seminar.net
MEDIA, TECHNOLOGY & LIFELONG LEARNING
www.seminar.net

ISSN: 1504-4831 Vol 21, No 1 (2025) https://doi.org/10.7577/seminar.6156

Knowing what's normal. The Production and Conveyance of Knowledge via Menstrual Tracking Apps and what that has to do with Capitalism

Lilli Riettiens
Institute of Educational Science, Johannes Gutenberg University Mainz
l.riettiens@uni-mainz.de

Abstract

Menstrual tracking applications that enable users to translate bodily states in relation to their menstrual cycle into data by means of predefined categories are part of the growing lifelogging and (self-)datafication trend. Combining questions on customisation and capitalistic logics in the digital present, the article first reveals two levels of (self-)disciplining by interweaving exemplary observations of the menstrual tracking application Flo with theoretical considerations. In the subsequent analysis, it becomes apparent that human and algorithmic optimisation in the context of menstrual tracking applications merge in an almost economic process. Through the interrelationships among (self-)discipline, health, and capitalism, technology-induced pre-sortings and algorithmic prefigurations become visible, prompting a debate on the modes of subjection in the digital present.

Keywords: Algorithmic Prefiguration, Menstruation, Optimisation, Self Tracking, Subjection

Introduction

Increasingly pervasive lifelogging processes (Selke, 2016) are made possible in the digital present[1] by digital technologies for self-measurement, with self-tracking apps or corresponding tools being continuously integrated into everyday life. This process can be understood as a translation of physical states and bodily (*leiblich*) sensations[2] into data[3] that intends to "increase self-knowledge and self-control" (Mau, 2018, p. 169).[4] In a present pervaded by neoliberal logics, this supposed knowledge about oneself is purported to 'help' people take responsibility for themselves, which not only calls on them to "actively participate in solving problems," but simultaneously "hands over the failure and the consequential costs" to them (Dederich & Zirfas, 2024, p. 231; see also Bröckling, 2007; Fach, 2013). The promise of *self*-knowledge and *self*-control to people who track themselves has a flipside, as the data they enter as well as the data collected via other means is condensed in the background into opportunities for *others* (e.g., companies) to generate or obtain knowledge about them.

This quest to gain (more) knowledge about the body—one's own and that of others—is evident in the context of athletic performance as well as health. In the latter domain, it finds its way into the areas of sexuality, contraception, and menstruation. Accordingly, an entire sector of medical technology—referred to as FemTech—has emerged, within which "technology-based programs and services [are] developed that are geared towards the specific health needs of women" (Mühlhausen, 2020). According to the estimates made by the global market research company Frost & Sullivan in 2024, FemTech has the potential to generate 50 billion USD in 2025 (Frost & Sullivan Institute, 2024). The so-called menstrual tracking apps can be categorised as FemTech. Their interface offers users the opportunity to translate physical conditions and bodily sensations in relation to their menstrual cycle into data by means of predefined categories. Their popularity is also—and above all—"associated with an increased shift away from hormonal contraceptive methods in recent years" (Rotthaus, 2020, p. 2; for an overview see Earle et al., 2021), as they

[1] When I talk about the 'digital present' and 'digitisation,' I refer to phenomena and processes of electrification, automation, and computers (Garz & Rietiens, 2025; Krämer, 2022; Strasser & Edwards, 2017), but I use these terms in order to be compatible with the current discourse.

[2] The division into physical states and bodily sensations is merely an analytical separation. Following Robert Gugutzer, I understand the human body as a "unity in duality" (Gugutzer, 2015, p. 14) because while "the culturally shaped knowledge of the body . . . shapes one's own bodily sensations" (Gugutzer, 2015, p. 22), one's own bodily sensations sometimes prevent control over the body. Particularly in the context of (self-)datafication, it therefore appears to be a fruitful consideration for the future that "bodily sensations are something radically subjective . . . [which is why] an 'embodiment' is required in order to communicate them" (Riettiens, 2021, p. 42). (Self-)data can also be read as such an embodiment—albeit now technology-induced—whereby it is important to consider, as noted by Gugutzer and Gesa Lindemann, that "how I feel myself" is dictated to me by the knowledge "that I have of the body" (Gugutzer, 2015, p. 22; Lindemann, 1996). This means that the 'knowledge' about the body obtained via the app and the translation of these states into data may have an impact on the user's own bodily sensations.

[3] Following Valentin Dander, I understand (digital) data not as given, but as produced, while data that is brought into form is information (Dander, 2014). For the present context, it is also significant that data usually tends to be classified or converted to numerical codes "due to possible evaluation modalities in the form of mathematical-informatic operations (algorithms)" (Dander, 2014, p. 118). I would also like to thank Valentin for his willingness to read this manuscript in advance and for the subsequent productive reflections, which led not least to the collaboration on this special issue.

[4] All German quotations have been translated into English by the author. I thank Natasha Kozul for her excellent proofreading, which is so much more than just a linguistic correction.

promise a transition towards "so-called 'natural' contraceptive methods such as the symptothermal method" (Rotthaus, 2020, p. 5). To do so, they provide users not only with simple menstrual calendars but also with health advice and algorithmically preconfigured forecasts.

From an educational research perspective, why is this interesting?

On the one hand, this phenomenon could and should be examined through the sex education lens, given the growing concern with where young people, in particular, gain their knowledge on their bodies, menstruation, and sexuality. In the digital present, this knowledge is increasingly generated and appropriated outside traditional educational institutions (See among others Nikkelsen et al., 2020, Oosterhoff et al., 2017; Töpper & Staab, 2024). However, this is not the topic of this article. Rather, it focuses on the menstrual tracking apps as digital technologies that can be read as "pedagogical actors" that "convey" something (Klinge, 2024, p. 18)—that is, as will be shown, a specific knowledge about gender and sexuality. This knowledge consists, on the one hand, of the "social, economic, technical and aesthetic conditions and knowledge" of the app developers (Klinge, 2019, p. 108) and of their "design knowledge" (Klinge, 2019, p. 112). This shapes both what can be known about bodies, sexuality, gender, and menstruation and the "way in which the apps may be used" (Klinge, 2019, p. 112). One could also speak of design-related "practices of disambiguation" (Klinge, 2024, p. 19). On the other hand, this knowledge is co-produced by algorithms as "epistemic actors" (Jörissen & Verständig, 2017, p. 40; Schäffer, 2024), which use data collection and analysis to gather information about users. Taken together, "apps and their technological casings are 'powerful bodily [*leibliche*; L. R.] communication partners' (Gugutzer, 2015, p. 163) as they are constructed objects of perception that aim at affect, and thus at bodily affective [*leiblich-affektive*; L. R.] concerns, and carry a certain authority with their demands" (Klinge, 2019, p. 112).

In what follows, I will exemplarily analyse the interface of one of the most downloaded menstrual tracking apps in the world,[5] with a particular focus on the "(pedagogical) knowledge condensed in the apps, i. e. delegated (pedagogical) knowledge, and the associated algorithmic modes of conveyance" (Klinge, 2019, p. 108). Using this exemplary analysis, I show in section 2 that the apps discipline their users in at least two ways, as users are constantly encouraged to enter their bodily states in a disciplined manner, whereas the addressings within the apps have a disciplining effect in terms of subjection. With the aim of making these addressings as customised as possible, the app works by means of a self-learning algorithm, which brings me to section 3. Here, I explore my

[5] The empirical material, which was analysed using a qualitative-hermeneutic approach, consisted of an observation protocol in which screenshots of the German app were recorded and continuously annotated based on my own use of the *Flo* app from 2021 to the end of 2024. The digital media associated with the app, such as the company's website (in German and English) and Apple's German App Store, where the app can be downloaded, were also included in this analysis.

During that observation period, some of the wordings have been slightly changed, but most have remained the same. What has changed is that there is now an *anonymous mode*, which was presumably set up in numerous states mainly due to the outcry in the USA in the context of the abortion ban. However, this mode is accompanied by some restrictions that are particularly relevant to the question of this special issue on customisation; for example, "pairing a wearable device" is not possible and you no longer receive "monthly cycle report alerts" (*Flo* website, December 2024). While *Flo* points out that they do not share any personal data if you have selected the anonymous mode, they still share "aggregated, anonymised, or de-identified health data with research institutions to help advance scientific research on female health or for statistical purposes" (*Flo* website, December 2024). However, to whom exactly they make this data available remains open.

argument that algorithms in the digital present generate 'friendliness' through personalisation that is intended to encourage users of, for example, period tracking apps to purchase the premium version. While customers in local stores might be approached by human sales assistants, in shopping and self-tracking apps this is done on the basis of (personal) data entered directly by the users in combination with a self-learning algorithm. Finally, in section 4, I bring both perspectives together by identifying the in-app addressings as socio-technical prerequisites of cultural practices and thus as socio-technically prefigured possibilities of becoming an intelligible subject. This opens up the critical question on how we can and must understand subjection in a digital present, given that orientation possibilities for the relationship between self and world are prefigured by companies developing and selling the technology we use.

"Check your Symptoms." Menstruation and Discipline

With almost 400 million downloads worldwide (as of February 2025), the menstrual tracking app *Flo* is one of the big players in the FemTech field. According to the claims made on the company website, this "world's #1 women's health app" was developed in collaboration "with over 100 leading health and medical professionals"[6] and is explicitly aimed at women, as "[n]o two women's cycles are the same" (*Flo* website, 2024). The fact that menstruation is detached from sexual orientation and gender positioning remains invisible in advertising and descriptive texts as well as in the app interface. While there is at least a tab on the English-language website about LGBTIQ+ with a short article that was last updated on December 20th, 2021,[7] within the app, menstruation is consistently associated with being a cis-woman and in this context primarily with questions of pregnancy or its avoidance—which is thereby also associated with cis-heterosexual sex (cf. Fox & Epstein, 2020). For example, the so-called *Insights (Einblicke)*, which can be found in the app and are structured in a similar way to a for-you page or reels on social media platforms, state: "Why sleep is important for women's health," "Sexual wellbeing in women," "Based on your cycle: Is pulling out really safe?" or "Pleasure drops or a torn condom? Are you afraid of unwanted pregnancy?" (In-App-Screenshots, September 20, 2024).

In addition to these *Insights*, when they open the app, users are prompted to enter their physical conditions and bodily sensations using predefined categories with the phrase "Track your symptoms": "In each of your cycle phases, Flo gives you personalised insights into changes in your mood and energy levels. Track over 70 symptoms and activities to get the most accurate predictions and personalised tips" (Description text Apple App-store, December 2024). Two interwoven levels of gendered (self-)discipline are condensed in this demand, which I address in the following sections. On the one hand, users are constantly encouraged to 'donate' data in a disciplined manner—after all, the use of self-learning algorithms also requires a continuous data input on the basis of which the customised predictions can be made. On the other hand, the in-

[6] It is interesting to note that, at the end of 2022, the app was still advertising that it had been "developed in collaboration with 100 leading health experts, doctors and renowned medical institutions" (description text German App Store, November 2022). It remains unclear why the former doctors have now become medical and health experts, while the renowned medical institutions have disappeared altogether.

[7] https://flo.health/lgbtq/trans-period [Last updated December 24, 2024].

app addresses have a disciplining effect on a subjectivising level insofar as they produce norms or normality and ideal concepts of menstruating cis-women's bodies and, in the process, advise supposedly optimising behaviours in or for the future. This deliberate design reveals a historically contingent negotiation of menstruation in the context of illness and health, which I will interweave below with the question on what might have changed in the digital present.

As Stefan Selke describes in the context of lifelogging, which has been transferred "from a military to civilian contexts," there is "no superfluous information in the logic of lifelogging, every detail could be important," because only on the basis of complete recording can "the 'operational situation' be assessed in detail" (Selke, 2016, p. 2). Accordingly, *Flo* offers a "complete solution" with the help of which "all important data relating to female health and well-being can be recorded, such as start and duration of the period, fertile window, PMS symptoms, flow intensity and much more" (description text Apple App-store, November 2022). Physical conditions and bodily sensations translated into data are interpreted in terms of their usefulness for one's own lifestyle and—in the case of the analysed app—for one's own health. By means of seamless self-datafication, the menstruating person 'takes care' of themselves in this way, assuming self-responsibility (Bröckling, 2007; Fach, 2013).

While some users see this approach as positive and feel more empowered by menstrual tracking apps, as the knowledge of the body generated in this way increases the ability to plan period or the cycle (Epstein et al., 2017; Rotthaus, 2020), this disciplined, comprehensive recording is reminiscent of Michel Foucault's reflections on historical recording procedures in the binary context of illness and health (Foucault, 2019b). Here, too, it was central to bring "individual data seamlessly into storage systems," in which Foucault recognises the "fundamental conditions of a good medical 'discipline' in both interpretations of the word" (Foucault, 2019a, p. 245). It is the compelling gaze understood as a "technique . . . of seeing" in an "overall gearbox of power" (Foucault, 2019b, p. 221) that is able to enforce discipline. According to Foucault, this data processing—whether analogue or electrified—represents a kind of objectification that can be identified as an "ever finer penetration of individual behaviours" (Foucault, 2019b, p. 224). In a sense, it functions as "an individualisation of power . . . that enables permanent control and seamless surveillance" (Foucault, 2019a, p. 230). In this interpretation, menstrual tracking apps become Foucault's recording apparatuses within which the users constitute themselves "as a describable and analysable object" (Foucault, 2019b, p. 245), which makes (self-)documentation understandable as knowledge production that feeds on the collected details and disintegration. For "[i]nstead of uniformly and en masse subjugating everything that is subject to it [power; L. R.]" (Foucault, 2019b, p. 220), individuals are separated, analysed, and differentiated.

In the context of illness and health, this disintegrating data processing "turns every individual into a 'case'" (Foucault, 2019b, p. 246, ephasis in the original), making it not only measurable, but also comparable and normalisable: "In people who have a similar cycle to yours, these symptoms usually occur between their fertile days and their period" (*Flo* App, June 2022), according to *Flo*'s 'case comparison.' In this way, the menstruating body and with it the menstrual cycle also become a (comparable) case. *Flo* continuously asks users to enter their 'symptoms,' interweaving (self)-datafication and gender. In order to exclude "disease-related coincidence" (Pfeifer, 1993), data is collected as comprehensively as possible, which in turn (should) record whether the menstruating person is healthy or ill. This circumstance proves to be historically contingent, as even in "the menstrual calendars of the 1920s, the interest in the pathological was clearly in the foreground"

(Schlünder, 2005, p. 166)[8]. At first glance, "clinical pictures and suspected diagnoses should be able to be linked" (Schlünder, 2005, p. 166).[9] In addition, parallels to discourses on female education since the beginning of the so-called modern era are striking. Even then, the female body was supposed to be "healthy and strong in order to fulfil the female destiny, especially that of mother, since only a healthy mother's body would guarantee the prosperity of the small child" (Schmid, 1995, p. 64). So when the *Flo* app asks at the beginning for what reason or for what purpose it would be used, the address "to take care of myself and my baby" (*Flo* App, June 2021) reveals itself as a historically contingent negotiation of the 'healthy' female body, for which ideal states are written into or onto the body by means of the app (Laqueur, 1992).

Both historically and in the present, such a negotiation of menstruation thus fits into a context of biopower within which the members of a society are to be "maintained in their health and reproductive power" (Meyer-Drawe, 2001, p 451).[10] This requires "disciplining the individual," as identified in the previous analysis, which can be achieved by "developing safety technologies [that] are directed against illness and uselessness" (Meyer-Drawe, 2001, p. 451)—especially if these are algorithmically preconfigured, as in the case of the app. I will come to this later. By turning the human being, and its corporal aspect, into an object of knowledge, its subjugation takes place, whereby it could be cynically remarked that in this logic the person that is entering the data (initially) becomes the driver of their own subjugation. Hidden behind the promise of increased utility and performance, disciplinary power "imposes visibility on those it subjugates" (Foucault, 2019b, p. 241).

The second level of identified disciplining is inevitably interwoven with the first. The addressings within the menstrual tracking application have a disciplining effect insofar as they produce norms or normality and ideal concepts of cis-women's bodies that must be preserved or achieved in the future. By designating certain states as '(ab)normal' and corresponding intervening practices as adequate—and associating these with being a woman or mother—the *Flo* app—or the software engineers behind it—basically design the subject that they have programmed. Moreover, the material anchoring in the code and the user interface lends additional legitimacy to the recommended practices and statements about states of health and '(ab)normalities' whereby their "historical emergence, their changeability in principle and the power relations inherent in them" are concealed (Wulf et al., 2001, p. 13). An "implicit disciplining of bodies is revealed, which [in the course of app use; L. R.] incessantly inscribes itself into them" (Riettiens, 2021, p. 35). Thereby, it becomes clear that this power mechanism aimed at usefulness and optimisation works on people "in the same direction as the economic process" (Foucault, 2019a, p. 228). Users (un)consciously make their data available by entering their physical and embodied states into

[8] It is particularly interesting in this context that "[t]he doctrine of the 28-day normal cycle . . . was derived more ideally from the classifications of the pathological than that this normal cycle was precisely observed and measured" (Schlünder, 2005, p. 166). The challenge at that time was that "healthy women [were] not exactly the clientele to which clinicians had easy access" (Schlünder, 2005, p. 171).

[9] Here, it is relevant to note that Foucault describes the "perfect disciplinary apparatus" as the one that "allows a single gaze to see everything all the time" (Foucault, 2019b, p. 224). *Flo* advertises that this also applies to users, as the app "allows you to keep a close eye on your cycle, your fertile days and your pregnancy" (description text App Store, 30.11.2022). The fact that this also applies to the company remains unmentioned.

[10] The *Flo* app also has a section on "Reproductive health and care" under *Insights*, which in turn deals with topics such as "Female Hygiene" or "Visiting the Gynecologist" (*Flo* App, June 2021).

prefabricated categories, and thus contribute to the app creating '(ab)normality.' In this process, the menstrual tracking app becomes an anamnesis sheet. On the one hand, "an 'artificial' order" can be recognised (Foucault, 2019b, p. 231) that has materialised in the app code and interface and which—similar to an infrastructure (Bowker & Star 1999)—is not only an external boundary, but also "influences individuals, makes their behaviour influenceable, allows the effects of power to reach them, exposes them to knowledge and changes them" (Foucault, 2019b, p. 221). On the other hand, in this digital feedback loop, the users generate their own order by means of disciplined data 'donation.' For example, *Flo* rates the "length of the last cycle," "length of the last period," and "fluctuations in cycle length" as either 'normal' and 'regular' or 'abnormal' and 'irregular' (*Flo* App, September 2024). This negotiation of menstruation in the context of health and illness, 'abnormality' and 'normality,' as well as its link to being a woman proves to be historically contingent. Through the constant (self-)confrontation with questions such as "Is my cycle (currently) 'normal'?" and "Do my 'symptoms' correspond to what is 'normal' for my cycle status?" the app explicitly declares certain 'symptoms' as 'normal' at certain times of the cycle. It almost seems like a merit or even an award when *Flo* writes: "Your last 6 completed cycles were within the *normal range*" (*Flo* App, November 2022, emphasis in the original).

However, the fact that 'artificially intelligent' apps are 'helpful' in the self-logging and "case-by-case evaluation" of one's own menstruation (Foucault, 2019b, p. 247) and produce '(a)normalities' in the course of socio-technical feedback loops proves to be transformed in the digital present: "Tell Flo about yourself and log how you're feeling. Our clever tech will help *predict where you are in your cycle* (and what you might expect now and in the future) so you can *understand your body even better*" (*Flo* website UK, December 2024, emphasis in the original). Accordingly, in the digital present, the normalising and 'case-by-case evaluation' is also algorithmic and thus implicitly normative because, in order to be able to analyse and evaluate at all, the algorithm must be inscribed with the instructions and regularities that it is supposed to execute (Allert, 2021). The 'artificial' and therefore normative order has already materialised in the code and interface and, in the case of *Flo*, becomes a socio-technical feedback loop with the self-entered data: "You receive a monthly health report with personalized cycle diagrams and information about the processes in your body. A virtual health dialog provides you with proactive information based on your personal profile and symptoms" (description text Apple App-store, November 2022). The more frequently and regularly the app is supplied with data, the more "Flo helps to identify possible problems in your body and advise you to see a doctor" (*Flo* App, June 2021). 'Punishable' in the Foucauldian sense are therefore "the non-observation, the deviation from the rule," as indicated by non-logging, whereby the "emphatic inculcation" for disciplined data donation should lead to future 'improvements' (Foucault, 2019b, p. 231f) in (logging) action and health as well as the 'customisation' of the algorithm.

"Go Premium." Friendliness Customised through Algorithms

The *My daily Insights* section can be found at the bottom of the *Flo* landing page within the app. The content is adapted depending on where the users are in their cycle, which symptoms they have entered, and how disciplined they are in doing so. For example, if insomnia is entered, the app addresses the user with: "You reported insomnia shortly before your period. Is there a

pattern?" (*Flo* App, December 2024). If users now click on the corresponding tab, the same address appears again in a format reminiscent of a story from Instagram. The following page then reads: "13% of Flo users notice sleep problems during this cycle phase" (*Flo* App, December 2024). To get to the promised explanation of common causes of insomnia related to the menstrual cycle, the user has to click again, and a pixelated image appears with the caption: "Go premium to continue reading. The premium version includes: A daily health plan. Advanced chats with the health assistant. Video courses with top experts . . . and other content created with top health experts" (*Flo* App, December 2024). So, while users initially 'pay' with their disciplined data 'donation' in order to be able to use the app in an apparently limited way, further advice and information about their health are hidden behind a paywall. The *Flo* website states: "A Premium subscription unlocks the tools you need to understand your body better. . . . *Find out in advance how you're likely to be feeling at every stage of your cycle* with personalized predictions based on your symptoms and cycle logging" (Flo website English, December 2024, emphasis in the original).

Behind this paywall, the aforementioned 'experts' are also waiting to give supposedly personalised advice or have presumably checked the information. For example, the following is noted above the question on the possible pattern of insomnia: "Reviewed by Jennifer Lincoln, M.D. Specialist in Obstetrics and Gynecology, Obstetrics Hospitalist, Portland, USA" (*Flo* App, December 2024). So, while users are told in the monetarily free version that they can learn something about the possible patterns of their insomnia—and receive what is construed as medical advice—they only learn from their data donation that 13% of other tracked users also suffered from insomnia during this phase of their cycle. This is also what one user writes in their review:

> Not only has the app become significantly less user-friendly, but the constant push to 'go premium' has really negatively impacted my experience. . . . what I don't respect is how I'm constantly being mislead [sic] in order to be trapped into signing up for a premium subscription. I find it really irresponsible that women who don't want to pay for this app will be given insights about their menstrual health, only to find out that they can't have access to the information behave [sic] they don't have an account! . . . It's honestly cruel that an app meant to help women feel more secure about their health, [sic] is constantly misleading them like this, or trying to buy their desire for basic health info! (mallalalalalalalalalalala, July 2021)

Against the backdrop of capitalist logics, this 'taking by the hand' up to the paywall can be read as a targeted method of initiating consumption. In the field of tension among digital self-tracking, health, and capitalism, it seems downright perfidious to promise medical explanations for physical ailments and sometimes even relief, but then to hide them behind a paywall, thereby encouraging consumption through the promise of health. By means of the socio-technical feedback loop described above, app users are addressed by 'their' algorithms in the most customised and supposedly personal way based on collected and 'donated' data in order to ensure that value is realised as effectively and permanently as possible.

"Hello, you're in your luteal phase. Let's talk about the following: Your feelings, changes in your body, important life hacks" (*Flo* App, June 2021),[11] says the so-called *Flo Health Assistant*, which opens automatically when the app is started. This addressing is peculiarly reminiscent of being greeted by a retail assistant in a physical store, for example, with Sabine Pfeiffer stating that friendliness in capitalism has been "instrumentally rediscovered" Pfeiffer, 2021, p. 188).[12] In the digital present, which according to Felix Stalder is characterised by algorithmicity (see Stalder, 2018), it is therefore becoming apparent that this instrumental friendliness is being algorithmically intensified, because while people are still—more or less—personally addressed by human sales assistants in local stores, this is done in shopping apps as well as in self-tracking apps on the basis of data and a self-learning algorithm. Algorithmicity thus proves to be "the digital curation of the world" (Hofhues & Riettiens, 2024, p. 318) which is already pre-sorted. Accordingly, the concept of so-called *Curated Shopping* can in the digital present be extended to include considerations of technology-induced pre-sorting and algorithmic customisation, which are intended to initiate and promote continued user consumption. In the case of menstrual tracking applications, the supposedly personalised approach and customised addressing—in short, algorithmic curation—constantly reminds users to donate data in a disciplined manner, while at the same time 'taking them by the hand' all the way to the paywall with the promise of learning more about themselves, their bodies, and their feelings. In the digital present, optimisation also—and above all—works via digital data, which enables customised advertising and thus customised methods to initiate consumption. Digital data therefore becomes the basis for precisely these targeted methods of value realisation. I concur with Sabine Pfeiffer in that it is not so much digital capitalism that is currently gaining ground, but rather that digitisation has become an optimising force in an already highly developed capitalism. Hence, digitisation is not a solution to the problem of value realisation, but rather an exacerbation of the fundamental problem, as it "optimises and accelerates" the strategies of sales (Pfeiffer, 2021, p. 16).

Conclusion

At the beginning, I identified two levels of discipline within the *Flo* menstrual tracking app and explained them in more detail. First, users are constantly encouraged to 'donate' data in a disciplined manner. This is intended to feed the self-learning algorithm, on the basis of which the app can make increasingly accurate predictions in connection with the user's menstrual cycle. On the other hand, I have shown that the in-app addressings have a disciplining effect in terms of subjection by providing gendered instructions on lifestyle that are based on a binary understanding of being a cis-woman. Both levels fit into a context of biopower within which the preservation of health and reproductive power is at stake (Foucault, 2019a, 2019b; Meyer-Drawe, 2001). In a sense, they work hand in hand when they generate knowledge about human bodies and thus conceptualise them as objects of knowledge. In the digital present, these "power mechanisms and power procedures" are techniques "that are invented and improved and constantly developed further" with the help of algorithms (Foucault, 2019a, p 226). While these

[11] In December 2024, the app's so-called Health Assistant announces: "You are now in the luteal phase of your cycle. Here's a helpful chat to find out what that means for you." Next slide "Go Premium."

[12] At this point, Sabine Pfeiffer refers to a statement by Werner Sombart, who, however, linked Judaism with capitalism at the end of the 1920s. Like Pfeiffer, I expressly distance myself from such connotations.

'self-learning' algorithms are constantly improving their own 'learning' through "a permanent loop of (self-)optimising feedback" (Hofhues & Riettiens, 2024, p. 319), human and algorithmic optimisation intertwine in an almost economic process. Indeed, in section 3, I showed that the provision of medical explanations for physical ailments and corresponding advice, which are then hidden behind a paywall, can be understood as a targeted method of initiating consumption. In the context of digital self-tracking, health, and capitalism, these methods are often based on self-entered data that is used for technology-induced pre-sorting and algorithmic customisation. In the digital present, people are thus addressed as personally as possible by 'their' algorithms on the basis of collected data in order to ensure sales as effectively and permanently as possible. The 'instrumentally rediscovered friendliness' Pfeifer (1993) refers to is therefore supported and intensified by algorithms.

In conclusion, I would now like to bring both aspects together. Technical systems can be understood as performative and thus as participating in the creation of realities (Allert & Asmussen, 2017). This leads to the question as to what it means for possibilities of becoming a subject in the digital present if they are prefigured by companies on the market.[13] For instance, the *Flo* app works via a self-learning algorithm that provides users with accurate predictions based on their usage behaviour and the data they enter, while presenting them with a pre-sorted set of cultural codes and subjectivising practices. These socio-technically prefigured possibilities of becoming a subject are condensed in the course of algorithmic prefiguration, as the users are constructed as cis-female and mostly cis-heterosexual on the basis of the underlying code. They are also addressed in this way through the interface and are confronted with an algorithmically curated set of supposedly female and cis-heterosexual practices and cultural codes. At the same time, these constructions are based on capitalist logics that read the—in this case—menstruating woman as a (potential) consumer and thus treat her as a (potential) consuming subject. In the digital present, biopower and capitalism combine in (at least) two ways. On the one hand, it is beneficial for the app operators if as many people as possible 'donate' their data and/or opt for the paid version. On the other hand, the healthy body is of benefit to society according to logics of biopower, because this is about "the production of efficiency, of skills, of producers of a product" (Foucault, 2019a, p. 225).

So, if we are concerned with *Bildung* in the digital present and understand subjection as bound to cultural practices and symbolic orders, we should think of algorithmic prefiguration and, accordingly, about algorithmically prefigured possibilities of subjection that, as in the case of the app *Flo*, are characterised by capitalist logics. In view of the pervasiveness of the present through the digital, a critical deciphering of this phenomenon seems as complex as it is necessary. With an educational–philosophical perspective on *Bildung* as "productive involvement" (Allert & Asmussen, 2017) and/or as the "response to the possibilities of things" (Zirfas & Klepacki, 2013, p. 43) it seems necessary to also analyse the modes of use. This is crucial as, while "ideas about

[13] The issue also gained and continues to gain additional socio-political and tragic relevance as a result of the abortion law overturned by the US Supreme Court in June 2022, which has since been negotiated at state level. With regard to menstrual apps, data protection issues and concerns have been raised in this context about the extent to which federal institutions can access this app data and use it to conclude that pregnant women have had an abortion. Eva Galperin, Head of Cybersecurity at the Electronic Frontier Foundation, tweeted: "If you are in the United States and you are using a period tracking app, today is good day to delete it before you create a trove of data that will be used to prosecute you if you ever choose to have an abortion" (Galperin, 2022).

people and their behaviour . . . are inscribed in technical objects," it is nevertheless "only the relations in actual action" (Allert & Asmussen, 2017, p. 41) within which or through which subjects are formed. With this in mind, we might come to the conclusion that *Bildung* as the "play with uncertainties" (Verständig, 2023, p. 395) occurs at the 'edges of the interface.'

Sources

Flo website (English and German Version / 2024). https://flo.health/ [23.12.2024]

Review mallalalalalalalalalala (23.07.2021): https://apps.apple.com/us/app/flo-period-pregnancy-tracker/id1038369065 [31.03.2025]

Flo App (German Version / 2021–2024)

References

Allert, H. (2021). Optimierung als digital-kapitalistisch. *MedienPädagogik: Zeitschrift für Theorie und Praxis Der Medienbildung*, *42*, 301–326. https://doi.org/10.21240/mpaed/42/2021.06.24.X

Allert, H., & Asmussen, M. (2017). Bildung als produktive Verwicklung. In H. Allert et al. (Eds.), *Digitalität und Selbst. Interdisziplinäre Perspektiven auf Subjektivierungs- und Bildungsprozesse* (pp. 27–68). Bielefeld: transcript. https://doi.org/10.25656/01:22151

Bowker, G. C., & Star, S. L. (1999). *Sorting things out: Classification and its consequences*. Cambridge, Mass: MIT Press. https://doi.org/10.7551/mitpress/6352.001.0001

Bröckling, U. (2007). *Das unternehmerische Selbst: Soziologie einer Subjektivierungsform*. Frankfurt am Main: Suhrkamp.

Butler, J. (2015). *Psyche der Macht: das Subjekt der Unterwerfung*. Frankfurt am Main: Suhrkamp.

Dander, V. (2014). Datendandyismus und Datenbildung. Von einer Rekonstruktion der Begriffe zu Perspektiven sinnvoller Nutzung. In H. Ortner, D. Pfurtscheller, & M. Rizzolli (Eds.), *Datenflut und Informationskanäle* (pp. 113–129). Innsbruck: Innsbruck University Press. https://doi.org/10.25969/mediarep/896

Dederich, M., & Zirfas, J. (2024). Einleitung: Die Optimierung des Ganzen. In M. Dederich & J. Zirfas (Eds.), *Optimierung* (pp. 229–235). Berlin, Heidelberg: Springer. https://doi.org/10.1007/978-3-662-67307-2_33

Earle, S., Marston, H. R., Hadley, R., & Banks, D. (2021). Use of menstruation and fertility app trackers: A scoping review of the evidence. *BMJ Sexual & Reproductive Health*, *47*(2), 90–101. https://doi.org/10.1136/bmjsrh-2019-200488

Epstein, D. A., Lee, N. B., Kang, J. H., Agapie, E., Schroeder, J., Pina, L. R., Fogarty, J., Kientz, J. A., & Munson, S. (2017). Examining menstrual tracking to inform the design of personal

informatics tools. *Proceedings of the 2017 CHI Conference on Human Factors in Computing Systems*, 6876–6888. https://doi.org/10.1145/3025453.3025635

Fach, W. (2013). Selbstverantwortung. In U. Bröckling, S. Krasmann, & T. Lemke (Eds.), *Glossar der Gegenwart* (pp. 228–235). Frankfurt am Main: Suhrkamp.

Foucault, M. (2019a). *Analytik der Macht*. Frankfurt am Main: Suhrkamp.

Foucault, M. (2019b). *Überwachen und Strafen: die Geburt des Gefängnisses*. Frankfurt am Main: Suhrkamp.

Fox, S., & Epstein, D. A. (2020). Monitoring menses: Design-based investigations of menstrual tracking applications. In C. Bobel, I. T. Winkler, B. Fahs, K. A. Hasson, E. A. Kissling, & T.-A. Roberts (Eds.), *The Palgrave Handbook of Critical Menstruation Studies* (pp. 733–750). Singapore: Springer. https://doi.org/10.1007/978-981-15-0614-7_54

Frost & Sullivan Institute. (2024). *Femtech: Revolutionizing Women's Health Through Innovation*. Retrieved March 25, 2025, from https://frostandsullivaninstitute.org/femtech-revolutionizing-womens-health-through-innovation/

Galperin, E. (2022). *If you are in the United States and you are using a period tracking app, today is good day to delete it before you create a trove of data that will be used to prosecute you if you ever choose to have an abortion*. Twitter. https://twitter.com/evacide/status/1521568113250082816?ref_src=twsrc%5Etfw%7Ctwcamp%5Etweetembed%7Ctwterm%5E1521568113250082816%7Ctwgr%5E63956259ee4ff11a51285ced362110f081818206%7Ctwcon%5Es1_&ref_url=https%3A%2F%2Fitwire.com%2Fhealth%2Feff-cybersecurity-head-warns-us-women-to-delete-their-period-tracking-apps-in-post-roe-v-wade-world.html

Garz, J. T., & Riettiens, L. (2025). Format research. On the epistemic effects of changing forms and formats in education research. *Learning, Media and Technology*, 1–10. https://doi.org/10.1080/17439884.2024.2448547

Gugutzer, R. (2015). *Soziologie des Körpers*. Bielefeld: transcript.

Hofhues, S., & Riettiens, L. (2024). Digitalität. In M. Dederich & J. Zirfas (Eds.), *Optimierung. Ein interdisziplinäres Handbuch* (pp. 317–321). Stuttgart: Metzler. https://doi.org/10.1007/978-3-662-67307-2_45

Jörissen, B., & Verständig, D. (2017). Code, Software und Subjekt: Zur Relevanz der Critical Software Studies für ein nicht-reduktionistisches Verständnis „digitaler Bildung". In R. Biermann & D. Verständig (Eds.), *Das umkämpfte Netz* (pp. 37–50). Wiesbaden: Springer. https://doi.org/10.1007/978-3-658-15011-2_3

Klinge, D. (2019). Dokumentarische Methode und digitale Artefakte—Zur Rekonstruktion der Vermittlungsweisen von Apps. *Jahrbuch Dokumentarische Methode*, *1*, 107–130. https://doi.org/10.21241/SSOAR.65687

Klinge, D. (2024). *Algorithmische Wissenskonstruktionen und designte Vermittlungsweisen: Pädagogische Modi Operandi digitaler Technologie*. Weinheim & München: Beltz Juventa. https://doi.org/10.3262/978-3-7799-8259-3

Krämer, S. (2022). Kulturgeschichte der Digitalisierung. Über die embryonale Digitalität der Alphanumerik. *Aus Politik und Zeitgeschichte, 72*(10–11), 10–17.

Laqueur, T. W. (1992). *Auf den Leib geschrieben: Die Inszenierung der Geschlechter von der Antike bis Freud*. Frankfurt am Main/New York: Campus.

Lindemann, G. (1996). Zeichentheoretische Überlegungen zum Verhältnis von Körper und Leib. In A. Barkhaus (Ed.), *Identität, Leiblichkeit, Normativität. Neue Horizonte anthropologischen Denkens* (pp. 146–175). Frankfurt am Main: Suhrkamp.

Mau, S. (2018). *Das metrische Wir: Über die Quantifizierung des Sozialen*. Bonn: Bundeszentrale für politische Bildung.

Meyer-Drawe, K. (2001). Erziehung und Macht. *Vierteljahrsschrift für wissenschaftliche Pädagogik*, *77*, 446–457. https://doi.org/10.30965/25890581-07704006

Mühlhausen, C. (2020). *Sechs Beispiele für zukunftsfähige FemTech-Anwendungen.* zukunftsInstitut. Retrieved March 25, 2025, from https://www.zukunftsinstitut.de/artikel/sechs-beispiele-fuer-zukunftsfaehige-femtech-anwendungen/

Nikkelen, S. W. C., Van Oosten, J. M. F., & Van Den Borne, M. M. J. J. (2020). Sexuality education in the digital era: Intrinsic and extrinsic predictors of online sexual information seeking among youth. *The Journal of Sex Research*, *57*(2), 189–199. https://doi.org/10.1080/00224499.2019.1612830

Oosterhoff, P., Müller, C., & Shepard, K. (Eds.). (2017). Sex education in the digital era. *IDS Bulletin. Transforming Development Knowledge*, *48*(1). https://doi.org/10.19088/1968-2017.102

Pfeifer, W. (1993). Symptom. In Berlin-Brandenburgischen Akademie der Wissenschaften (Ed.), *Etymologisches Wörterbuch des Deutschen, digitalisierte und von Wolfgang Pfeifer überarbeitete Version*. Retrieved March 25, 2025, from https://www.dwds.de/wb/etymwb/symptom

Pfeiffer, S. (2021). *Digitalisierung als Distributivkraft: Über das Neue am digitalen Kapitalismus*. Bielefeld: transcript.

Riettiens, L. (2021). *Doing Journeys—Transatlantische Reisen von Lateinamerika nach Europa schreiben, 1839–1910*. Bielefeld: transcript. https://doi.org/10.14361/9783839456736

Riettiens, L. (2022). "Erfolgreich und souverän mit Daten umgehen." Kritische Perspektiven auf (Subjekt-)Bildung in einer datafizierten Gegenwart. *merzWissenschaft*, *6*, 85–94. https://doi.org/10.21240/merz/2022.6.8

Rotthaus, H. (2020). Aushandlungen von Schwangerschaftsverhütung im Kontext digitaler Selbstbeobachtung. *Hamburger Journal Für Kulturanthropologie (HJK)*, *11*. https://journals.sub.uni-hamburg.de/hjk/article/view/1519

Schäffer, B. (2024). Medienvielfalt und Medienwissen. Vom impliziten Medienwissen zur ‚schweigenden' Dimension der Algorithmen. In A. Kraus, J. Budde, M. C. Hietzge, & C. Wulf (Eds.), *Handbuch Schweigendes Wissen: Erziehung, Bildung, Sozialisation und Lernen* (pp. 465–481). Weinheim/Basel: Beltz Juventa.

Schlünder, M. (2005). Die Herren der Regel/n? Gynäkologen und der Menstruationskalender als Regulierungsinstrument der weiblichen Natur. In C. Borck, V. Hess, & H. Schmidgen (Eds.), *Maß und Eigensinn: Studien im Anschluß an Georges Canguilhem* (pp. 157–195). München: Fink.

Schmid, P. (1995). Sauber und schwach, stark und stillend. Der weibliche Körper im pädagogischen Diskurs der beginnenden Moderne. In F. Akashe-Böhme (Ed.), *Von der Auffälligkeit des Leibes* (pp. 55–78). Berlin: Suhrkamp.

Selke, S. (Ed.). (2016). *Lifelogging: Digitale Selbstvermessung und Lebensprotokollierung zwischen disruptiver Technologie und kulturellem Wandel*. Wiesbaden: Springer. https://doi.org/10.1007/978-3-658-10416-0

Stalder, F. (2018). *The digital condition*. Cambridge, UK/Medford, MA: Polity Press.

Strasser, B. J., & Edwards, P. N. (2017). Big Data Is the Answer … But What Is the Question? *Osiris*, *32*(1), 328–345. https://doi.org/10.1086/694223

Töpper, D., & Staab, L. (2024). "Love yourself this Valentine's Day" – Sexuelle Bildung und geschlechtliche Subjektivierung in der digitalen Arena des Wissens von Instagram. In T. Mayer, L. Meyer-Jenßen, D. Töpper, & N. Uhlendorf (Eds.), *Interdisziplinäre Beiträge zur Bildungsforschung* (pp. 177–202). Berlin: Berlin Universities Publishing. https://doi.org/10.14279/DEPOSITONCE-20135

Verständig, D. (2023). Vom Prinzip der Universalität zur Unberechenbarkeit des Sozialen. In S. Aßmann & N. Ricken (Eds.), *Bildung und Digitalität* (pp. 385–402). Wiesbaden: Springer Fachmedien. https://doi.org/10.1007/978-3-658-30766-0_14

Wulf, C., Göhlich, M., & Zirfas, J. (2001). Sprache, Macht und Handeln. In C. Wulf, M. Göhlich, & J. Zirfas (Eds.), *Grundlagen des Performativen* (pp. 9–24). Weinheim: Juventa.

Zirfas, J., & Klepacki, L. (2013). Die Performativität der Dinge: Pädagogische Reflexionen über Bildung und Design. *Zeitschrift für Erziehungswissenschaft*, *16*(2), 43–57. https://doi.org/10.1007/s11618-013-0410-4