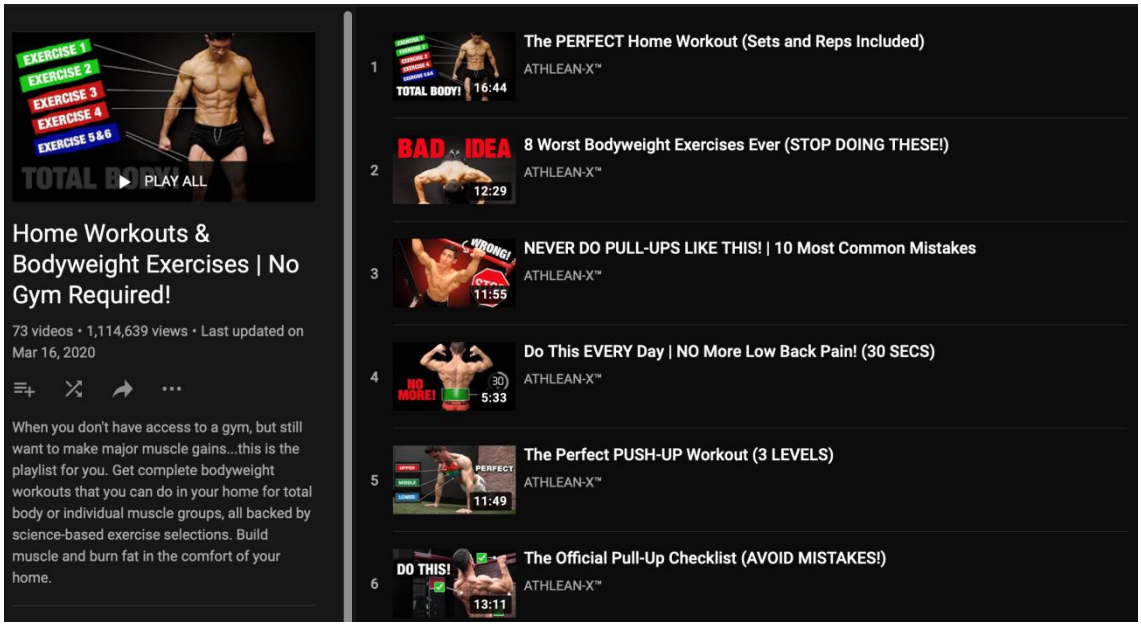

Figure 18: The Athlean-X YouTube channel home page. Athlean-X YouTube channel, 1 May 2021. Screenshot by author.

5.5.2 Video 1: "How to Lose 'Stubborn' Belly Fat"

Cavaliere introduces the video as a how-to guide aimed at reducing abdominal fat. He stands in front of a digital slideshow while explaining different body fat ranges and uses stock images to illustrate instances of higher body fat percentages (Figure 19). Thereafter, he shows an image of his own bare chest as an ideal to strive toward. The repeated display of headless male bodies with the torso exposed is symbolic of the split of mind and body into opposites – the body is reduced to an instrument that can, and should, be controlled or hacked.

His rules for having visible abdominal muscles include abstaining from alcohol, eating at a caloric deficit (through portion control and consistently eating clean), as well as doing aerobic exercises and weight-training the abdominal muscles specifically. The promotion of participation in diet regimes refers to the postmodern body project and self-conception (Negrin 2008, 9). Cavaliere debunks popular fitness myths such as spot-

reduction of fat,[17] and encourages honest self-reflection to effectively address problem areas. He shows a picture of a male body with more body fat and then switches back to his own "ripped" upper body as an example of what the audience should aspire to (Figure 19). By repeatedly presenting the perfect body as comparison to what is unacceptable, the aestheticisation of the appearance of the self is promoted through bodily practices directed at the project of the self (Featherstone 2007, 64; Negrin 2008, 13).

Cavaliere maintains that achieving physical transformation is "all a matter of the levels of sacrifice you're willing to make, the level of consistency you are able to do that in" (Athlean-X 2020b). It is important to note that Cavaliere refers here to sacrificial practices, suggesting that the body has become an object of salvation that has overruled the moral functionality of the soul. Here also exists the idea that punishment awaits those who do not make "bodily devotions", and that those ailments sprout from being "irresponsible towards yourself" (Baudrillard 1998, 129-130).

Cavaliere concludes the clip by promoting various meal plans and digital step-by-step workout guides, emphasising that he wants the audience to become more consistent in what they are doing to "get to a better place than you are now" (Athlean-X 2020b). This statement suggests that most viewers probably have yet to reach this ideal status of enhanced bio-literacy. Finally, he encourages viewers to subscribe and send him feedback on the biohacking topics, effectively inviting the audience to participate in his content creation.

17 Spot-reduction refers to the localised loss of body fat as a result of training a specific grouping of muscles. Most investigations evaluating spot reduction have found that spot reduction of fat as result of exercise is not possible (Kostek *et al*. 2007, 1177).

Figure 19: Jeff Cavaliere in "How to Lose 'Stubborn' Belly Fat", Athlean-X YouTube channel, 2020. Screenshot by author.

5.5.3 Text 3: User comment on "How to Lose 'Stubborn' Belly Fat"

The subsequent quote is a comment posted the video discussed above:

> *User G: I strolled in expecting a secret ab workout routine, instead I got a hardcore physical science lesson* (Athlean-X 2020b).

5.5.4 Analysis of Text 3

User G expresses surprise after expecting non-educative content ("*I strolled in expecting a secret ab workout routine*") and instead receiving a lecture offering scientific explanations of the fat-loss and muscle-building process ("*instead I got a hardcore physical science lesson*"). Because he refers to it as a "lesson", this study assumes that *User G* likely obtained pedagogical value from Cavaliere's content. It is evident here that Cavaliere is regarded as having a dominant social role (that of a teacher influencing the mental processes of learners).

5.5.5 Text 4: User comment on "How to Lose 'Stubborn' Belly Fat"

This comment has been collected from the comment section of the analysed video:

> *H: I've never physically met this man nor does he even know about my personal existence. But from every video I've seen he just cares SO MUCH about people and their progress – not just in terms of physical appearance but in a person's well being. Dude, thanks for being so awesome. You're incredibly helpful. Some people pay good money for all of the advice you give us FOR FREE.* 👏👏👏 *I appreciate your no BS methods* (Athlean-X 2020b).

5.5.6 Analysis of Text 4

User H is a regular watcher ("*from every video I've seen*") and appreciates Cavaliere for being candid, scientific and caring of the health of his audience ("*he just cares SO MUCH about people and their progress – not just in terms of physical appearance but in a person's well being*"). The motivation for the communication seems to be gratitude toward Cavaliere for influencing the mental processes of viewers. The user addresses Cavaliere casually, as a friend or a casual acquaintance ("*Dude, thanks for being so awesome*"), even though they are strangers ("*I've never physically met this man nor does he even know about my personal existence*"). *User H* also thanks Cavaliere for his biohacking information sharing ("*You're incredibly helpful*"). *User H* sees Cavaliere's advice as valuable ("*Some people pay good money for all of the advice you give us FOR FREE*") and expresses appreciation for Cavaliere's uploads and scientific explanations on YouTube ("*I appreciate your no BS methods*"). This communication establishes Cavaliere as the dominant figure in the social exchange and reveals *User H* as consumer and student.

5.5.7 Video 2: "Get a '6 Pack' in 22 Days!"

Cavaliere introduces an abdominal workout that consists of six exercises requiring no equipment and that is suitable for individuals of varying experience levels (Figure 20). This exemplifies the DIY-oriented approach of the Athlean-X channel. Cavaliere then provides an immediate disclaimer to manage viewer expectations by explaining that those with a higher body fat percentage will need more than 22 days to see a six-pack. Cavaliere clarifies that the 22 days – notice here too the use of the established minimum number of days intended for building habits – will allow the implementation of productive behavioural changes. He states that anyone can see some level of a result within 22 days, should they implement the biohacks provided. He continues to

demonstrate exercises targeting the core muscles and explains the anatomy and movement mechanics for maximum engagement. He describes the biomechanics of different abdominal muscle groups and shows how to enlarge the muscle, reminding the audience that consistent repetition of the exercises shown in the video will produce ideal physical changes to the abdomen. In conclusion, Cavaliere states that he wants the audience to develop better habits for a lifetime and then uses the opportunity to promote his programmes, encouraging viewers to participate by sharing the video on their personal SNSs to challenge their friends (Athlean-X 2020a).

5.5.8 Text 5: User comment on "Get a '6 Pack' in 22 Days!"

This quote is an extracted user comment from the video discussed above:

> *User I: I did this challenge over a month ago and I'm still working my abs everyday, to be completely honest this will not give you ripped abs like you're used to seeing in magazines, movies etc. At most it will give you a base line for your abs, meaning doing this will increase how big your ab muscles get, but you need to make sure you have the appropriate amount of bodyfat for your abs to be visible. Doing this challenge specifically will not burn the fat needed for your abs to show. I still recommend this challenge however, you need to incorporate cardio as well as different ab exercises to really maximise results.* (Athlean-X 2020a)

5.5.9 Analysis of Text 5

User I has completed the Athlean-X core programme ("*I did this challenge over a month ago*") and exercises frequently ("*I'm still working my abs everyday*"). He posts a public review of the 22-day core workout and gives feedback on the results he experienced while managing expectations of other readers and advising users on what to do to get the best results.

User I manages the expectations of readers in the comment section and explains that results will not be as glamorous as portrayed by mass media ("*to be completely honest this will not give you ripped abs like you're used to seeing in magazines, movies etc.*"). This disclaimer signifies the posthuman distrust of traditional authority structure, which is in this case the mass media. *User I* explains what he actually experienced ("*At most it will give you a base line for your abs, meaning doing this will increase how big your ab*

muscles get") and gives advice about what viewers actually need to do for visible abdominal muscles ("*you need to make sure you have the appropriate amount of bodyfat for your abs to be visible*"). *User I* helps other members of the Athlean-X community to understand that this challenge alone will not suffice in "revealing" the abdominal muscles ("*Doing this challenge specifically will not burn the fat needed for your abs to show*"). *User I* recommends Cavaliere's challenge to interested parties and advocates more varied exercises ("*I still recommend this challenge however, you need to incorporate cardio as well as different ab exercises to really maximise results*") for the most prominent physical transformation ("*to really maximise results*").

Figure 20: Jeff Cavaliere in "Get a '6 Pack' in 22 Days!" Athlean-X YouTube channel, 2020. Screenshot by author.

Because *User I* reports daily workouts, he seems to have internalised the biohacking regime Cavaliere demonstrates in the video, and as he is commenting, appears to be an active fitness community member or a hobbyist bodybuilder.[18] *User I* knows the

18 Bodybuilding involves exercise regimes aimed at enlarging muscles and is a popular form of biohacking. Basic biohacking is synonymous with bodybuilding, since it is a sport aimed at improving the body through implementation of various lifestyle regimes. This means that, when the body is biohacked, it is subordinated to diet and exercise regimes or routines to improve the body's capabilities and social worth. Furthermore, hobbyists, like amateurs, are serious about their leisure activities, but unlike amateurs, hobbyists are outside a professional–amateur–public system. A hobby is not one's occupation, nor is it done for money (Daily 2018, 8). The word hobby is a synonym for a "leisure activity" (Daily

biomechanical reason for "having abs" ("*you need to make sure you have the appropriate amount of bodyfat for your abs to be visible*") and produces a brief text sharing information with less experienced participants in the community. Accordingly, the motive for this communication is sharing information regarded as helpful. The additional suggestion *User I* gives readers ("*you need to incorporate cardio*") proves that the user has gained an enhanced level of fitness literacy by consuming Athlean-X's content. This is made apparent by their ability to contribute to Cavaliere's instructions, which suggests a greater understanding of the body's processes (increased cardio will boost fat loss).

5.5.10 Text 6: User comment on "Get a '6 Pack' in 22 Days!"

The following quotation is extracted from the comment section of the discussed video:

> *User J: For anyone starting out, I'd recommend that you get into a general workout routine for a week or two before doing these exercises. Because it requires stamina and getting into a routine will help you stay consistent for 22 days (or more) and help avoid fatigue after the first few days* (Athlean-X 2020a).

5.5.11 Analysis of Text 6

User J contributes to Cavaliere's advice and provides friendly tips to beginner body projects in the comment section. *User J* shares advice regarding exercise habits to the other community members who are also starting the Athlean-X workout challenge ("*For anyone starting out, I'd recommend that you get into a general workout routine for a week or two before doing these exercises*"). This information could be valuable to community members starting out on their personal body-enhancing project, as it will mean slower and steadier lifestyle changes, instead of "quick-fixes" that could result in a relapse of old habits. *User J* takes the role of a more experienced biohacker as he gives advice to beginners in the hopes of influencing less knowledgeable users. *User J* also provides a short explanation of why he advocates for first starting a routine workout schedule before implementing the particular Athlean-X 22-day abdomen

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2018, 5), even though a bodybuilder's "leisure time" or free time is committed to improving the body and the self, which challenges the definition of leisure (Jong & Drummond 2016, 762).

regime ("*Because it requires stamina and getting into a routine will help you stay consistent for 22 days (or more) and help avoid fatigue after the first few days*"). *User J* is deemed as already being fitness-literate, as he demonstrates knowledge of foundational fitness hacks such as consistency and routine, and has created text advice to aid other Athlean-X followers who struggle to achieve the set transformation goals and to minimise their chance of failure.

5.6 Final comments on Athlean-X

Athlean-X was used as case study to demonstrate its contribution to and promotion of the fitness megatrend by sharing specialised biohacking knowledge or fitness literacy by creating and sharing educational YouTube videos. An analysis of the educational impact of Athlean-X's YouTube channel was conducted according to key themes of bio-literacy, biohacking and posthumanism. An examination of visual and textual elements was performed along with a discourse analysis of public comments on the most popular Athlean-X videos of 2020. The analysis provided evidence of enhanced audience literacy levels and established the channel as a notable distributor of biohacking practices following enhanced fitness literacy. Cavaliere assumes the dominant role in influencing mental processes and social attitudes of the audience toward the fit body.

The ideal male body shape, as promoted by Cavaliere and as the outcome at which his biohacks are aimed, is lean but also enlarged with regard to muscle size. Cavaliere views the body as a flexible tool to be sculpted and transformed in an instrumental manner. The repeated removal of the head, as the symbolic seat of identity and thought, suggests that the body is separate from thought and is therefore an instrument that is controlled and made literate.

The Athlean-X channel meets all the requirements to create a participatory culture, such as easy accessibility, community contribution and connection, informal mentorship, and emphasised project sharing (Chau 2010, 68-72). This user participation makes YouTube a unique platform for research and is evident in the emphasised sharing of specialist knowledge, as demonstrated by visuals such as the Athlean-X cover image and thumbnails. The emphasis on participatory culture is evident in audience members conferring among themselves to better understand Cavaliere's biohacking

recommendations. Analysis of comments has further shown community contribution and social connection and has demonstrated a perception of educational value in Athlean-X's video content. Cavaliere is seen as a mentor figure with the purpose to guide viewers to an enhanced physique through DIY methods as he assumes the dominant role in influencing mental processes and social attitudes of the audience toward the fit body.

In summary, the Athlean-X videos have pedagogical value in terms of biohacking knowledge being disseminated. The videos also encourage an instrumentalist view of the self, while promoting biohacking toward the perfect body and upholding the body project as providing a form of self-actualisation. This channel is therefore established as a prime example of popular biohacking practices on YouTube, where the fitness culture encourages participants to increase their fitness literacy and transform their bodies as an instrument toward greater self-actualisation.

5.7 Comparative interpretation of Athlean-X and Blogilates

This section seeks to compare the selected case studies and establish the impact of SNSs on the fitness trend to enhance fitness literacy. As is evident in the Athlean-X and Blogilates YouTube channels, online fitness culture communicates information about food intake, motivation, exercise, functioning of the body and representations of ideal fit bodies (Andreasson & Johansson, 2014, 106; Jong and Drummond 2016, 760).

A fit or athletic-looking body is therefore a powerful icon for fitness participants, and online fitness communities gather on places such as YouTube to "consume" literature on this fit body. Viewers are directed by the YouTubers in question to achieve this ideal through messages and values that are then consumed by participants of the culture (Jong and Drummond 2016, 762). Featherstone (2007, 88) state that the lower middle-class possess little economic or cultural capital and consequently must procure it by adopting a "learning mode of life" where they are consciously and continuously educating themselves in terms of taste, style and lifestyle. Because the growing global middle-class is the driving force behind the fitness megatrend, this learning-oriented mind-set is crucial to the bio-literacy argument as advanced by this study, as it is the goal of this research to explore the impact of popular educational fitness channels on YouTube.

Both Cavaliere and Ho treat the body as a site worthy of investment (Baudrillard 1998, 129) and as a site for the construction of identity of the self (Negrin 2008, 5). The type of body reproduced is the healthy-looking ideal, which is physically attractive (Jong and Drummond 2016, 763).

It is crucial to keep in mind the consumerist root of the individualistic rhetoric of the contemporary self-conception (Negrin 2008, 9). Both Ho and Cavaliere encourage the aestheticisation of the self or influencing the body project through bodily regimes, and both use their bodies as commodities to display consumer objects (Negrin 2008, 13-14). The channels display advertiser-friendly personas that legitimise them as knowledgeable specialists, while also advertising products through their channels to support their efforts to share expert bio-knowledge with an audience who do not pay for access to content. These objects include fitness programmes, active wear and fitness accessories in the case of Blogilates, and performance-enhancing supplements in the case of Athlean-X. Their bodies are thus used as a type of living marketing tool for their respective ranges of products.

Other recurring similarities between the channels, including challenges, transformations and the appearance of headless bodies, are interpreted hereafter. There is a repeated emphasis on health challenges (as seen in the case of 21 days being constantly put forward as the number of days it takes to learn a habit or transform the body). These health challenges promise transformation in the minimum amount of time (Clear 2014, 2-3), to entice viewers to participate and promote constant yearning for further improvement as evident in biohacking techniques to “fashion the body” or influence appearance through controlled food intake and exercise (Negrin 2008, 13).

Heavy emphasis is placed on bodily transformation by both channels, and overweight bodies are shamed in before-and-after or transformation pictures, creating a constricted view of what it means to be healthy (Jong and Drummond 2016, 763). The appearance of the headless body is also important, as it occurs in both channels, especially in transformation images. This element can be interpreted as the body being split into opposites, where the body is degraded by a fragmented view of embodiment as instrument to be disciplined and educated or made literate in its mechanical functioning so that it can be transformed and improved. Both channels have been established as

examples of massively popular biohacking practices on YouTube, where fitness culture participants gain fitness literacy and make their bodies literate as instruments.

Finally, discourse analysis of comments on both channels indicates that the channels are participatory hubs for enhancing fitness literacy, and comments on the most popular biohacking videos are reflective of this contention. Viewers often position the advice they receive as useful and transformative, inspiring further self-monitoring and self-improvement, which further reinforce the disciplining of bodies and influences the audience to work on their body project.

5.8 Conclusion

In this chapter, user engagement on popular fitness YouTube content was investigated to determine elements of self-actualisation in the practice of biohacking and to explore the impact of SNSs on the fitness trend by demonstrating enhanced fitness literacy. Indicators of audience fitness literacy could be determined through analysis of user engagement on popular biohacking-related videos. It was argued that biohacking videos on YouTube encourage fitness practices aimed at altering the body through routine practices and primarily offer viewers DIY methods to lose fat and stimulate muscle growth. YouTube was therefore explored as a digital platform, and case studies of fitness channels were conducted to contextualise online fitness culture and analyse visual and textual strategies related to biohacking and fitness literacy. Additionally, a discourse analysis of comments posted on the most popular fitness-related channels available on YouTube established enhanced audience fitness literacy.

User engagement was analysed to establish aspects of biohacking and fitness literacy toward self-actualisation. By hacking health and fitness, different levels of personal enhancement and goals are attained, as physical activity is proven to enhance quality of life (World Health Organisation 2018). The pursuit of fitness literacy and a certain type of body were reflected in YouTube comments, and the implementation of YouTuber health practices was frequently reported.

Generally, comments on biohacking-related YouTube videos reflect different levels of understanding of fitness practices. Biohacking content on YouTube promotes health and

fitness practices focused on changing physical appearance and offer users DIY methods to achieve a certain level of leanness, setting a benchmark for the ideal percentage of body fat and muscle mass. A thin and toned body is presented as the current sociocultural ideal (Ratwatte and Mattacola 2019, 10; Tiggemann and Zaccardo 2018, 1008) and, in line with this set norm, many of the most-viewed videos specifically discuss the reduction of abdominal fat, which indicates the most popular body part participants in fitness culture are interested in changing.

CHAPTER SIX: CONCLUSION

This chapter presents a conclusive summary of key arguments, findings and conclusions.

6.1 Summary of findings

This research explored the enhancement of fitness literacy through the consumption of fitness content on SNSs. YouTube is considered as a pedagogical tool, whereby a transformed perception of embodiment is found to be produced. New technologies impact on public literacy in different areas. In the case of this study, the focus was on the impact of YouTube as SNS on enhanced fitness literacy, which can be compared to the increase in traditional lay literacy in the fifteenth century, as initiated by the development of the printing press in early modern Europe.

A revolution is currently taking place in the fitness industry due to interactive SNSs, comparable to the revolution created by development of the printing press, which allowed the layperson to access knowledge in ways which were not possible earlier. Due to the development of SNS technologies such as YouTube, access to advanced knowledge behind managing a fit body is democratised. The fitness megatrend is diffused through media such as YouTube videos that shape the development and perception of the human body into a fitness instrument. Since the realisation of the ideal body is universally defined, virtual professionals are able to teach fitness as a self-actualising tool which is globally accepted. The contemporary movement of public health toward digitising the body is now a crucial part of individual embodiment and postmodern culture.

Technological developments increase the awareness of healthy living by visually mediating the ideal body and its activities and practices. It also provides non-professionals with the means to control their health independently. This present-day perception of the body, or the contemporary self-identity, has been snowballing since mass urbanisation started increasing on a global level. By hacking individual health and fitness through shared information on SNSs, different levels of personal enhancement are attained. Biohacking is understood as a tool or instrument produced through

knowledge of diet and exercise regimens shared by biohackers on various SNS platforms. It is argued that increased access to fitness information, enabled through improved technology, enhances the fitness literacy of users across a wide spectrum and enables greater control over the body, transforming it into a higher form of being. Biohacking has a DIY and instrumentalist approach to the human body; thus, the transformations of physiology through fitness regimens promoted on SNSs are identified as a form of biohacking.

By analysing user engagement on top-performing fitness channels as case studies, aspects of fitness literacy were determined by analysis of public discourse following engagement of users on popular YouTube fitness channels. Indicators of literacy could be determined in comments of YouTube users, and biohacking knowledge is undoubtedly distributed through health-related YouTube videos. The pursuit of fitness literacy and a certain type of body (lean and toned) was reflected in YouTube comments, and the implementation of YouTuber health practices was often described. Biohacking content on YouTube promotes health and fitness practices focused on changing physical appearance and offered users DIY methods to achieve a certain level of slimness, setting standards for the ideal amount of body fat and muscle mass.

The research demonstrated, through the case studies and discourse analysis conducted on two of the most popular fitness YouTube channels, how SNSs contribute to enhancing the fitness literacy of audience members. Findings of this study revealed that the informal environment of YouTube fitness videos, as reflected in users' comments, suggests enhanced but different levels of understanding of fitness practices. Some users went beyond information sharing by giving advice to others on the same journey toward an actualised body, proving that a higher level of knowledge creation is taking place on YouTube, further inspiring and enhancing the current fitness megatrend.

6.2 Summary of chapters

In Chapter One, the significance of the study was determined, along with its aim to establish the pedagogical value of YouTube as a digital platform to diffuse fitness literacy leading to the fitness megatrend. Key concepts were introduced, such as literacy, biohacking, fitness literacy and digital technology. The theoretical framework

was described and the methodology was justified, seeking to fill the gap in literature regarding the significance of digital platforms to convey fitness literacy and biohacking information.

Chapter Two established the printing press as a revolutionary technology and explored the notion of literacy and its link with religious cultures and modernity. This was done in order to draw parallels between the increase in traditional literacy (the ability to read and write) that resulted from the development of the printing press and the influence of new technologies such as YouTube on the general public's fitness literacy. Marshall McLuhan provided the lens through which contemporary technologies such as social networks could be viewed.

Chapter Three provided background to the popularisation of fitness culture into a megatrend. This chapter started by defining fitness before exploring it as a self-actualising tool. Thereafter, urbanisation, the fitness industry, the gym culture, gender and fitness were assessed to provide context to the contemporary fitness megatrend.

In Chapter Four, SNSs were explored as enabling enhanced fitness literacy and promoting a contemporary perception of embodiment. Theories such as posthumanism, transhumanism and cyborgism were investigated as possible influences of biohacking. Thereafter, biohacking was defined and explored as a contemporary DIY movement focused on body strategies.

YouTube was contextualised as a digital platform in Chapter Five, and multiple case studies as well as discourse analysis were conducted on the most popular fitness-related YouTube videos in the world to establish the impact of YouTube as a digital platform on fitness literacy. User engagement was analysed to establish aspects of biohacking and fitness literacy toward self-actualisation. The pursuit of fitness literacy promoted a specific type of body that was reflected in YouTube comments, and the carrying out of YouTuber fitness practices was repeatedly reported.

This chapter presents a conclusive summary of findings and recommendations for further research, and discusses the limitations and ethical considerations concerning this study.

6.3 Contribution of the study

This study contributes to research by examining how SNSs, in this case, YouTube, become spaces where health topics are promoted and discussed by cosmopolitan audiences across the spectrum, from laypeople to professional health and fitness experts. This research demonstrates how SNSs contribute to enhancing the fitness literacy of viewers through multiple case studies and discourse analysis of popular fitness YouTube channels. Unequivocal evidence has been provided that YouTube has pedagogical value in terms of increased fitness knowledge, motivation to maintain and improve personal fitness and better DIY healthcare of SNS users. Additional insights have been gained into how individuals cognise popular fitness practices and issues.

6.4 Ethical considerations

Although potential ethical problems are limited due to the exploratory nature of the study, digital user engagement was collected from public domains for discourse analysis, which may incorporate some ethical risks. Respect for the dignity of research participants was prioritised, and to ensure the anonymity of individuals participating in the research, the identities of research participants have been obscured to protect anonymity and privacy. Instead of real names, pseudonyms such as *User A* or *B* have been used. All reasonable attempts have been made to reduce the potential of personal, organisational or systemic harm resulting from my work. This research is not subject to funding and no possible conflicts of interest exist. The representation of primary data findings has been treated with honesty and transparency.

6.5 Limitations of the study

The section provides an overview of the limitations of the study. The most important constraint affecting the credibility of the findings of this study is the relatively small amount of discourse that could be analysed, from which generalisations and conclusions were drawn. The consequences of this could be that findings of this study may not be as reliable when generalised to other fields of study or to digital platforms other than YouTube. However, all measures have been taken to assure reliable results from which conclusions could be drawn – such as cross-referencing sources and utilising multiple

qualitative research methods to construct an understanding of fitness literacy, in order to demonstrate its presence in public discourse on top-performing YouTube channel case studies.

6.6 Suggestions for further research

Based on these conclusions, other practitioners could address the unique impact of different digital platforms or software on mass fitness literacy. YouTube provides an abundance of up-to-date data for future research to be conducted. Further research could also engage in measuring indicators of fitness literacy in discourse through in-depth interviews with audience members of informal pedagogical platforms such as YouTube. Interviews could alternatively be analysed by means of reliable coding frameworks to indicate quantitative measurements of fitness literacy as enhanced by fitness media, assigning value to the improved literacy derived from pedagogical input on SNSs.

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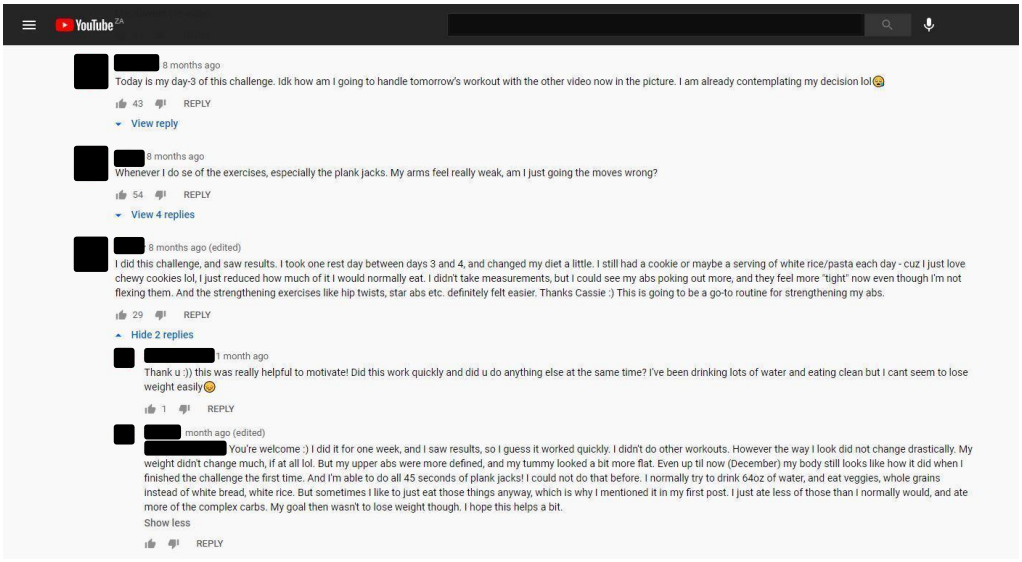
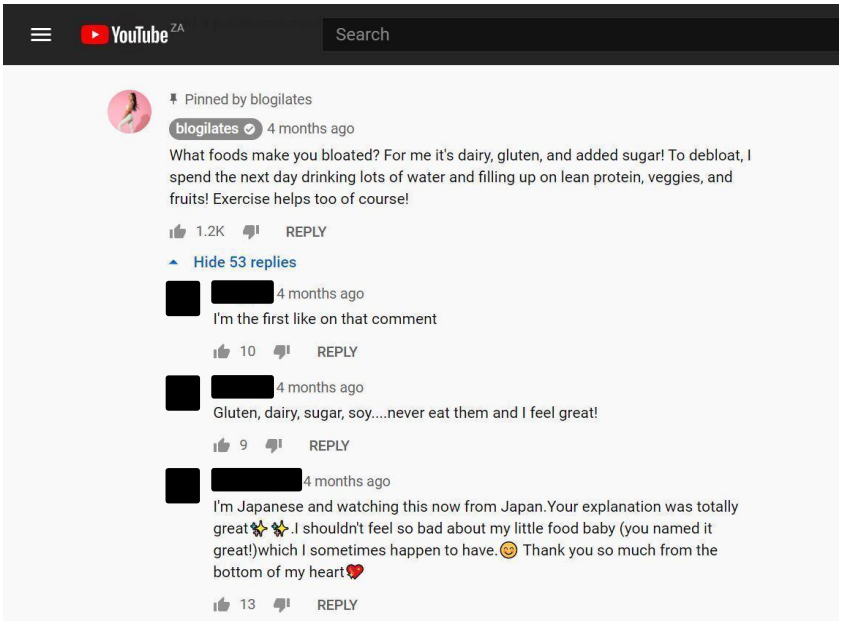
Appendix A

Text 1: User Comments on “Waist Whittler Workout”



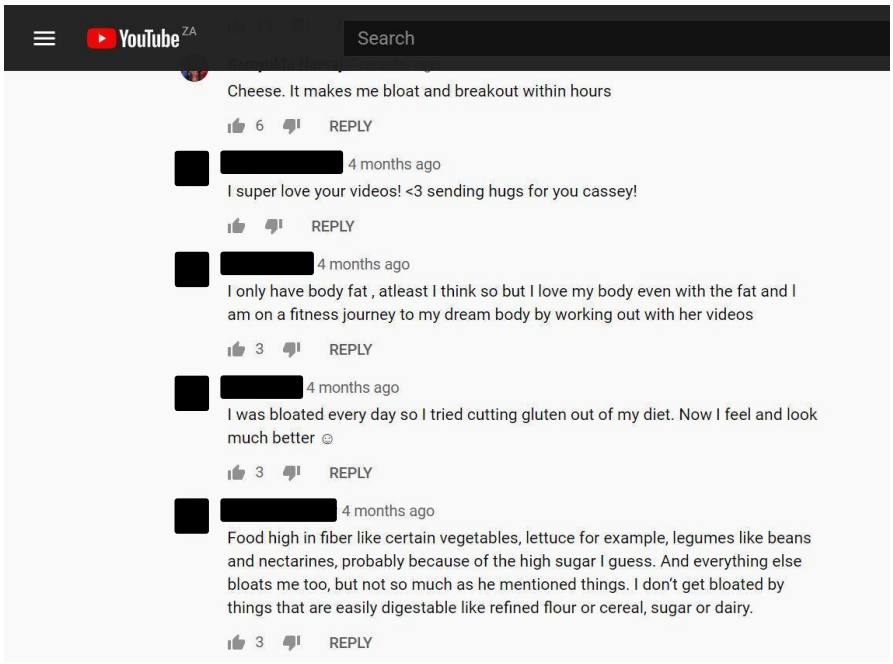
Text 1: Screenshot taken by author on 5 Feb 2021 (user A and B)

Text 2: User comments on “How to Reduce Bloating Quickly”



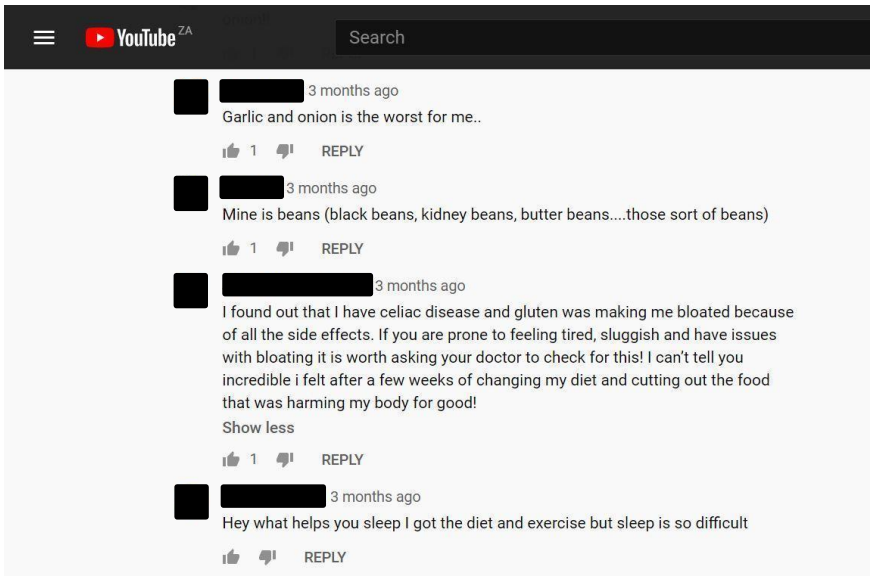
2.1 Text 2: Screenshot taken by author on 5 Feb 2021 (Blogilates)

Text 2: User comments on "How to Reduce Bloating Quickly"



2.2 Text 2: Screenshot taken by author on 5 Feb 2021 (user C and D)

Text 2: User comments on "How to Reduce Bloating Quickly"

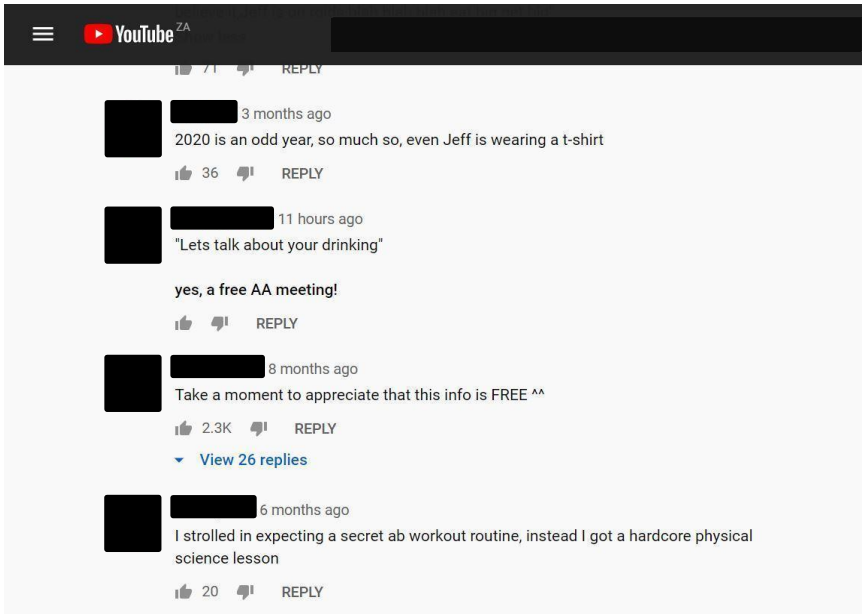


2.3 Text 2: Screenshot taken by author on 5 Feb 2021 (user E)

Text 2: User comments on "How to Reduce Bloating Quickly"

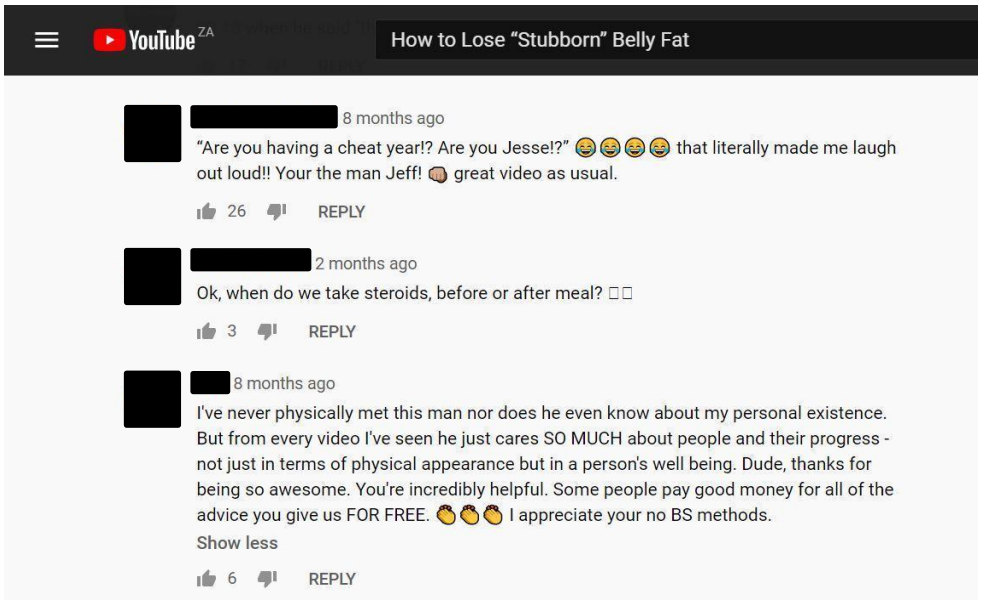
2.4 Text 2: Screenshot taken by author on 5 Feb 2021 (user F)

Text 3: User comment on "How to Lose 'Stubborn' Belly Fat"



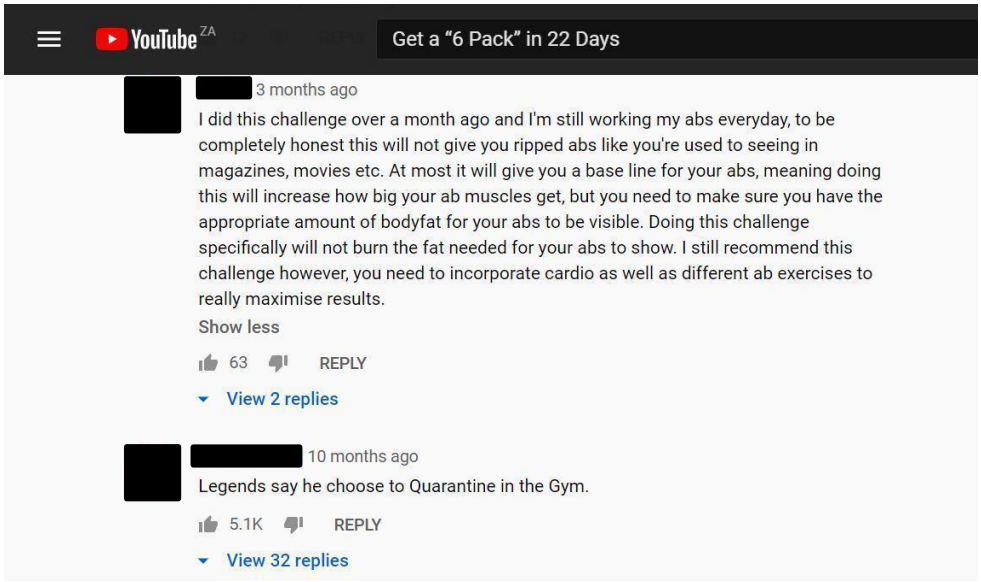
Text 3: Screenshot taken by author on 5 Feb 2021 (user G)

Text 4: User comment on "How to Lose 'Stubborn' Belly Fat"



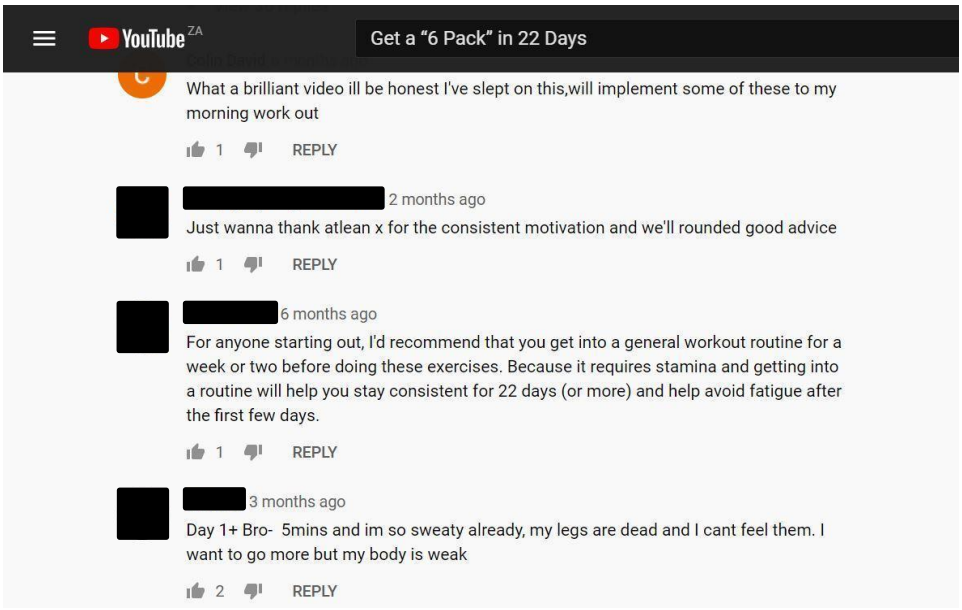
Text 4: Screenshot taken by author on 5 Feb 2021 (user H)

Text 5: User comment on "Get a "6 Pack" in 22 Days!"



Text 5: Screenshot taken by author on 5 Feb 2021 (user I)

Text 6: User comment on "Get a "6 Pack" in 22 Days!"



Text 6: Screenshot taken by author on 5 Feb 2021 (user J)

Appendix B: Language editing declaration

EDITING DECLARATION

Susanna Elizabeth Louw
Non-accredited member of the South African Translators' Institute
Entry-level member of the Chartered Institute of Editing and Proofreading
Email anzelle@wordfix.co.za

DATE: 2021-08-12

I, SE Louw, hereby declare that I did language editing for the dissertation titled **Spreading Fitness Literacy as Biohacking on YouTube: The Body as Self-Actualisation** by JB de Kock, with the exception of images and verbatim quotes, and without seeing the final version.

If further information is required, please contact me.

SE Louw	2021-08-12
Susanna Elizabeth Louw	Date