



# Body Literacy

*Our Vital Knowledge, Our Vital Power*

An Embodied Research Journey into developing  
Body Literacy as a Systems Thinker

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# Abstract

The menstrual cycle has been recognized as the fifth vital sign: a holistic health indicator that enables people who menstruate (PWM) to understand the state of their general health through physiological biomarkers. Understanding the menstrual cycle as a vital sign empowers PWM to develop their body literacy which requires a capacity for systems thinking. While this fact was acknowledged in the early 2000's, it is not common knowledge among PWM, healthcare, education, menstrual health product makers, or FemTech innovators. This knowledge gap has significant implications for the holistic health, confidence, and agency of PWM to make informed health decisions.

This embodied research project aims to simultaneously develop my capabilities as a systems thinker while developing my body literacy. By applying systems thinking methods and tools rooted in feminist participatory action research, the research objective is to gain a systemic understanding of this vital knowledge gap from multiple perspectives: the individual PWM, the community of body literacy educators, and society at large.

This study investigates the systemic factors that have created a society with this knowledge gap. It then identifies the community of actors working to close this knowledge gap. It concludes with a systems-based approach to exploring the opportunity spaces revealed through the research to promote social change to scale and emerge a new system.

# Acknowledgements

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To my body literacy educator, Vienna Farlow, Holistic Reproductive Health Practitioner (HRHP), The Cuntsultant. Thank you for all of your lessons and teaching me how to read my body. This life skill has transformed my relationship with my body and I am grateful for your knowledge, kindness, and sense of humour.

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Together, you have all challenged me to become a more critical thinker and transform these words, images, and concepts to see the systems, relationships, hidden patterns that were always there.

### *The feminist and menstrual health movement*

This work exists within a movement that started long before me and will continue long after me. This MRP is just a drop in the bucket and I hope it creates ripples to support a new wave forward that appreciates, celebrates, and uplifts all people who ovulate and recognizes the power that exists within each cycle.

## *Acknowledging my relationship with our land and our bodies*

As a settler residing on the lands colonially known as Canada, I want to acknowledge the lands of which I live, learn, create, and grow. This MRP journey intimately took place in my body, which moved across many lands during the COVID-19 pandemic. The initial research took place on the territories of the Mississaugas of the Credit, the Anishnabeg, the Chippewa, the Haudenosaunee and the Wendat peoples. Lands covered by Treaty 13 and the Williams Treaties. The writing, synthesizing, and finalizing of this MRP took place on the traditional and unceded lands of the Coast Salish peoples, the x məθk əy əm (Musqueam), S wx wú7mesh Úxwumixw (Squamish), and səl ilw əta (Tsleil-Waututh) peoples.

This work created an opportunity for me to continue reconciling my relationship with my body. In my critical learning and unlearning journey surrounding my body, what was revealed to me was how my unconscious beliefs about land, women's bodies, and this country's economic history are rooted in the same colonial worldviews, myths, and value systems. I've begun to unpack how the mental models that shape how North American settler societies view land and bodies are based in the same fragmented, dominating, and extractive thinking. This journey helped me realize how my whole life, living as a hapa (mixed-race) half-Japanese female, my body has been seen as something to be conquered, controlled, and exploited. And I guiltily played a role in this behaviour as I hadn't realized that I myself had adopted these toxic ways of thinking. My studies have taught me how an intersectional lens is critical to recognizing how pain, suffering, and ill-health outcomes are disproportionately worse when factoring in the confluence of gender, race, and class.

To dream of a new, inclusive future that promotes reproductive justice and body sovereignty for all, we need to learn the uncomfortable histories that are still playing out in our systems and on the land - today. We need to prioritize the health of, and reproductive justice for, First Nations, Inuit and Metis people, along with Black, Brown and Asian bodies, if we genuinely want a transformed system. This will require us to constantly challenge our cognitive biases from thinking not linearly but more circularly, from fragmented and reductionistic to holistic and interconnected, and we must do so with our whole selves - our minds, hearts, bodies, and spirits.

## Dedication

This labour of love is dedicated to my fifth vital sign: my ovarian and uterine cycle. And by extension, it is also dedicated to all of the systems within my body that are working together as an integrated system to keep me healthy, immune, and alive. My uterus, my ovaries, my ovarian ducts (a.k.a “oviducts”), cervix, cervical crypts, vagina, vulva, and endometrium, fimbriae. My glands and the hormonal orchestra they compose: estrogen, progesterone, follicular stimulating hormone, luteinizing hormone, testosterone, adrenaline, cortisol, oxytocin, serotonin, etc. Thank you for doing what you do.

It is also dedicated to the next generation of people who menstruate. May you live with an embodied, emboldened, and powerful relationship with your bodies..



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1.

Intro



*Hello Ovaries et al., I'd like to get to know you better....*



# Letter to my body, I have a vital knowledge gap

Dearest Ovaries, Fimbriae, Uterus, Ovarian Ducts, Cervix, Cervical Crypts, Vagina, Endometrium, Vulva, Thyroid, Pineal gland, Pituitary gland, Hypothalamus, Thyroid gland, Adrenal glands, Liver, Pancreas, Thyroid, Stomach, Estrogen, Progesterone, Follicle Stimulating hormone, Luteinizing hormone, and any other part or player I may have accidentally missed:

Thank you for doing what you do, every day, from the time my life began. While unaware to me, you've been working in such a sophisticated and cooperative manner, keeping me alive and healthy. I didn't realize that being healthy played a role in my fertility. I didn't know how relevant my reproductive system could be during the times I had no desire to reproduce. I didn't know much about my menstrual cycle beyond the days that I bled. How ovulation is a key event to a healthy cycle and the various hormones that work together to produce biological signals of health.

I'm sorry for all the distress I burdened you with while on hormonal birth control pills, using the copper IUD (intrauterine device). And I'm sorry for the too many years I was dependent and addicted to sugar-filled convenience foods and caffeine, fueling a FOMO (fear of missing out) driven lifestyle to keep up with others at the expense of taking care of myself. I didn't realize how much havoc I was wreaking on y'all, because all the while I ignored my insides, I was too attentive (I admit, obsessed) with my outsides - constantly contorting, controlling, and condemning my shape to fit into size 0 jeans, hoping to be seen as attractive in the eyes of others. I so desperately yearned to be accepted and belong to the outside world.

I've spent so much of my life thinking about what food to eat and what not to eat, how to exercise, perform self care and act healthy - it's ironic to realize that the goals I set to improve my body were all driven from my neck up. Living in such a fragmented way, it didn't dawn on me that I should have learned to listen to you, that I could listen to you, and that it was even possible to learn what you were saying to me through physical sensations, feelings and hormonal signals. Body literacy!?!?! What? I didn't know that was even a thing until I hit the age of 36 a couple of years ago. Learning about it as an actual thing (thank-you Amanda Laird, Lisa Hendrickson-Jack, Toni Weschler, Justisse College International and many others), and how illiterate I have been has shaken me up and thrown my life down a rabbithole. Regretfully, I just didn't know what I didn't know. And I'm so sorry it took so long for me to come to a place of learning how to treat you better, by learning how to listen to you. It's been confronting to realize how my self image and limited perspective led me to believe that I was doing healthy things, and that even my best of intentions didn't always lead to healthy and sustainable outcomes. My menstrual cycle irregularities, adrenal fatigue, and digestive issues were speaking to me all along telling me that something's not quite right. In my ignorance, (and possibly denial), I kept silencing you with whatever I could to keep moving, pushing, and forcing myself until I realized there's got to be a better, more natural, and more intuitive way to be healthy.

As the saying goes, once we know better, we can do better. I'm here now and ready to learn how to listen to you, to learn how to cooperate as an "us", to develop my body

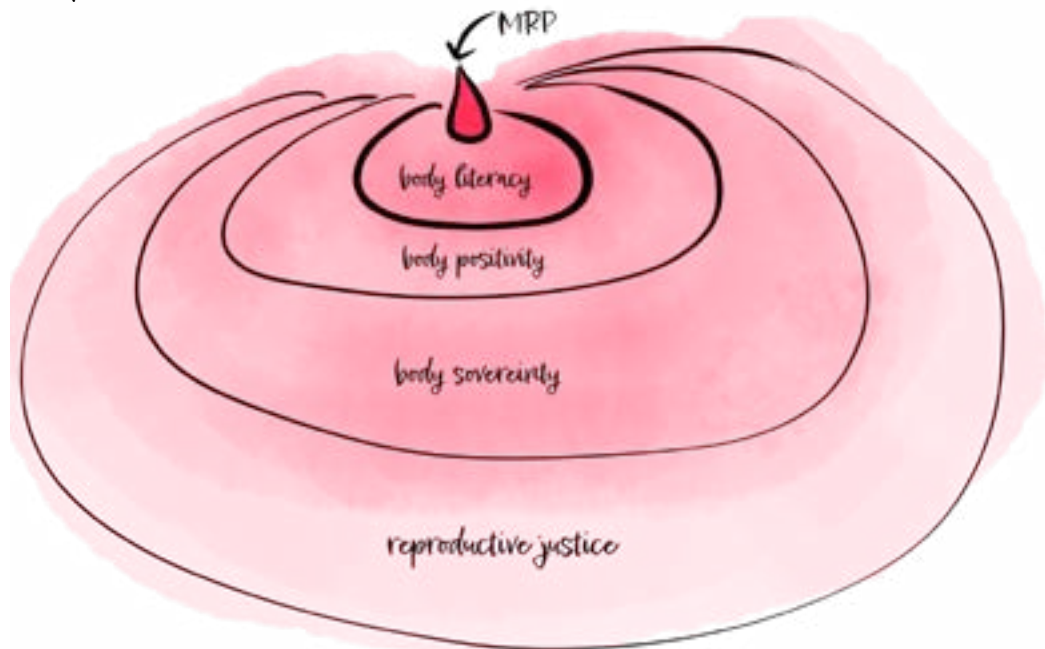
literacy and build a more systemic and holistic understanding of how we all work together to keep us healthy, fertile and resilient. I'm here to learn systems thinking from a living systems paradigm, to learn how my body works, and recommit to building a healthier relationship with each of you as unique parts and as an interconnected whole. I've dedicated my master's research project (MRP), to YOU (well, technically 'us'). This body of work builds off the many tenacious and courageous people in the menstrual health movement and is only possible because of their generosity in sharing what they've learned on their journeys. It is just a drop in the bucket towards reproductive justice, and my hope is that by contributing to the collective body of feminist health care knowledge, more people who experience menstrual cycles will have access to the knowledge to understand, appreciate, respect and love their bodies.

Love from,

Angie's brain, your hopeful collaborator & partner

PS: As seen in *Figure 1: Desired impact of MRP to waves towards Reproductive Justice*, I hope this small document enables more people to develop their body literacy. My objective is to do it in a way that helps people build a positive relationship with their bodies so that they can feel they have the agency, confidence and power to navigate their life in proactive and health promoting ways. From this place I hope we can create a world where all people experience the justice and freedom over their bodies inclusive of their reproductive system and reproductive choices.

## Drop in the Ocean



*Figure 1: Desired impact of MRP to make waves towards Reproductive Justice*  
Illustration by Angie Eriko Fleming





*The menstrual cycle  
is our vital power,  
did you know that?*



# Letter to the Reader, We have a vital knowledge gap

Dear Reader,

This was written to all the people who experience a menstrual cycle who are curious about developing their body literacy. It is also written for people who don't personally experience a menstrual cycle but want to better support the people in their lives who do experience a menstrual cycle - their partners, spouses, children, siblings, friends, and caregivers who make up the community surrounding people who menstruate (PWM). Throughout this document, I refer to people within this group as a "person who menstruates" using the acronym "PWM." I sometimes use the term "menstruator."

Whether you are in the early stages of menstruation, have been menstruating for a while, or are nearing the later stages of your menstruating days and approaching menopause, there is a lot of power to be gained through understanding how your menstrual cycle works. Its signals are communicating to you throughout each cycle and phase of your menstruating life, from menarche (i.e. your first cycle) through menopause (i.e. your last cycle). I wrote this paper because I managed to get to the later stages of my menstruating life and realized how little I knew, how much there is to learn, and how vitally powerful this knowledge is. I hope that reading this speeds up your learning journey and provides you with the power of learning to read your own body.

*Did you know the menstrual cycle is considered a fifth vital sign?*

According to the American College of Obstetricians and Gynecologists (2015), just like blood pressure, heart rate, body temperature, and respiration rate, the menstrual cycle indicates the state of health for people who menstruate. It operates as a systemic indicator of overall general health and can indicate the status of bone health, heart disease and ovarian failure, and long-term fertility (Hillard, 2014).

*Did you know that the menstrual cycle, fertility, and sex drive operate as an interconnected system?*

If our menstrual cycles are healthy, our bodies remain fertile during our reproductive years and perform as they are naturally designed to do (Hendrickson-Jack, 2019). Fertility is a natural function of being human, a highly sophisticated collaboration between our endocrine systems, adrenal glands, excretory systems, our lifestyle and connection to our feminine energy (Vitti, 2014). The health of the menstrual cycles is related to fertility and sex drive; therefore, if we are experiencing issues in any of these areas, there may be underlying systemic causes (Hendrickson-Jack; 2019, Vitti, 2014). Our cycle, fertility and sex drive are

merely symptoms needing attention (Vitti, 2014). If we want to treat the root cause, we can address these issues through upstream interventions that address our blood sugar, adrenal load, elimination pathways, life choices and how we balance our energy (Vitti, 2013).

## Interconnected Systems

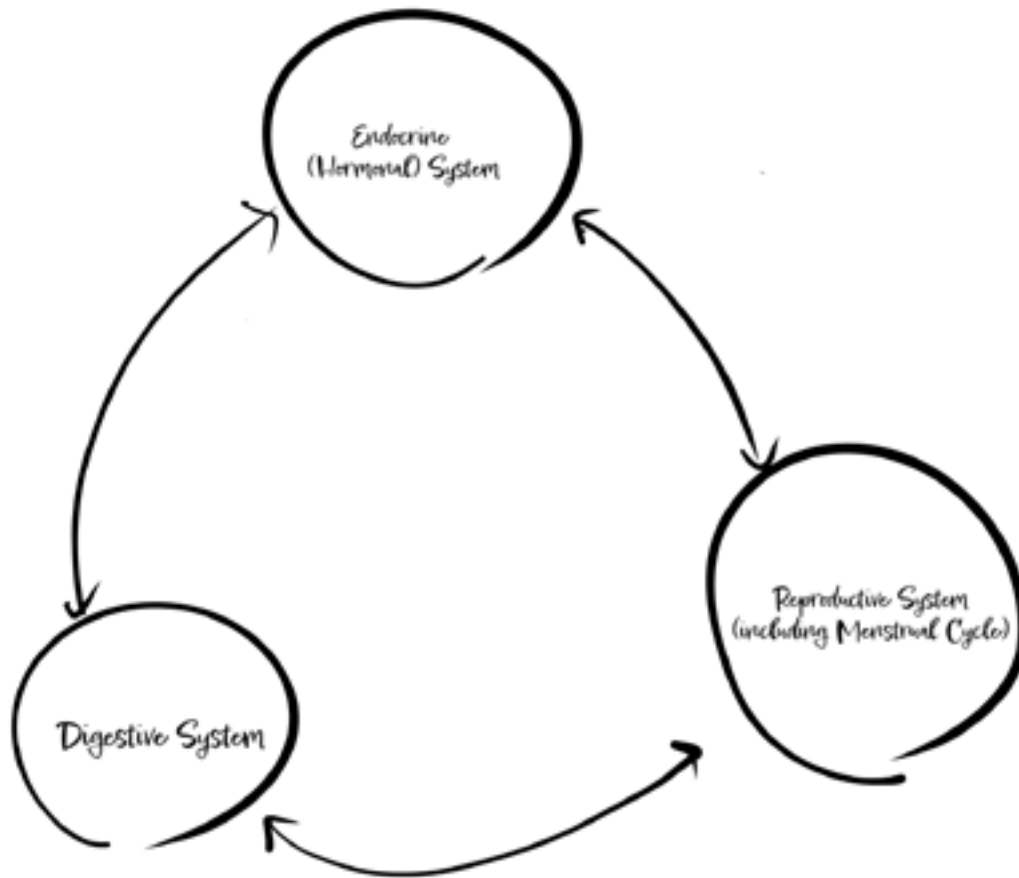


Figure 2: The interplay between the digestive, endocrine and reproductive systems

Illustration by Angie Eriko Fleming

As seen in *Figure 2: The interplay between the digestive, endocrine and reproductive systems*, are highly interconnected. Therefore, to improve one function we must learn to understand how the parts are interconnected and operate as a whole. For complex domains such as holistic reproductive health, systems thinking is valuable because it allows us to see how the parts interact as a whole by enabling us to see the relationship between structures and behaviour (Meadows, 2008). By doing so it “gives us the freedom to identify the root causes of problems and see new opportunities” (p.2, Meadows, 2008).

*Our bodies are communicating to us throughout our menstrual cycles, our ability to understand is called “body literacy”*

In North America, in June 2005, Laura Wershler, the Executive Director for Planned Parenthood Alberta introduced the term “body literacy” defining it as follows (Wershler, 2012):

1. Learning to read and understand the language of the body.
2. Learning to observe, chart, and interpret an ovulatory menstrual cycle.

Unknown to Laura, five years earlier in India, the organization Tathapi, an Indian women’s health resource organization, began using and developing the concept of body literacy as a “medium to scientifically explain the processes of the body, its parts and functions to men, women and children of different age groups” (“Body Literacy”, n.d.).

*What does it mean to have body literacy?*

Ultimately, having body literacy comes down to knowing what is both normal and healthy for one’s own individual body. This isn’t always what is considered average for each individual PWM as there are many contributing factors that create a balanced and healthy range. Someone who has developed their body literacy understands the hormone-driven physiological changes that occur throughout their cycle, and also understands on a personal level what is a healthy range of experiences for them. With this knowledge, they are able to proactively identify when physiological signals are outside of their own healthy range, indicating that something is out of balance within their system (Tavris, 1993).

*Have you heard of the “fertility awareness based methods” (FABM)? And no, it is NOT to be confused with the rhythm method.*

The standard forms of birth control options that rely on synthetic hormones are promoted most by doctors because of their reliability (Lake & Epstein, 2021). These methods include hormonal birth control pills (“the Pill”), the intrauterine device (IUD), and contraceptive injections (“Depo-Provera”). However, there are natural, non-hormonal birth control alternatives that are proven to be as effective with no side effects (Frank-Hermann, 2007). These scientific, evidence-based methods do not rely on synthetic hormones. Instead, they empower the user to both prevent or promote pregnancy, based on their goals, by knowing how to read their body’s biological signals of fertility, a.k.a their body literacy. These methods are called “Fertility Awareness Based Methods” (FABM), which for the record is NOT (but sadly all too often confused with) the rhythm method. It has been proven to be up to 98% effective when used as directed (Frank-Hermann et al., 2007). This method is all about education and awareness, and understanding the body as an interconnected system. Therefore, once a menstruator becomes aware, they can use FABM throughout their reproductive lives to develop a sense of personalized body literacy. Through daily observations and charting of a combination of three key biomarkers, cervical fluid, basal body temperature, and/or cervical position, they become

self-aware of when their body is either fertile or infertile. This information enables users of FABMs to be deliberate in deciding when having sex during their fertile period and whether or not to use a form of protection based on their goals. Compared to hormonal contraceptives, some of the most significant benefits of this method are that there are no short-term or long-term side effects.

*Reflections as a PWM:*

*With so many benefits, applications, and minimal side-effects and comparable effectiveness rates as the dominant prescribed method, hormonal contraceptives, how did I never hear about this before my late reproductive years?*

*Facing and accepting my body ignorance...*

These vital knowledge gaps, and many more were revealed to me, sparked by a healthy conversation with a dear friend when she shared what she learned from a life-changing book, *Taking Charge of Your Fertility*, by Toni Weschler. Through a conversation that gripped me by the shoulders and shook me hard to my core, my ignorance was exposed and sent me on an embodied research journey to learn what I could do to better understand how my body worked. I needed to reconcile the dissonance between my freshly revealed ignorance and my desire to be self-aware. It also unleashed an assortment of emotions ranging from fuming anger for not knowing this until my mid thirties, to sadness, disappointment and regret for all the uninformed choices I had made that I wish I could go back and re-do if only I had known how my menstrual cycle worked. I felt stunted, stupid, and ashamed for how little I knew about my body, and had to come to terms with the sad truism that “I didn’t know, what I didn’t know”. To make matters even worse, my ego confronted my self identity that declared I was healthy and knew how my body worked! I have been tracking my period through various apps for almost 10 years, only to realize I had insufficient knowledge to live in balance with my natural cyclic flow.

*Reflections as a PWM*

*How could I be educated and see myself as intelligent, and simultaneously come to grips with this newly found reality of not knowing this fundamentally vital knowledge?*

*...and tackling it through this menstrual research project*

My primary learning goal for the Strategic Foresight and Innovation program at OCADU was to develop my knowledge and paradigms to become a systems thinker. I couldn’t see a path to systemic transformation without developing the capacity and capabilities to think with complexity, nonlinearity, and interrelationships. My initial curiosity when applying for graduate studies was to explore how we might deconstruct the taboos that prevent vital health-promoting conversations from taking place. In 2022, it saddens me how menstruation is still a heavily shrouded topic. I believe we can dismantle social norms by speaking them away. We normalize topics such as menstruation, cervical fluid, ovaries, etc., by conversing about them as if they are no longer taboo.

These learning objectives, combined with my desire to learn body literacy, came together as the basis for this embodied research journey guided by the following questions:

## Research Questions

*Can I develop my capabilities as a systems thinker, while building my body literacy in a way that promotes an evidence-based, holistic and compassionate understanding of my body?*

*and,*

*How might I share what I learn through this research journey in a way that promotes systems thinking, body literacy, and body positivity?*

## *Exposing my unknown-unknowns, and realizing my ignorance is systemic*

Through secondary research on this topic, it became apparent that my lack of awareness surrounding my body literacy, menstrual cycle, and fertility spanned far and wide. It also became quickly obvious that it wasn't just me who suffered from these knowledge gaps; it wasn't just my friends. Through my initial context analysis of the literature, I discovered that the knowledge gaps on health topics for people who menstruate are not only personal but also a systemic and global epidemic. The following summarizes some of the key themes from my context analysis that validate the significance of the lack of body literacy for menstruating people.

### **The modern woman doesn't know her own body**

In 2020, I attended the FemTech Forum conference, "Women in Wearables." This was the first global virtual gathering about FemTech, which are technologies designed to support and advance women's healthcare ("About Clue," n.d). It brought together researchers, entrepreneurs, healthcare professionals, and journalists to showcase and celebrate innovation taking place in women's health. While an exciting amount of progress is being made in this space, a common theme that continually echoed throughout a series of presentations and panel discussions was that the modern woman doesn't know her own body. Many speakers acknowledged the significant lack of research and data on women's health topics such as menstruation and menopause.

### **The health care system has insufficient knowledge about people who menstruate**

The Office of Research on Women's Health at the National Institute of Health refers to women as "the three U's: understudied, underrepresented, and underreported" (Dusenbery, 2019). According to Caroline Criado-Perez, in her book *Invisible Women: Data Bias in a World Designed for Men* (2019), this is because we live in a world that was designed by and for men. These design decisions go far back in time. The very roots of modern medicine since 2000 BC were built on myths that women's bodies were inferior (Cleghorn, 2021). These false beliefs went unchecked and thus were invisibly reinforced through the development of healthcare knowledge and practices, built and led by a male majority (Cleghorn, 2021). The people who are responsible for modern day healthcare as it pertains to people who menstruate, have often lacked the lived experience of a menstrual cycle. This has led to a lack of relevant understanding, thus inhibiting motivation to ground this knowledge through the equitable inclusion of people with female reproductive systems during the course of medical research (Cleghorn, 2021, Criado-Perez, 2019).

Furthermore, our modern Western healthcare systems take an allopathic and reductionist approach to health (Tsuei, 1978) and lack holistic and inclusive ways of knowing (Wilson, 2008). This fundamental worldview creates a view of health that focuses on treating individual parts instead of seeing how they interconnect as a whole (Tsuei, 1978).

## **The complexity of menstruating bodies is seen as inconvenient for research**

There is a diverse nature to women's bodies - each body is unique, and each cycle is unique. The 28-day cycle is not 'normal', (unless one is taking hormonal birth control). While some women sometimes ovulate on day 14 of their cycle, a healthy cycle is more dynamic and responsive to the menstruator's health, stress, and lifestyle (Hendrickson-Jack, 2019, Matus, 2009). The variability surrounding menstrual cycles and the unknown risks to fertility have been excuses for leaving women out of medical research (Criado-Perez, 2021). In addition, including women has been seen as too costly, time-consuming, and inconvenient (Criado-Perez, 2021). This failure to include women in health research has led to an unintended male bias in healthcare (Criado-Perez, 2021). The results have been disproportionately adverse health outcomes for females compared with males (Criado-Perez, 2021).

## **Systemic lack of health literacy and body literacy**

Body literacy falls within the broader category of health literacy, which is the "knowledge and competencies of persons to meet the complex demands of health in modern society" (Sorenson et al., 2012, p.1 ) A Canadian study found that 60% of Canadians do not have an adequate level of health literacy to manage their health and health care needs (Health Literacy in Canada, 2008). This is significant because health literacy underpins people's capacity to participate actively, fully, and confidently in their multiple life roles as parent, employee, patient, student, consumer, citizen, etc. (Hoffman-Goetz, et al., 2014).

As mentioned in the opening, body literacy is "the ability to read and understand the signs of your menstrual cycle" (Wershler, 2012). When we learn that our menstrual cycles act as a fifth vital sign, our body literacy enables us to make proactive health choices that best meet our preferences and needs as they adapt and evolve throughout our lifetime (Hendrickson-Jack, 2019). Low levels of body literacy mirror low levels of health literacy, as many women are unaware of their body's physiological symptoms and fertility signs (DeNora, 1996). Only a small percentage of people who menstruate have successfully mastered the skill of fertility awareness to use it for its various purposes (Yewchuk, 2006).

## **Conflicting menstrual health priorities**

When it comes to menstrual health progress, we have often prioritized access to products over education (Bobel, 2019). For example, much of the menstrual health movement in the Global South focuses the distribution of resources to increasing access to commercialized feminine hygiene products, or empowering social enterprises that sew and sell reusable cloth pads (Bobel, 2019). This trade-off makes it easier and quicker to count (and thus get credit for) what 'impact' is being made towards a more inclusive global agenda (Bobel, 2019). However, it simultaneously dis-invests in the education required to develop menstruators with the capabilities to make informed choices and have agency and sovereignty over their bodies throughout their reproductive lives (Bobel, 2019). Furthering this issue is that the minimal education that does get included is delivered by the product manufacturers. This limits the education element due to the biases and agendas for product promotion that perpetuate the stigmatization and shame of menstruation as dirty (Bobel, 2019). The prioritized focus on menstrual products over education is common across the world, and reinforces the global taboo that keeps



menstrual education from developing.

As shown by this exhaustive list of my freshly exposed ignorance, I didn't know what I didn't know, I wasn't alone, and body literacy is a systemic knowledge gap. I also lacked the capacity of systems thinking to understand how the current systems perpetuate a global society that is menstrually unaware. I was cursed with a lack of information, misinformation, and the societal suppression of information. This preserved my ignorance by socializing me to treat my body as separate parts.

### *Mixing research methods to promote feminist methodologies, embodied knowledge, and systems thinking*

The methods for this work are inspired by a combination of methodologies: contemporary feminist research practices, participatory action research (PAR), systems thinking and autoethnography.

## **Contemporary Feminist Research Practices**

As a topic centred on bodies of people who menstruate, a feminist methodological approach was cultivated to resist the dominant western methodologies of reductionism, objectivity, and fragmentation (Wilson, 2008). My intent was to understand the topic of body literacy from a perspective that promotes feminism and holism. A feminist epistemology of standpoint feminism, also known as "difference feminism," acknowledges the "fundamental difference between men and women" (Leavy & Harris, 2018, p.47). This focused on the selection of secondary sources that predominantly feature the voices and experiences of diverse people who menstruate, primarily in the western world. According to Patricia Leavy and Anne Harris in their book *Contemporary Feminist Research from Theory to Practice* (2018), feminist research ethics add feminist concerns to the research process by expanding our consideration of the nature of knowledge itself (ontology), what counts as knowledge and how that knowledge is represented (epistemology), as well as the theories and tools of doing research (methodology). Therefore, the references and resources that were reviewed in the research process went beyond the dominant realm of academic journals to listen to the voices and experiences of people who menstruate. Sources that showcase educators of body literacy were considered, including contemporary literature, podcasts, documentaries, websites, social media, digital apps, platforms, YouTube and crowd-sourced knowledge bases such as the *Menstrual Health Hub* (mhhub.org) and *Wikipedia*.

Embedded within a feminist research methodology is the inherent agenda for social change to address inequality within the feminist research point of view (Leavy & Harris, 2018). Throughout this project, the social change I championed is the practice of expanding our epistemologies and ontologies to embrace feminist ways of knowing, as well as promote the value of systems thinking as a key vehicle for learning how to understand and better relate to our bodies.

## **Feminist Participatory Action Research (FPAR)**

Feminist participatory action research inspired a systemic approach to personal and social transformation (Maguire, 1987). According to Patricia Maguire in her book *Doing Participatory Research: A Feminist Approach* (1987), the explicit purpose of participatory action research is to go beyond the dominant research role of “merely recording observable facts” (p.3) to “collectively investigating reality in order to transform it” (p.3). The stages of PAR create the outline for this embodied research journey: investigate, educate, act. Maguire explains FPAR as a praxis, a dynamic interplay between learning, reflection and action. As a person who experiences a menstrual cycle and is actively learning body literacy, my personal reflections are incorporated throughout as I develop my capacity as a systems thinker. I chose to write in the first person, which Maguire inspired. She describes how this point of view is used to challenge the “forced and false dichotomy between personal politics and scholarly research” (Maguire, 1987, p.7). It recognizes that the personal is political; it’s systemic and steeped throughout culture and time.

## **Systems Thinking**

Thinking in systems requires us to think about how parts interact as a whole (Meadows, 2008). It looks at how systems are nested within systems of increasing complexity as we scale outwards from micro (e.g. individual) towards macro (e.g. societal) dimensions. To develop as a systems thinker, while exploring the topic of body literacy, I set boundaries around the topic of body literacy education (and miseducation) for people who experience a menstrual cycle. I focus on the education about the menstrual cycle and developing body literacy. Included in this is the understanding of female reproduction, fertility, and the key biomarkers of the menstrual cycle to be used as a holistic vital sign. Although highly interrelated, topics such as menstrual management products and hormonal birth control are out of scope for this project. They have the potential to be incorporated into future research.

In exploring topics related to menstruation, it’s easy to see how vast and messy this exploration can get. For example, in *Periods Gone Public: Taking a Stand for Menstrual Equity* (2017), Jennifer Weiss-Wolf writes how menstruation is at the intersection of social justice, civic participation and gender equity. She adds how the topic of menstruation falls into reproductive function, biology and public health (2017). In *The Managed Body: Developing Girls and Menstrual Health in the Global South* (2019), Chris Bobel expands on this by saying how “[w]hen we talk about menstruation, we are talking about more than blood. We are talking about bodies and self-presentation and consumerism and appearance and health and reproduction and sexuality and gender and family the breathless list goes on” (p.311-312). She elaborates further stating how “menstrual health is a gateway issue; it taps into a portal to topics such as sexual harassment, assault, dating violence, sexual decision making” (Bobel, 2019, p.310). As I wrestle with this topic, the system boundaries enable me to prioritize the findings of my exploration. These boundaries recognize that body literacy’s relationships in other domains make it a complex topic. They also enable focus for patterns to emerge and actionable insights to surface.

## **Autoethnography**

As demonstrated in the opening letter to my body, this research journey engages in autoethnography, an approach to research and writing that “seeks to describe and systematically analyze personal experience in order to understand the cultural experience” (Ellis et al., 2011, p.273). It is a method where I as the researcher am engaging rigorously in my own personal experience as a person who experiences menstrual cycles, and am using my lived experience and personal curiosity as an entryway into making connections between the personal and larger cultural phenomena (Ellis, et al., 2011). Throughout this work, I share my reflections as a PWM because I learned from my experiences that realizing I was not alone with this knowledge gap made it easier to build the critical awareness and openness required to close this knowledge gap.

## **Content Analysis**

The final method included in this research project is content analysis, a feminist method for studying nonliving data which includes the studying of written texts, documents, visual images, audio-visual recordings (e.g. podcasts, *YouTube* videos, documentaries) and digital platforms (Leavy & Harris, 2018). In acknowledging the personal and sensitive nature of this topic, I chose to focus my exploration using existing informational sources, as this investigative journey revealed such a diverse range of published works that capture various perspectives (e.g. historical, cultural, economic, personal, etc.) surrounding this topic.

## *Research Design Principles*

In addition to practicing mixed research methods, three key research design principles were established to ensure that the research implemented the goals promoting inclusion and receptiveness by others, as well as eradicating the taboo, stigmatization and shame surrounding menstruation.

## **Designing for Inclusion**

The term “person who menstruates” (PWM) is used throughout this work to acknowledge that not all people who menstruate relate to themselves as female, and include gender non-binary people who also experience menstrual cycles. However, diverse cultural influences impact the topic of menstruation, the learning I’m focusing on is the biological lessons of body literacy that remain constant across cultures (i.e. physiological signals of the menstrual cycle as fifth vital sign). These biomarkers are consistent across cultures; therefore, this research is relevant to people of diverse cultural and ethnic backgrounds. Future expansions of this work intend to explore the role that culture plays in menstrual cycle education (e.g. traditional knowledge and wisdom).

Being situated in Canada as a PWM, I use my personal experience developing my body literacy within a North American and global context. With access to the internet, many of the online resources are sourced from around the globe. The majority of multimedia resources (e.g. books, podcasts, technical references) on the topics surrounding body literacy and the health of PWM are from a western context (e.g. North America and the UK).

Another way to promote inclusion is by addressing this document to both people who experience a menstrual cycle, PWM, and people who do not personally experience but support PWM. I feel this knowledge needs to be spread beyond the primary audience of PWM to include other bodies if we truly want to see systemic social change. The perpetuation of this knowledge gap around body literacy has been influenced by people who do not menstruate due to the lack of representation of PWM in the design of modern healthcare systems. Therefore, building a world where body literacy is accessible to all will require people who don't menstruate to learn and act on this vital information.

## **Designing for People with High Urgency**

The primary audience for this body of work are people with a high degree of urgency for this information - those who are highly receptive and eager to learn about their fertility and holistic health options because of their unique personal circumstances. This group includes people who are in the later stages of their reproductive years, likely in their mid to late 30's, even into their 40's, who are looking to increase their fertility naturally. In addition, this group also includes menstruators of any age who are struggling with more complicated health conditions such as polycystic ovarian syndrome (PCOS) and endometriosis. Many people who experience abnormalities with their menstrual cycles have been able to resolve their issues at the root cause by developing their body literacy and working with holistic health practitioners (Hendrickson-Jack, 2019). I'm writing this for the people who want to understand better how their bodies function in an integrated way. For people like me who didn't know there were questions we could be asking ourselves to help us lead more holistically healthy and knowledgeable lives. For a body literacy self-assessment, I summarized key questions I started asking myself in the beginning of my body literacy journey in *Appendix A: Body Literacy Self Assessment*.

## **Designing to Normalize the Normal**

For a topic that approximately half the world's population experiences, many of us are still in the dark about how our bodies work due to the taboos, stigma, and shame that perpetuate our collective knowledge gap of this important topic. This knowledge gap can't be addressed if we can't talk about menstruation in healthy, body-positive, normalized ways. For example, euphemisms and code words such as "the curse", "aunt flo", "on the rag", "moon time", "that time", "time of the month" are used so commonly when people talk about their menstrual cycles. Even the ubiquitously used term "period" is a euphemism for menstrual cycle. The use of these terms over the use of biologically accurate words indirectly reinforces a negative relationship with menstrual cycles. Therefore, with the objective of normalizing menstruation as a normal, healthy, biological experience, a key research and design principle for this project is to use plain, descriptive, and neutral language. I hope that it may also be vitally powerful towards normalizing your relationship with menstruation too.

## Framing the Journey

As I develop as a systems thinker, I learn that it is critical to explore the system from various levels which are nested within one another. For instance, the PWM has a system within themselves. They have multiple systems operating within them including their reproductive system, endocrine system, digestive system, etc. This PWM's system is nested within a community of caretakers that may or may not provide them with access to body literacy education. This community layer includes the caregivers, peers, healthcare practitioners, teachers, online networks, etc. who are in relationship with the PWM. Finally, each of these communities is nested within a larger system referred to as society. This outer layer is composed of culture, media, institutional systems of healthcare, education and government. These systems nested within systems are depicted in *Figure 3* below, and outline the systems of focus for this research project .

In following the three part process of participatory action research (PAR), investigate, educate and act, this journey weaves in and out of each layer exploring the topic of body literacy from the individual PWM lens, the community of educators who play a role in developing body literacy, and the societal layer that both educates and miseducates its members on the topic of body literacy.

## Systems Nested within Systems

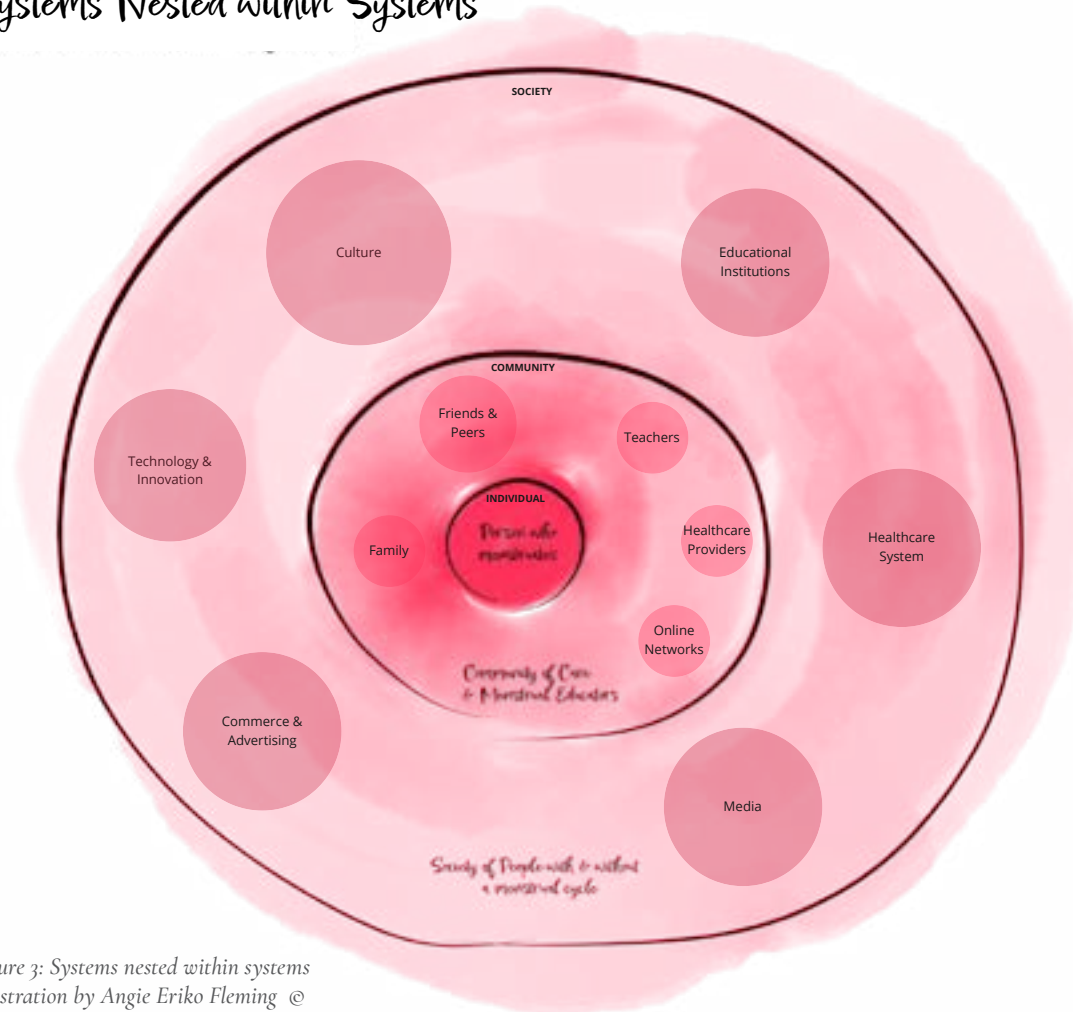


Figure 3: Systems nested within systems  
Illustration by Angie Eriko Fleming ©

Bringing the methods, process and principles together, *Figure 4: My Embodied Research Journey* on pages 30-31 illustrates the five stage journey that this embodied research journey takes, guided by the overarching research question:

*Can I develop my capabilities as a systems thinker while building my body literacy in a way that promotes an evidence-based, holistic and compassionate understanding of my body?*

*And, how might I share what I learn through this research journey in a way that promotes systems thinking, body literacy, and body positivity?*

The sub questions that guide each phase of the journey are outlined below.

### **Stage 1: Investigate at the level of Society**

*How did we get here? What's keeping us here?*

This current section provides evidence for how the knowledge gap surrounding the topic of body literacy for PWM is systemic and thus impacts many individuals. This provides the starting point for the next section, "Investigate." I focus on the outer realm of the system, exploring society while asking the following questions to uncover the systemic factors that contributed to our current reality:

- *What is underpinning our systemic knowledge gap on the topic of body literacy for PWM?*
- *How has history shaped our systemic knowledge gap on the topic of body literacy for PWM?*

### **Stage 2: Educate at the level of Community and Individuals**

*Who doesn't have this knowledge gap? How are they helping to close it?*

For the "Educate" phase, I move into the middle realm of the system focusing on the community of people and organizations who are currently playing a role in addressing this vital knowledge gap. This section asks the questions:

- *What are some of the key lessons these actors are sharing to promote the fundamentals of body literacy?*
- *Who are the key actors in the system of body literacy education who are addressing this knowledge gap?*
- *What resources have they produced for PWM to develop body literacy ?*

### **Stage 3: Act to make body literacy accessible for PWM**

*How can we close this knowledge gap to make body literacy accessible to all?*

For the “Act” phase, I weave together lessons learned from the previous sections of the journey to identify opportunity spaces that can help to close this knowledge gap so that individual PWM’s, their communities, and society at large have access to body literacy and the power of the menstrual cycle as a fifth vital sign.

This section is guided by the following question:

- *How can we close this knowledge gap in a way that might bring about system transformation?*

To conclude, after discovering that I have a vital knowledge gap surrounding the topic of body literacy, I soon realized it isn’t personal; it is systemic. It has prevented me and other PWM from being able to benefit from understanding our menstrual cycle as a fifth vital sign. As a result, PWM unnecessarily suffer from the adverse side effects of limited knowledge and fragmented thinking when making decisions about their health throughout their lives.

To address this knowledge gap, I will apply systems thinking to holistically expand my knowledge of body literacy. The following section pursues this embodied research journey as I investigate society to understand what shapes what we know, don’t know, and the provisional nature of knowledge.





# Overarching Research Questions

*Can I develop my capabilities as a systems thinker while building my body literacy in a way that promotes an evidence-based, holistic and compassionate understanding of my body?*

*and,*

*How might I share what I learn through this research journey in a way that promotes systems thinking, body literacy, and body positivity?*

## 2. Investigate

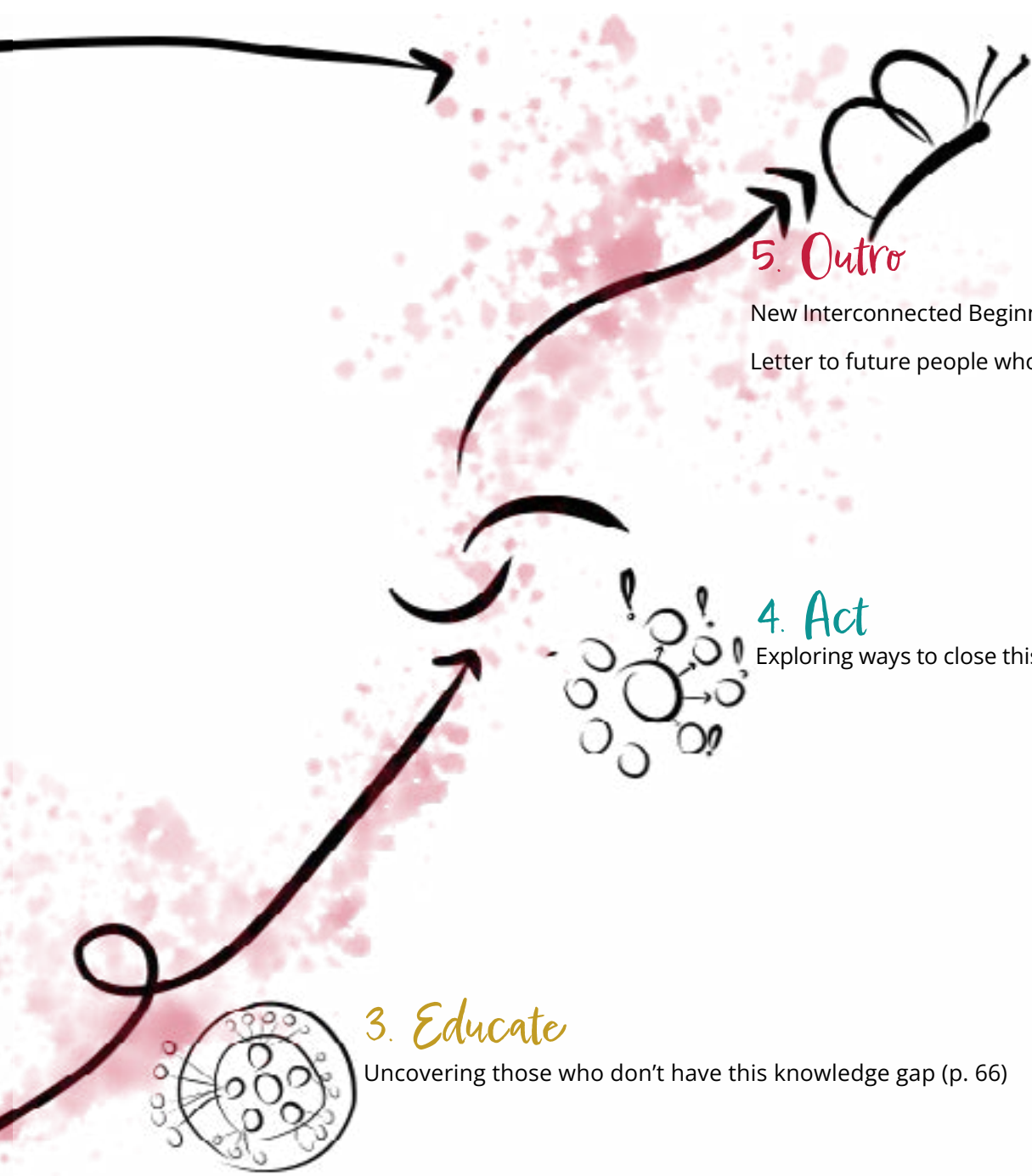
Understanding our societal knowledge gap (p. 38)

## 1. Intro

Letter to my Body, I have a vital knowledge gap (p. 15)

Letter to the Reader, we have a vital knowledge gap (p.18)

Figure 5: My Embodied Research Journey  
Illustration by Angie Eriko Fleming ©



## 5. Outro

New Interconnected Beginnings (p. 101)

Letter to future people who menstruate (p. 103)

## 4. Act

Exploring ways to close this knowledge gap (p. 85)

## 3. Educate

Uncovering those who don't have this knowledge gap (p. 66)

Abstract (p. 4)

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2.

Investigate



*How did we get here as a society?  
What's keeping us stuck?*

# Understanding our societal knowledge gap

Donella Meadows, a pioneer in systems thinking, states in her book, *Thinking in Systems* (2008) how systems cannot be controlled or solved. Instead, she teaches the need to “expose our mental models to the light of day” (2008, p.172) and “get a beat of the system” (2008, p.170). Doing this builds an interconnected understanding of the actors and behaviours of the system. It helps identify leverage points for intervening actions (Meadows, 2008). To help understand how we got here as a society, I explore the literature for statements supporting the body literacy knowledge gap to expose mental models indirectly. I then use the causal layered analysis (CLA) tool to uncover unconscious causes, worldviews, myths, and metaphors that uphold this system. I then synthesize historical events relevant to society’s development of body literacy for PWM to understand the roots of our current level of awareness.

The research questions that I explore in the Investigate stage explore the systemic factors that perpetuate our collective knowledge gap of body literacy at a societal level. They are as follows:

- *What is underpinning our systemic knowledge gap of body literacy for PWM?*
- *How has history shaped our systemic knowledge gap of body literacy for PWM?*

## *What is underpinning our systemic knowledge gap of body literacy for PWM?*

Mental models are our internal representations of the external reality (“Mental model,” n.d.). In *The Fifth Discipline: the Art and Practice of the Learning Organization*, systems thinker Peter Senge defines mental models as “deeply ingrained assumptions, generalizations, or even pictures and images, that influence how we understand the world and how we take action” (Senge, 2010, p.8). Uncovering societal mental models will help answer the question, “what is underpinning our collective lack of body literacy?” by allowing us to examine and understand the deeply held unconscious beliefs that form a root cause of subsequent outcomes. Examples of mental models include beliefs, worldviews, myths and metaphors. By exploring these mental models, I aim to gain a deeper understanding of this systemic problem.

The tool used to explore mental models is the Causal Layered Analysis (CLA). It is developed by futurology researcher, Sohail Inayatullah, as a foresight technique that helps to explore the many different and reinforcing levels that construct the current reality, or a desired future state (Inayatullah, 2004). As seen in *Figure 5: Causal Layered Analysis*, the visual metaphor used by Inayatullah is the iceberg model to illustrate how the litany occurs above the surface where it is exposed, while the causes are just below the surface, the worldviews are below the causes, and the myths and metaphors are the deepest – buried in the unconscious realm of society. With each of the four layers of analysis, the timescale for change grows exponentially. The pace of change shifts from constant, to years, to decades, to civilization for litany, causes, worldviews, and myths, respectively. This shows how the deeper the ideas and beliefs are on the CLA model, the longer and harder they will be to change.

# Causal Layered Analysis

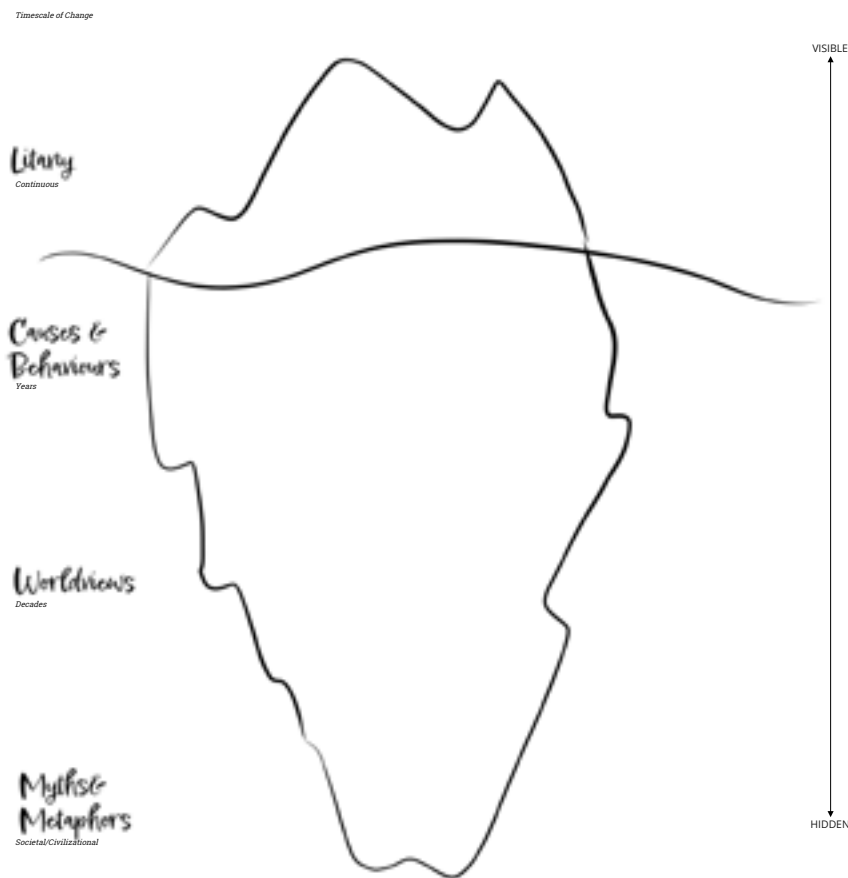


Figure 5 Causal Layered Analysis  
Method Sohail Inayatullah, 2004 ©  
Illustration by Angie Eriko Fleming

In *Figure 6: Causal Layered Analysis - What's underpinning our collective lack of body literacy*, I apply the CLA to investigate society's lack of body literacy, working through each layer to expose the persistent mental models upholding this problem. To play off the iceberg symbolism, I use the shape of a menstrual cup, which is a menstrual hygiene device made out of silicone. It is used internally and inserted into one's vagina to collect menstrual fluid. The tip of the cup is what is left outside of the body while the rest of the cup is hidden inside. In this version as a CLA, I turn it upside down to depict the blood spills and stains that symbolize the long-standing myths from the past that underpin today's lack of body ignorance.

# What's underpinning our collective lack of body literacy?

Timescale of Change

Continuous

**PROBLEMS**  
(the litany)

Years

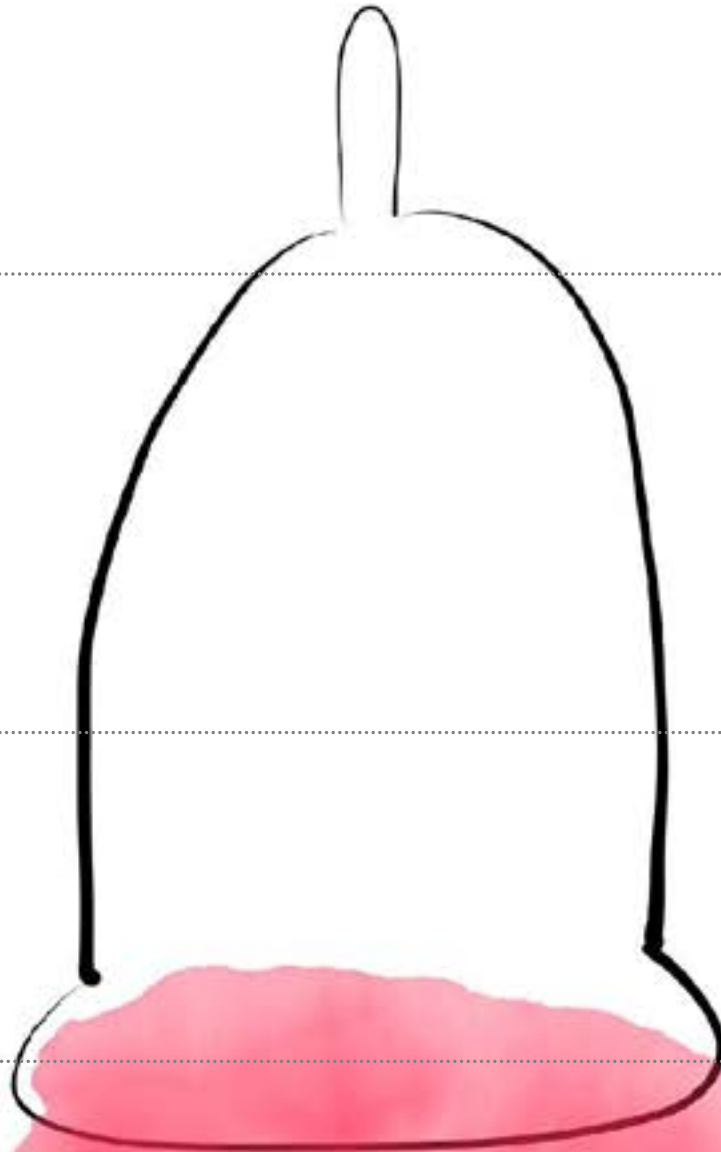
**CAUSES**  
(patterns & behaviours)

Decades

**WORLDVIEWS**  
(mental models & social constructs)

Societal/  
Civilizational

**MYTHS & METAPHORS**  
(collective unconscious beliefs)



- **The modern woman doesn't know her own body** (Unanimous agreement, Femtech Forum, Women in Wearables Virtual Conference, 2020)
- The Office of Research on Women's Health refers to women as "the three U's: understudied, underrepresented, and underreported" (National Institute of Health as cited by Dusenbery, 2019)
- Absence of medical research on reproductive health, PMS, endometriosis, menopause, etc (Laird, 2019, Chemaly, 2019, Criado-Perez, 2019, Cleghorn, 2021).
- "recent studies show that up to 10% of girls still get their first period without any clue whatsoever what's going on... what's more, college women consistently exhibit an amazing level of ignorance about the underlying biology of menstruation. " (p.15, Stein & Kim, 2009)
- "through no fault of her own, girls are not sufficiently menstrual literate, this is true for girls everywhere, not only in resource poor regions" (p.158, Bobel, 2019)
- "65% of respondents felt doctors took their pain less seriously because of their sex" (Laird, 2019).
- "59% of women report they do not want to menstruate monthly, 1/3 say they're keen to never menstruate again" (Bobel, 2019).

- **"You never get to know the answers to the questions you don't ask"** (Dr. Sharon Malone on The Michelle Obama Podcast, August 12, 2020)
- Pressure on women to be both feminine and masculine (Tavris, 1993)
- "If we can't acknowledge what's going on with us, we can't fully celebrate just how amazing we are" (The Michelle Obama Podcast, August 12, 2020)
- Menstrual mandate- culture to conceal all things menstruation (Bobel, 2019)
- Learned helplessness - accept things as they are (Chemaly, 2019)

- **Gendered data gap - lack of research and data on women's bodies (Criado-Perez, 2019)**
- Over focus on short term solutions (e.g. menstrual care products) over long term investments in education (Bobel, 2019).
- We fund what we fear (e.g. heart disease in men at the expense of menstruation and menopause) (Tavris, 1993).
- "Othering" - conditioned response to being in an environment in which one's innate needs have been systematically ignored in favour of the needs of others with more power (Northrup, 2020).
- "Subjugated Knowledge" - knowledge about populations of oppressed people are excluded from the formal domains of knowledge creation (Foucault, 1980)

- **Menstrual Mandate - shame, silence, stigmatization (Bobel, 2019)**
- Menstruation is something to be 'managed', hidden, discreet, silenced (Bobel, 2019)
- Menstruation is taboo, it is seen as dirty, disgusting, and needs to be controlled and suppressed

- **Patriarchy prioritizes male bodies over female bodies**
- Male bodies are seen as whole, female bodies are seen as parts (Chemaly, 2019).
- Gender as a system of dominance, women as second class citizens (Chrisler, 2012).

- **Female body is flawed and inferior to male (Aristotle)**
- Women are abnormal, Male is prototype
- Male as subject, female as object/other (de Beauvoir, 2010)
- "Man is the measure of all things" (Protagoras)
- Menstrual blood is impure, unclean, disgusting (Pliny the Elder & most world religions)





## Problems

The CLA structure helps me summarize the litany, which signals body literacy's sizable knowledge gap. I lead with the unanimous agreement shared at the *FemTech Forum* in 2020, claiming that the modern woman doesn't know her own body. Followed by the statement from the Office of Research on Women's Health referring to women as "understudied, underrepresented, and underreported" (Dusenbery, 2019). I highlight specific statistics around the lack of body literacy and negative impressions PWM have about their menstrual cycles. For instance, in the book *Flow: The Cultural Story of Menstruation*, authors Elissa Stein and Susan Kim refer to studies showing that "up to 10% of girls still get their first period without any clue whatsoever what's going on [in their bodies]" (2009, p.15). Stein & Kim also note this knowledge gap persists with age as "college women consistently exhibit an amazing level of ignorance about the underlying biology of menstruation" (2009, p.15). A related issue that prevents open discussion and learning around PWM's health is a study that found that "65% of respondents felt doctors took their pain less seriously because of their sex" (Laird, 2019).

## Causes

The following section, "causes," is where I highlight some of the patterns and behaviours that underpin this problem. I organize these causes into two key categories: 1) you can't get the answers to the questions you don't ask, and 2) the gendered data gap. Chris Bobel's book, *The Managed Body: Developing Girls & Menstrual Health in the Global South* (2019), refers to the 'menstrual mandate' as a culture that conceals all things menstruation. Bobel claims how this leads to the stigmatization of a natural biological event that takes place for all healthy PWM and is a necessary occurrence for all of humanity to exist. When society at large conceals this topic, it prevents the open space for learning, curiosity and questioning from occurring. These factors are essential for vital information to efficiently and proactively spread across networks between the people who menstruate and their communities of care.

Another cause for the collective lack of body illiteracy is the "gendered data gap" that was already discussed in the previous section. Criado-Perez identifies how women have been largely excluded from medical research as they've been seen as "not important, burdensome, costly, [and] inconvenient to research. An article from *Scientific America* states how "[i]ncluding both sexes in research is seen as a waste of resources" (as cited in Criado-Perez, 2019, p. 216). If we lack priority in health research, we lack the knowledge that can be gained from it, and the result is a collective lack of awareness on the topic of female bodies and health.

## Worldviews

I explore deeper into the worldviews that underpin the causes and litany. For example, the menstrual mandate reveals a worldview that regards menstruation as something that needs to be managed, hidden from public sight, handled discreetly, and never spoken of out loud beyond whispers (Bobel, 2019). This silencing continues to reinforce the topic of menstruation as taboo. Seeing menstruation as dirty, disgusting, and in need of suppression further reinforces the menstrual mandate worldview.

This silencing of women's health is interconnected with the patriarchal worldview that values the needs of male bodies over women's. This worldview prioritizes the investment in understanding male bodies in medical research while deprioritizing medical research on female bodies with the excuses noted above as costly and too inconvenient (Criado-Perez, 2019).

## **Myths & Metaphors**

At the deepest layer are society's myths and metaphors. Often society's myths and metaphors exist as unconsciously held beliefs about what is true and not true. They are upheld by society through how people are socialized through various relationships. The most dangerous myth that prevents medical research for PWM is the belief that female bodies are flawed and inferior (Stein & Kim, 2009). This myth dates as far back as 300 BC in Ancient Greece, when Aristotle (and many others) prioritized the male body above the female body (Stein & Kim, 2009). This belief was adopted by other men with power and silently went unquestioned. As a result, the male body became believed to be the prototype and the subject. In contrast, the female body is relegated to abnormal and becomes an object. This observation was published and popularized in 1949 by French existential philosopher Simone de Beauvoir in her popular book *The Second Sex*. de Beauvoir argues that the male gender is considered the unquestioned default sex, while the woman becomes the other and is thus subordinated in status (Beauvoir, 2010).

Religion has reinforced beliefs of how menstrual blood has been stigmatized as dirty, disgusting, unclean and impure. These myths have been written in the scripture of many of the world's oldest religions, such as Christianity, Hinduism, Judaism, Shintoism, Buddhism, and Islam. *Figure 7: Blood Stains of Biblical Proportions* highlights a selection of religious beliefs that view menstruation as dirty and unholy. While people today may not follow or believe these myths precisely as written, they persist through texts and doctrines. These unchecked and unconscious beliefs that permeate society uphold the worldview of gender as a system of dominance and women as second-class citizens (Chrisler, 2012).

# Blood Stains of Biblical Proportions

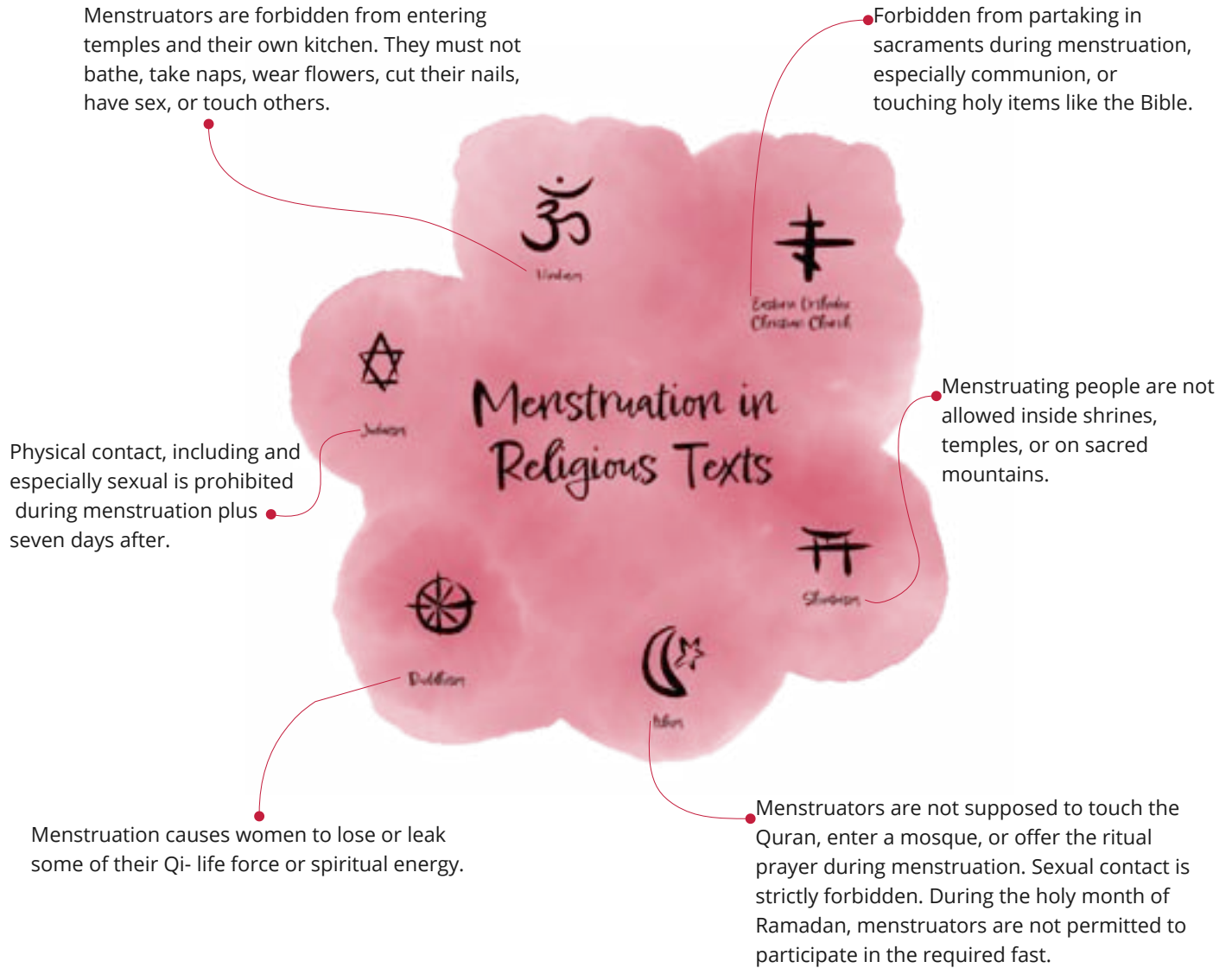


Figure 7: Blood Stains of Biblical Proportions  
 Illustration by Angie Eriko Fleming @  
 Source: *Periods gone public: Taking a stand for menstrual equity*, Jennifer Weiss-Wolf (2017)

## Learning Summary

Using the CLA tool, I learned what is underpinning our systemic knowledge gap on menstrual literacy for PWM. Gender bias and the subordination of PWM (i.e. women, trans, and gender non-binary people) play a significant factor. It prevents investment in research on health issues about PWM at disproportionate rates compared to people who do not menstruate (Mirin, 2021). This lack of prioritization perpetuates unequal adverse health impacts on PWM. Through an intersectional lens that factors in race and class, these disproportionate negative health impacts are experienced at significantly worse rates for people of colour and low socioeconomic status. I learned that when we value people less, it impacts our value of knowing about them. This is referred to as “subjugated knowledge” by French philosopher Michel Foucault (1980). Foucault (1980) describes how knowledge about populations of oppressed people within society, such as women, prostitutes, people of colour, etc., are excluded from the formal domains of knowledge creation which further reinforces the power imbalance and oppressions experienced by these populations.

The view that menstrual blood is dirty and disgusting and needs to be concealed perpetuates the silencing of the topic of body literacy. When people cannot ask questions, curiosity and research are stifled. This further propels the knowledge gap between bodies of PWM compared to bodies of people who do not menstruate.

This CLA enabled me to understand the larger forces underpinning society’s systemic knowledge gap on body literacy. By analyzing the evidence of this knowledge gap through the use of the CLA, I was able to gain a deeper understanding of how entrenched this issue is. This knowledge gap wasn’t created recently or deliberately. It is the unintended consequence of patriarchal worldviews, the lack of representation of PWM in the development of modern healthcare, and the resulting lack of economic investment in research to develop knowledge about PWM.

The following section builds off the CLA framework and the multi-layered approach to understanding this vital knowledge gap. By exploring the litany, worldviews and myths across time, my goal is to understand how we arrive at the current knowledge gap on body literacy.

### *How has history shaped our systemic knowledge gap of body literacy for PWM?*

Our history shapes our present, which shapes our future. Knowing what predates us helps in understanding our systemic knowledge gap on the topic of menstruation. It also helps to show the rise of body literacy knowledge that is advancing globally. Knowledge is provisional. We continually build upon what we know and develop our shared understanding of what it means to be healthy and informed. Included in Donella Meadows’s system wisdom is to “pay attention to what is important, not just what is quantifiable” (2008, p.176 ). She claims how “pretending something doesn’t exist because it’s hard to quantify leads to faulty models” (2008, p.176). The impact of historical events is complicated, if not impossible, to quantify due to the non-linear and emergent characteristics of how systems behave (Meadows, 2008). Even if hard to quantify, historical events have ripples that can stick around for long periods, decades, centuries,

millennia, and beyond. We see time and time again how some ideas aren't introduced at the right time because society is not ready for them yet. For example, the menstrual cup described in the previous section was first introduced in 1937 but did not compete well with the popularity of disposable pads or tampons. It didn't gain popularity until the 2000's with the support of the environmental movement when younger generations of PWM became aware of the waste and environmental impacts of disposable menstrual products and began searching for alternatives.

Technological and societal developments evolve through time and are shaped by cultural values, beliefs, and attitudes. These in turn, shape what and how we know what we know and don't know. Values also influence what topics of interest to invest in for research and knowledge creation.

The following tool I used to build my systemic understanding of body literacy for PWM is a historical timeline. I organized it into five overlapping sections around key eras of transformation toward our collective knowledge of women's bodies and menstrual cycles. A key concept within systems theory is nonlinearity which is the relationships between actions that have disproportionate effects (Meadows, 2008). For the design and mapping of this timeline, I use multiple overlapping waves to convey the shifts in paradigms, worldviews, and litany happening concurrently. I show how dominant systems rise and fall as new systems emerge by layering them together. Each wave is its own unique arc while also building upon the collective knowledge that came before. I reintroduce the use of the CLA in creating this timeline to include relevant worldviews, myths and metaphors. These beliefs hiding below the waves are at the roots of the litany of documented knowledge. To develop my capabilities as a systems thinker, I felt it was essential to keep exploring mental models to design solutions that can influence deep systemic change.

The complete timeline, *Appendix B: Tidal Waves of Menstrual Knowledge*, is included in the as "Accompanying Digital Materials" to enable readers to explore more deeply by zooming on the screen or via large format printing. It helps to communicate how the individual litany are interconnected as a whole. Arrows are used to connect related events to highlight precedents and antecedents. It shows the history of this topic over a span of four millenia. By showing how waves are overlapping in time, I show how the timing of some events fall outside the shape of the wave they belong to and end up encroaching on subsequent waves.

The history of time from 2000 BC to the present day is synthesized into the following five periods (i.e. tidal waves) with approximate date ranges:

- Wave 1: The Golden Age of Menstruation (Ancient Wisdom)
- Wave 2: Putting the "Men" in Menstrual Literacy (2000 BC to 1988 AD)
- Wave 3: Productization of the Period & Miseducation by Marketers (1900 AD - 1980 AD)
- Wave 4: Taking Women's Health into Womxn's Hands (1950 AD - 2015 AD)
- Wave 5: Democratizing Vital Knowledge via the Digital Revolution (2000 AD - Present)

The next section explores key events from each wave. Zooming into each phase of time makes it easier to see the individual elements that contribute to shaping the knowledge of that period, while zooming out to see the whole timeline helps to see the interrelationships, delays, and patterns within the system.

# Wave 1 - The Golden Age of Menstruation

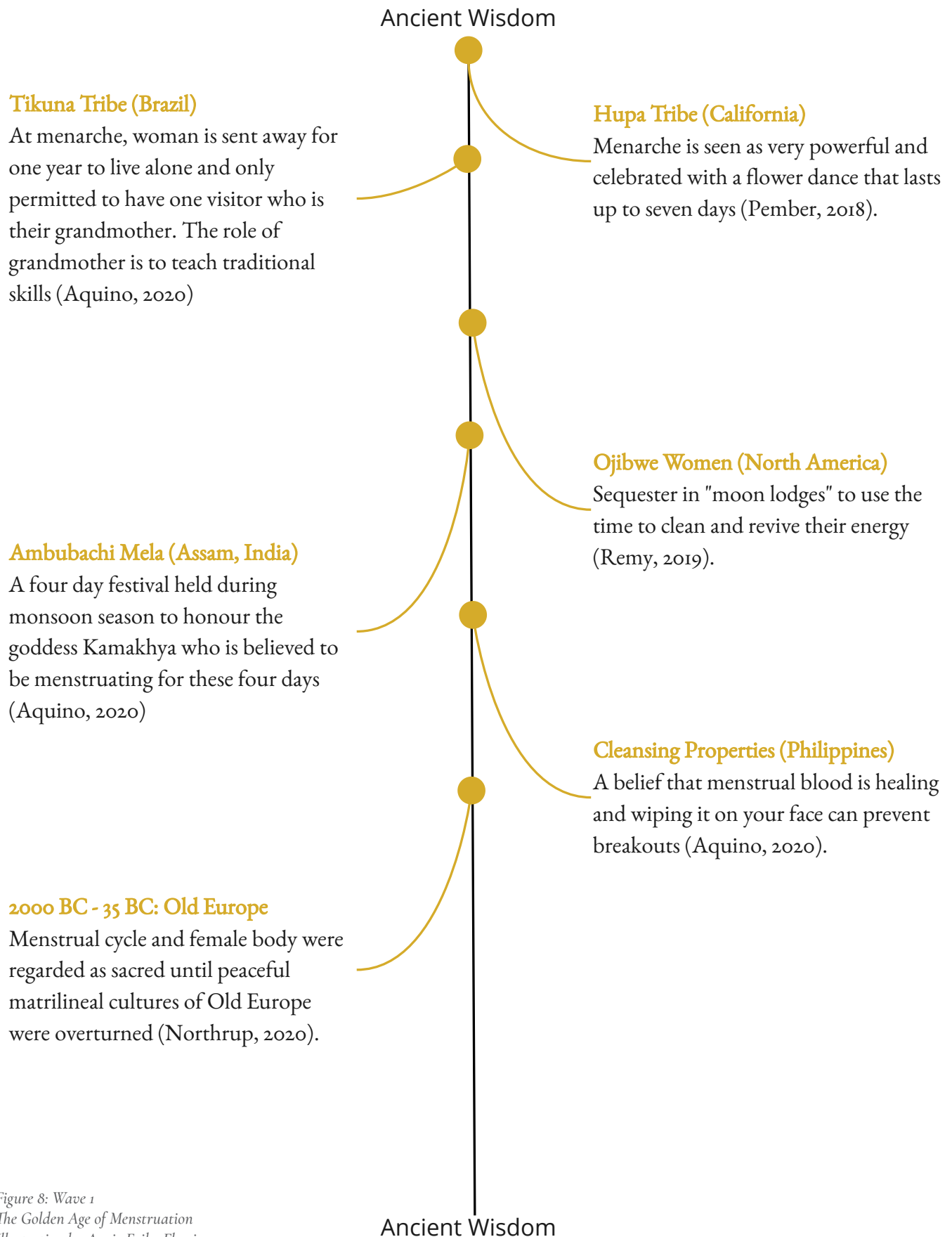


Figure 8: Wave 1  
The Golden Age of Menstruation  
Illustration by Angie Eriko Fleming

## **Wave 1: The Golden Age of Menstruation (Ancient Wisdom)**

*Figure 8: Wave 1- The Golden Age of Menstruation* shows how cultural views and attitudes around the world about menstruation have not always been stigmatized. Many ancient traditions celebrated menarche, which is the first menstrual cycle. Some cultures took time to celebrate the menstrual phase of the cycle, and some cultures valued the properties of menstrual blood. For instance, women's bodies and menstruation were revered in the matrilineal cultures of Old Europe from 2000 BC to 35 BC (Northrup, 2020). In Brazil, the Tikuna Tribe of the Amazon acknowledged a PWM's menarche by sending them away for a year to live alone (Aquino, 2020). During this period, they were only allowed their grandmother to visit to teach them traditional skills (Aquino, 2020). In the Assam region of India, the goddess Kamkhya was believed to be menstruating during the monsoon season, and a four-day festival was held to honour her (Aquino, 2020). The Ojibwe women, whose communities are on the lands colonially known as the American midwest, used the menstrual phase to be isolated in a moon lodge (Remy, 2019). They used this time to clean and revive their energy (Remy, 2019). The Hupa Tribe in the land known as California celebrated menarche with a flower dance that could last up to seven days (Pember, 2018). In the Philippines, menstrual blood was used for its cleansing and regenerative properties (Aquino, 2020). To prevent breakouts, people would wipe it on their face (Aquino, 2020). These examples show ancient wisdom that has struggled to endure through time and how values, worldviews, and myths change, as shown in the next sections.



## Wave 2 - Putting the “Men” in Menstrual Literacy (2000 BC - 1988 AD)

*Figure 9: Wave 2 - Putting the “Men” in Menstrual Literacy (part 1)*, is where we begin to see the rise of the body literacy knowledge gap. The earliest medical records on women’s health date back to 1900 BC in Egypt, where the “aberrant behaviour in women ” was seen as the result of a ‘wandering uterus’ (Stein & Kim, 2009, p.51). Hippocrates, who was alive from 460 BC - 370 BC, regarded as the Father of Modern Medicine, was influential in reinforcing the idea that the uterus wandered around women’s bodies (Stein & Kim, 2009). Following him, in 300 BC, Aristotle concluded that menstrual flow was excess blood that hadn’t yet been made into a fetus and thus considered useless and inert until it encountered semen (Stein & Kim, 2009). Recalling the CLA in the previous section, Aristotle is found to be one of the influencers responsible for perpetuating the idea that the female body is flawed and inferior to the male (Criado-Perez, 2019). In Rome in 77AD, Pliny the Elder wrote a 37-volume encyclopaedia of “Natural History” where he stated that:

*“Contact with the monthly flux of women turns new wine sour, crops touched becomes barren, grafts die, seed in gardens are dried up, the fruit of trees fall off, the edge of steel and the gleam of ivory are dulled, hives of bees die, even bronze and iron are at once seized by rust, and a horrible smell fill the air; to taste it drives dogs mad and infects their bites with an incurable poison” (Pliny the Elder, 77 AD, as cited by Weiss-Wolf, 2017)*

To reinforce his views on women and menstruation, Pliny advised men “that sex with a menstruating woman during a full lunar eclipse was not only a bad idea, but a potentially fatal one.” (p.37, Stein & Kim, 2009). Pliny’s theories were officially unchallenged until 1942, more than a thousand years later (Stein & Kim, 2009).

From 400 AD to 1500 AD, the church ruled society. Women deemed to have hysteria were tried in church courts and frequently prosecuted as witches (Stein & Kim, 2009). At the same time in history, there was a belief that men’s and women’s bodies were interchangeable. The knowledge of the 1600-1800’s in Denmark and the USA was that female reproductive organs were analogous to men’s, just found to be outside-in (Tavris, 1993). This, unfortunately, created the unintended side effect of preventing research on female bodies. When women’s bodies are seen as the same as men’s, a precedent is set to use men’s bodies as the standard across medicine, research and clinical practice (Tavris, 1993). The social psychologist and feminist Carol Tavris explains in her book *The Mismeasure of Women* (1993), how this enables “the male body [to] become the prototype of the human body” (p.121). This belief supports the lack of inclusion of PWM’s bodies in medical research, which feeds the gender bias in medical research that persists today.

# Wave 2 - Putting the 'Men' in Menstrual Literacy (part 1)

## The Slippery Slope of HISTory!

Because "women, on whole, are the same as "we" men.. **the male body in medical research, and clinical practice can be used as the norm.**" The male body becomes the prototype of the human body. This attitude persists today. (Tavris, 1993, p.121)

### 77 AD: Rome

Pliny the Elder write 37 volume encyclopedia "Natural History" where he includes menstruation as "[c]ontact with the monthly flux of women turns new wine sour, crops touched becomes barren, grafts die, seed in gardens are dried up, the fruit of trees fall off, the edge of steel and the glean of ivory are dulled, hives of bees die, even bronze and iron are at once seized by rust, and a horrible smell fill the air; to taste it drives dogs mad and infects their bites with an incurable poison" (Weiss-Wolf, 2017, p.8).

### 1900 BC: Egypt

Earliest record in medical history "theory about aberrant behaviour in women of wondering uterus as root of problems. As a result, Egyptian doctors routinely fed noxious substances to the female patients, hoping to drive the uterus away from the lungs and throat. Alternatively, they placed sweet smelling substances on the vulva, trying to coax it back into place" (Stein & Kim, 2009, p.51).

## Middle Ages

### 1700's

Female genitalia is all lumped together and indistinguishable. The belief was that men's and women's bodies are interchangeable and organs are analogous, just turned outside-in (Tavris, 1993).

### 1600-1800: Denmark & USA

Dutch anatomist, Bodfried Bidloo, creates set of anatomy drawing portraying male and female as the same. Uses genitals, beards, breasts, and hair length to portray sex.

### 300 BC: Greece

Aristotle concluded menstrual flow was excess blood that hadn't yet been made into a fetus. He deemed it useless and inert until it encountered semen. Aristotle believed the female body is flawed and inferior to male.

### 400-1500 AD: Middle Ages

In church led society, women with hysteria were tried in church courts and often prosecuted as witches (Stein & Kim, 2009)

### 460 BC - 370 BC: Greece

Hippocrates (aka "Father of Medicine") believed hysteria (the Greek word for "uterus") wandered around the woman's body.

## Ancient History

Figure 9: Wave 2 (part 1)  
Putting the "Men" in Menstrual Literacy  
Illustration by Angie Eriko Fleming

## Wave 2 - Putting the 'Men' in Menstrual Literacy (part 2)

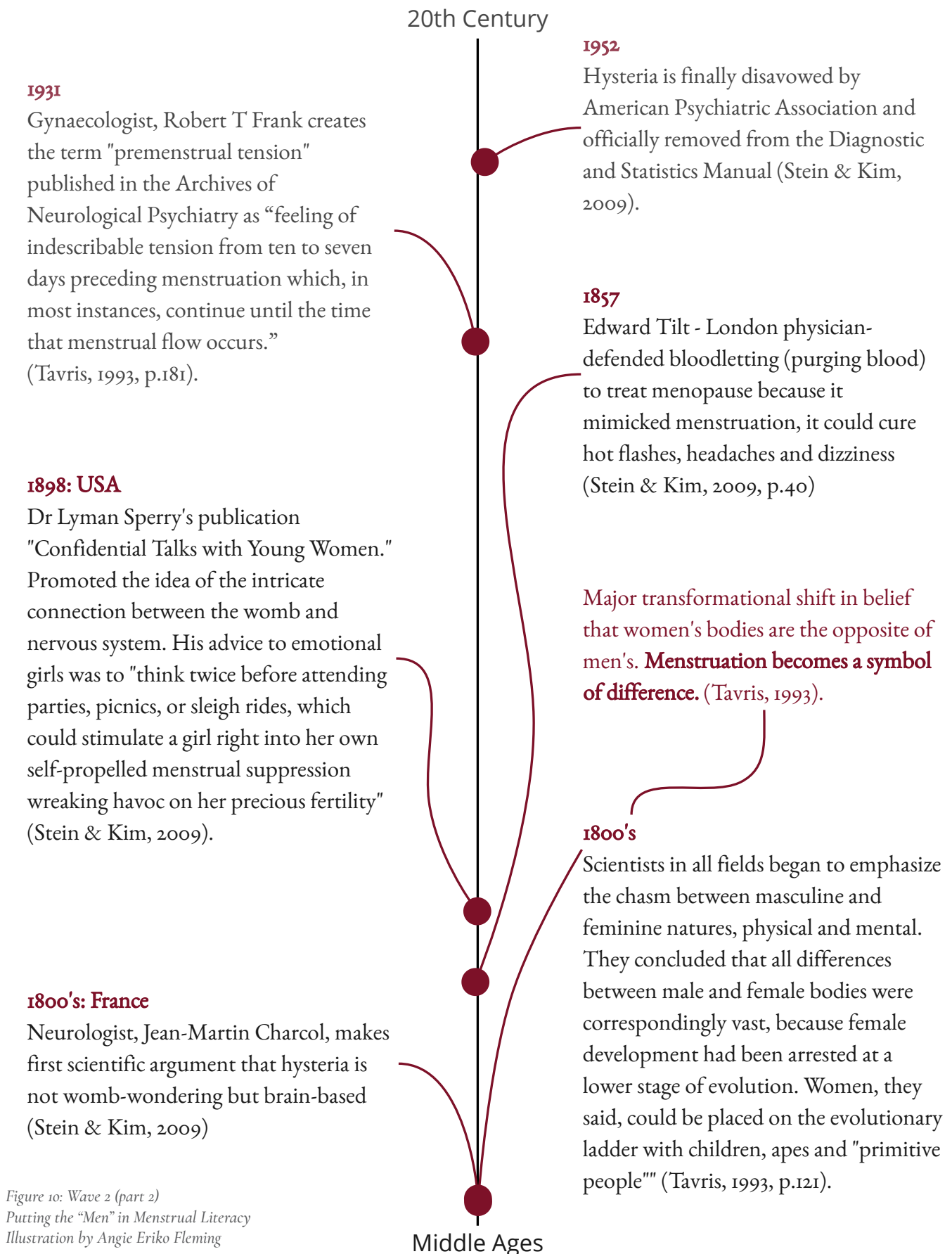


Figure 10: Wave 2 (part 2)  
Putting the "Men" in Menstrual Literacy  
Illustration by Angie Eriko Fleming

*Figure 10: Wave 2 - Putting the "Men" in Menstrual Literacy (part 2)* shifts into the Middle Ages and 20th Century. Tavis (1993) explains how in the 1800's these beliefs began to shift as scientists started to acknowledge and emphasize the difference between female and male bodies. Unfortunately for PWM, such scientists "concluded that differences between male and female bodies were correspondingly vast because female development had been arrested at a lower stage of evolution" (Tavis, 1993, p.121). "Women, they said, could be placed on the evolutionary ladder along with children, apes, and 'primitive people' " (Tavis, 1993, p.121). These false beliefs and misinformation reinforce the ideas dating back to ancient Greek and Roman times and sustain them in modern knowledge. In *Unwell Women: Misdiagnosis and Myth in a Man-made World* (2021), Elinor Cleghorn writes that the medical information from earlier times that were less focused on scientific evidence became mythologized into the knowledge of modern medical science. As I learned through the CLA, once beliefs exist in the myth and metaphor layer, they are more challenging and take more time to change.

Unfortunately, during this period, women's literacy rates were rather low. As a result, there is very little written record from their perspectives on how they viewed their menstrual cycles and what products they used to manage them. The online *Museum of Menstruation* (MUM), [mum.org](http://mum.org), has a post titled "European women and menstruation of the distant past through the early 20th century" that shares articles from university publications and emails from the MUM community which share some of the ways that people dealt with menstruation. One academic shared that before the rise of industrialized menstrual products, PWM either bled freely into their clothes, underwear or bloomers if they had them (Finley, 1999). However, undergarments were not worn by all during this time, especially by people of lower socioeconomic classes (Finley, 1999). There is mention of German women "leaving a trail of blood behind," and the use of cloth rags and the insertion of cotton cloths by Jewish people (Finley, 1999).

This article also mentions how women in this period menstruated far less than they do in modern days for several reasons: they had children earlier, breastfed longer, and died earlier (Finley, 1999). Some women may not have menstruated at all (Finley, 1999). Breastfeeding and childbirth suppress menstruation from occurring. With shorter lifespans and more children, the average number of menstrual cycles experienced during this time compared to today was significantly lower.

## Wave 3 - Productization of the Period

### (Late 19th Century - early 20th Century)

*Figure 11: Wave 3 - Productization of the Period* shows how the industrial era brought many advancements to menstrual hygiene care through the invention and mass production of menstrual management products by companies like Johnson & Johnson, Kotex, and Tampax (Stein & Kim, 2009). Coinciding with this period was the first feminist movement of the late 19th Century and early 20th Century, as women gained the right to vote, own property, have sex without being married, exercise birth control, and not be owned by their husbands and fathers (Leavy & Harris, 2018).

In the United States in the 1920's, companies such as Kotex launched their initial products of bulky pads that required pins and clips to hold them to elastic belts (Stein & Kim, 2009). The 1930's saw the launch of commercial tampons that were initially clunky and not especially absorbent (Stein & Kim, 2009). During this time, these same companies successfully introduced adolescent girls to their products through educational campaigns (Stein & Kim, 2009). This period marks an important shift in the responsibility of delivering menstrual education from schools to product marketers and advertising. "[O]ver time, schools ceded the job of teaching puberty education to product makers, a strange division of labour that still exists today" (Ustral 2000, as cited in Bobel 2019, p.250).

Simultaneously, the focus of menstruation changes toward hygiene and away from reproduction and fertility. This switch further reinforces the menstrual mandate of concealment, shame and secrecy (Bobel, 2019). Beliefs that were introduced by many religious texts and figures such as Pliny the Elder from previous waves are reinforced by menstrual product advertisements. Many ads hide all biological factors of menstruation and redirect consumer attention toward hiding the reality of menstruation. The focus on products came at the expense of body literacy because they explicitly promoted convenience and discretion while implicitly conveying the shame of being caught without them. The attention of consumers is strategically shifted from learning about what is happening to one's body to how to hide it and act like it's not happening at all.

The combination of shame mixed with the education gap left behind by product marketers creates a population of people who aren't proactively educated about menstruation in a systemic way. This limits the capacity and openness required to normalize and discuss menstruation among PWM and their communities.

# Wave 3 - Productization of the Period

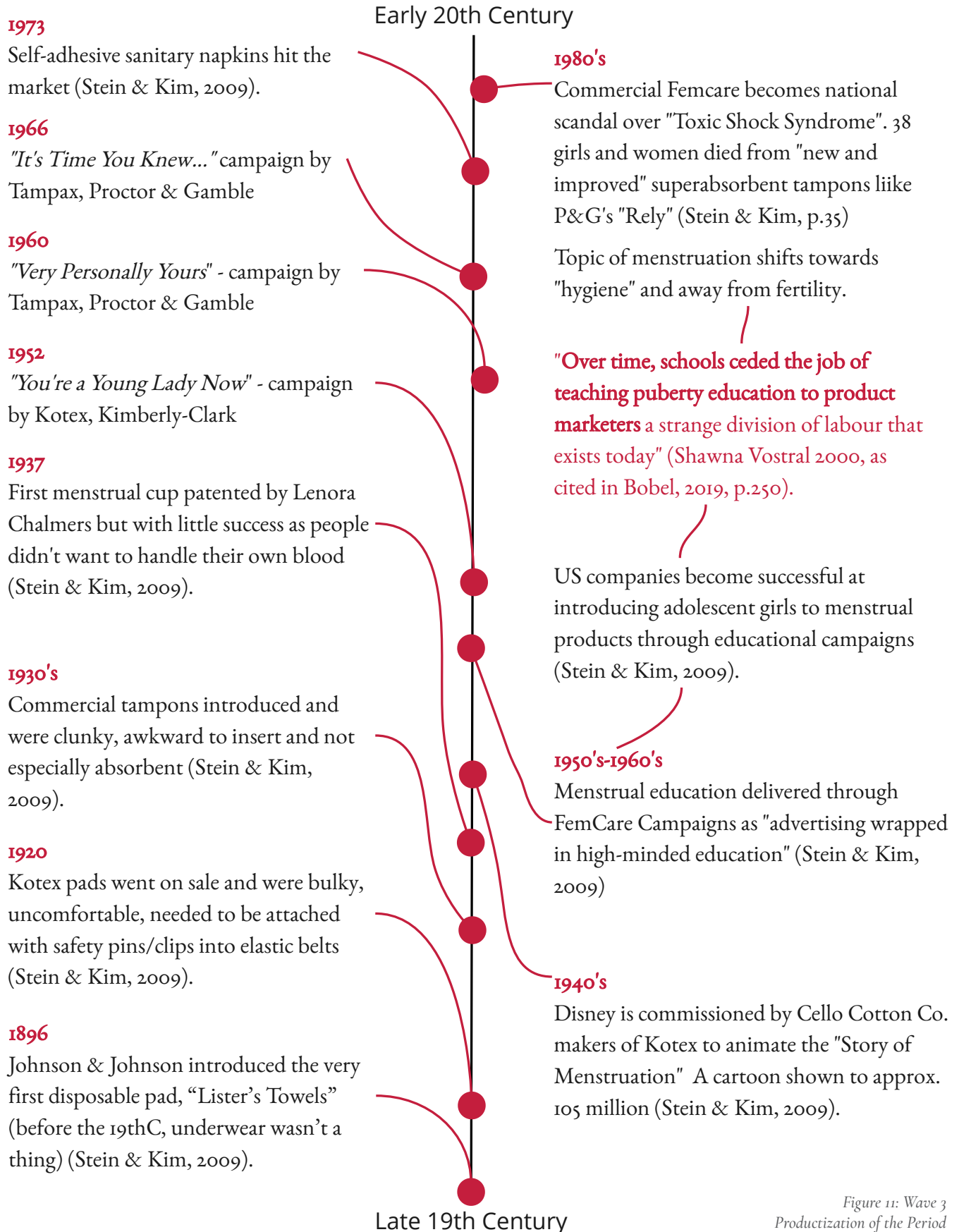


Figure 11: Wave 3  
Productization of the Period  
Illustration by Angie Eriko Fleming

## Wave 4 - Taking Women's Health into Women's Hands (1950's~2000's)

*Figure 12: Wave 4- Taking Women's Health into Women's Hands* depicts a period of women's liberation through self-empowered health care. As previously mentioned in the CLA, Simone de Beauvoir's book *The Second Sex* is often regarded as a catalyst to the second-wave feminist movement ("The Second Sex", n.d.). Another critical piece of literature that is considered to play a significant role in sparking the second wave was Betty Friedan's best-selling book, *The Feminine Mystique*, published in 1963. With birth control pills becoming available and the legalization of abortion in all fifty states as the outcome of *Roe vs Wade*, the second wave of feminism put into motion the right to education, work, and equal pay (Leavy & Harris, 2018). This time period challenged women's traditional representations and roles (Leavy & Harris, 2018) and shifted the mental models around who is the authority of one's body.

From a menstrual knowledge and literacy perspective, the responsibility and agency of knowing one's own body starts to shift away from institutionalized medical systems and towards the PWM. During the second wave of feminism, a movement began where PWM began to take their health and knowledge about their health into their own hands. This is facilitated by spreading education that enables PWM to learn how to listen to their bodies. Since this period took place before the technological developments of the digital age, the dominant sources of information were spread in analog ways such as books, pamphlets, magazines, and word of mouth, many produced by grassroots women's health organizations.

During the 1970's, movements in do-it-yourself (DIY) gynecology were established giving rise to women's health collectives and women's circles. A popular activity in these circles was learning how to perform self-exams. This is when PWM would gather, and with a personal mirror they became familiar with their anatomy - their cervixes, vaginas, vulvas, etc. The environment of being among friends and PWM created a sense of camaraderie and safety compared to the intimidation often experienced in the doctor's office. A hugely successful and popular body literacy resource launched in 1970 was *Women and their Bodies*, published by the Boston Women's Health Collective for \$0.75 a copy ("Our Story", n.d.). In 1971, this resource book was renamed *Our Bodies, Ourselves (OBOS)* and the price was lowered to \$0.45 and then to \$0.30 as each print run was sold-out ("Our Story", n.d.). This major female health reference book has been revised into its ninth edition and translated into over 30 languages selling millions of copies worldwide ("Our Story", n.d.). As per their website, the OBOS has played a major role in educating women about their bodies and has introduced many key ideas into the public discourse of women's health that promoted them to become their own health experts.

In addition to OBOS, there are many other female-centered health resources published by female health practitioners during the 1990's that were highly influential in promoting women to take their health into their hands to build body and menstrual literacy. In 1986, Toni Weschler, with a master's in public health, founded the Fertility Awareness Counseling and Training Services (FACTS). In 1995, she published the first edition of the national bestseller, *Taking Charge of Your Fertility (TCOYF): the Definitive Guide to Natural Birth Control, Pregnancy Achievement and Reproductive Health*. TCOYF is an in-depth and instructive guide with clear visuals that teaches the physiological biomarkers that indicate

# Wave 4 - Taking Women's Health into Women's Hands

**1987**

The Justisse Method of fertility awareness is first developed to address the need for fertility awareness education to support menstruators to build body literacy to manage their sexual and reproductive health while respecting individual right and decisions

**1986**

National Institute of Health policy established to include women in health research (Tavris, 1993)

**1955: Quebec**

Serena was founded to teach Natural Family Planning (NFP) to couples in a way that promoted Catholic values

Being successfully taught in over 100 countries with prolonged clinical studies to back up the scientific validity  
"Over fifty years of scientific research and hormonal studies have confirmed cervical mucus is the most reliable signal of fertility" ("About Billings Life", n.d.)

**1953: Australia**

Natural Family Planning (NFP) Billings Center is established to teach Fertility Management by recognizing that cervical mucus is a fertility marker that women can be trained to recognize.

**1949**

"Second Sex" is published by French Existential Philosopher, Simone de Beauvoir. Regarded as a catalyst to the second wave feminist movement.

2000's

**2015**

Release of 20th Anniversary Edition of TCYOF

**1995**

First publication of "Taking Charge of Your Fertility: the Definitive guide to natural birth control, pregnancy achievement and reproductive health" by Toni Weshler, MPH

**1970's**

Women's health collectives spring up promoting DIY Gynaecology, women's circles, self exams

**1970**

"Women and their Bodies" (OBOS) 1st edition) Published by Boston Women's Health Collective for \$0.75 per copy. OBOS sells millions of copies worldwide, is revised 9 times and translated into over 30 languages and adapted to local cultural contexts.

**1963**

Betty Friedan's best-selling book "The Feminine Mystique" hits bookshelves putting a voice to the 'problem with no name', raising awareness of the realities of unhappy housewives across suburban America

**1960's**

Birth control pills "The Pill" become available

1950's

Figure 12: Wave 4- Taking Women's Health into Women's Hands  
Illustration by Angie Eriko Fleming



times of fertility and infertility throughout one's cycle. It teaches people how to chart their cycles and understand the trends and patterns related to their unique personal circumstances. It puts body literacy knowledge into the hands of the menstruator to gain agency through self-awareness. By learning how to read their menstrual cycle as a vital sign, PWM gain the capacity to navigate their health throughout their menstruating lives (Weschler, 2015). For a list of other pioneering books that played a role in promoting body literacy, see *Appendix C: Body Literacy Resources*.

Through the 1950's-1980's, organizations sprang up dedicated to educating couples on methods of natural family planning (NFP). NFP is a form of body literacy that teaches people to understand the biomarkers of fertility to use this information for preventing or promoting pregnancy (Yewchuk, 2006). The NFP Billings Center was established in 1953 in Australia. Serena was founded in 1955 in Quebec. The Couple to Couple League was established in the USA in 1971. All approach NFP from a religious orientation. As a non-religious alternative, Justisse Healthworks for Women (which later became known as Justisse College International) was founded in 1987 in Canada. Justisse's mission is to serve "an expressed need for fertility awareness education that would support the provision of information and guidance necessary to manage sexual and reproductive health, while respecting individual rights and decisions" ("About Justisse", n.d., para. 2). The benefits of developing body literacy through NFP methods extend beyond family planning to understand one's menstrual cycle as a fifth vital sign for many health-impacting choices, inclusive of reproduction and fertility. Building these skills through the training offered by these organizations increases people's self-awareness of their bodies to make more holistically informed health choices (Yewchuk, 2006). However, because most of these organizations are positioned to support religious values and fertility goals, they do not have broad appeal or reach mass audiences. This is especially true when compared to the reach of conventional menstrual hygiene products through advertising, in-store product placement, and cultural media. As a result, most PWM are unaware that this knowledge exists.

While no doubt many more health organizations and resources were developed during this period, these resources have been cited as playing a role in creating the next paradigmatic wave. By having vital knowledge to build body literacy accessible to PWM, progress is being made towards more people learning how to use their menstrual cycle as a fifth vital sign. I'll show how this third wave creates momentum and the foundation for the subsequent fourth wave in the next section.

## **Wave 5: Democratizing Vital Knowledge via the Digital Revolution (Third wave feminism: early 2000's ~ present)**

The current wave of the feminist movement is shown on *Figure 13: Wave 5- Democratizing Vital Knowledge via the Digital Revolution*. It is also referred to as "post-feminism" and is considered to have started in the early 2000's (Leavy & Harris, 2018). This wave addresses the perceptions that feminism is either over or no longer relevant to the younger generations and celebrates sexuality in more expansive forms (Leavy & Harris, 2018). This current period continues to challenge the limitations of the social construct of gender as binary and promotes the adoption of a more nuanced, non-limiting spectrum of viewing gender. In this wave, we have seen a rise of menstrual products marketed in more diverse and inclusive ways, thanks to progressive companies like Aisle and Thinx recognizing that not all people who menstruate are female. They create products and use language that expands the cultural perceptions of what it means to be a person who experiences a

menstrual cycle.

This current wave of feminism coincides with the rise of the fourth industrial revolution. This period is marked by the digital age and is powered by the internet and global collaboration. According to Klaus Schwab, Founder and Executive Chairman of the World Economic Forum, we have entered into a “technological revolution that will fundamentally alter the way we live, work, and relate to one another. In its scale, scope, and complexity, the transformation will be unlike anything humankind has experienced before. We do not yet know just how it will unfold, but one thing is clear: the response to it must be integrated and comprehensive, involving all stakeholders of the global polity, from the public and private sectors to academia and civil society” (2016).

With these societal advancements gaining momentum, the fifth wave of this timeline focuses on events that highlight the developments of new knowledge, concepts and language that promote body literacy, inclusive of introducing the term “body literacy.” This wave also includes the launch of body literacy promoting digital platforms compared to the analog resources in the previous wave. These digital innovations are shifting how we relate to one another and how we relate to our bodies through access to real-time feedback about our key biomarkers and how they are trending over time. As digital devices grow in adoption by PWM, they enable innovative research through the big data collected at scale. This wave is just beginning and hasn’t reached its crest yet. With the rise of new language, new platforms, and the socially connected world, we’re witnessing the advancement of a new tidal wave that reflects themes from wave one, when the menstrual cycle was celebrated.

As previously mentioned, the term “body literacy” was coined in India and North America independently in 2000 and 2005, respectively. The earliest recorded instance of the term “body literacy” was in 2000 by Tathapi, an Indian women’s health resource organization that began using and developing this concept as a “medium to scientifically explain the processes of the body, its parts and functions to men, women and children of different age groups” (“Body Literacy,” n.d.). The Tathapi programs recognize the systemic relations between gender and power being played out through the body. They have therefore integrated these components into their programming in service of their mission to promote innovation in women’s health in a way that emphasizes “women’s empowerment and substantive equality for all” (“Women and Health,” n.d.). In North America, in June 2005, Laura Wershler, the Executive Director for Planned Parenthood Alberta, introduced the term “body literacy,” defining it as follows (Wershler, 2012.):

1. Learning to read and understand the language of the body.
2. Learning to observe, chart, and interpret an ovulatory menstrual cycle

In 2004, the “Menstrual Cycle is a Vital Sign” forum convened at the NY Academy of Sciences to boost awareness that the “menstrual cycle is a window into the general health and well being of women, and not just a reproductive event.... (that) can indicate the status of bone health, heart disease, and ovarian failure, as well as long term fertility” (Taylor, 2004). “Therefore, if a woman is not having her period, it is the first sign that something else could be going on” (Taylor, 2004). This acknowledgement demonstrates a significant shift in society’s view of the menstrual cycle. However, changes to institutional

# Wave 5 - Democratizing Vital Knowledge via the Digital Revolution

**2019**

Global Menstrual Health Collective is established in Geneva to amplify efforts of menstrual health movement (including education) to address the lack of sufficient and evidence-based investment.

Society for Menstrual Cycle Research (SMCR) pushing for recognition that menstrual cycle is a vital sign for anyone with a uterus (Laird, 2019).

Paula Hillard, MD, Professor of Obstetrics and Gynaecology and Pediatrics at University of Cincinnati College of Medicine stated: "The menstrual cycle is a window into the general health and well-being of women, not just a reproductive event (Laird, 2019, p.56).

**2004: New York**

Advocates for sexual and reproductive health held a conference "The Menstrual Cycle as a Vital Sign"

**2000's**

"Body literacy" is coined by Tathapi - an Indian Women's health Resource organization

Present

**2017**

The Body Literacy Collective is established to serve the fertility awareness community and launch the Read Your Body app. Designed through collaboration with fertility awareness educators and charters from around the world.

**2016**

Menstrual Health Hub is registered in Berlin, Germany as a global community working across the non-profit-enterprise world to collectively impact women's health through research and innovation

**2015**

"The Year of the Period" (NPR)  
"The Year the Period went Public" (Cosmopolitan)  
#PeriodsAreNotAnInsult

Raising awareness of menstrual justice through public policies and campaigns to address period poverty, and tampon tax

**2015**

American College of Obstetricians & Gynaecologists (ACOG) issued a statement that menstrual cycle should be considered a vital sign in adolescents.

**2005**

"Body literacy" being able to read and understand the signs of your menstrual cycle is coined by Laura Wershler

2000's

Figure 13: Wave 5  
Democratizing Vital Knowledge via the Digital Revolution  
Illustration by Angie Eriko Fleming

knowledge take time to be adopted into practice. It wasn't until over ten years later, in 2015, that the American College of Obstetricians and Gynaecologists (ACOG) issued a statement within its network of practising Obstetricians and Gynaecologists to use the menstrual cycle as a vital sign for treating girls and adolescents.

The year 2015 was a breakthrough year for menstruation. It was declared the "Year of the Period" by National Public Radio and the year that "periods went public" by Cosmopolitan Magazine (Laird, 2019). During this progressive year for periods, we saw high profile celebrities like Canadian poet and artist Rupi Kaur and artist and musician Kiran Ghandi use their social media platforms and profiles to normalize menstrual blood (Laird, 2019). On Instagram, Kaur shared her blood-stained sheets, and Ghandi freely bled through her tights during the London Marathon (Laird, 2019).

In 2016, the word "Femtech" was coined by Ida Tin, founder of the number one period tracking app, Clue ("About Clue," n.d.). According to the Clue website, it means a "group of technologies that are designed to support and advance women's healthcare" ("About Clue," n.d.). The drive to put language on this category of female health solutions is to intentionally pave a path forward for collaboration via conferences, investment via venture capital, and "create even more products within this segment that are important and needed in the world" ("About Clue," n.d.).

The holistic, body-positive and feminist language combined with the developments of globally connected digital platforms demonstrates how the fourth industrial revolution has the potential to transform the relationships of PWM with their bodies through data, research, and education. Through digital collaboration between PWM and innovators, body literacy knowledge has the potential to become even more personalized and relevant to PWM's unique situational goals and needs. The essential components are internet access and the willingness of the PWM to track their menstrual cycle metrics regularly. Furthermore, as the FemTech space evolves, we're seeing the rise of technological solutions such as digital apps and healthcare measurement devices that enable PWM to become body literate through more convenient ways to track one's vital signs on their smartphones. These innovations will be explored in the following section, Educate.

# Learning Summary

Creating this timeline highlights many contrasts and paradoxes that concurrently exist on the topic of body literacy for PWM. It shows how our societal knowledge gap is evolving; it is both closing and expanding at the same time. While many world religions played a role in stigmatizing menstruation, some ancient traditions also viewed menstruation as sacred. While PWM have not been proportionately included or represented in the development of medical knowledge, there are innovators in the FemTech space collaborating with researchers and healthcare practitioners to address this knowledge gap.

I also learned that timing is critical. Progress is stunted if society's culture isn't ready for innovation. The emergence of new systems cannot be overly controlled – the unplanned confluence of multiple systems (e.g. technology, economics, culture) often creates the conditions for the new systems to arise.

I believe this historical timeline shows that parts of society are now ready for a transformation. The rise of body literacy education, first through in-person and analog resources and more recently through technological innovations, highlights the vast potential to make this information more widely accessible. While people who don't have this knowledge gap are the minority, this investigation enabled me to identify people and organizations who no longer have this knowledge gap and are actively working to close it. The following section, Educate, is where I begin to shift focus from understanding the problem, to identifying innovators and their solutions.

## *Reflections of a PWM:*

*This exercise of creating a historical timeline helped me reconcile with my menstrual ignorance by allowing me to zoom out to gain a broad perspective across a long arc of time. The waves of progress and subsequent knowledge that came before my time have allowed me to realize how this is not solely an individual problem but a collective knowledge gap that runs deep and long. It made me realize how investments and committed efforts across multiple systems are needed to progress towards a sustainable transformation, and it will take time. However, seeing the progress in the present day and how it mirrors the ancient wisdom of days when menstruation was celebrated gave me hope that change is possible.*

*While far from exhaustive and complete, this exercise has also enabled me to recognize and appreciate all the thought leaders who predate me. All the determined efforts that had to be taken to research a topic that wasn't receiving much prioritization, funding or support. The fact that these courageous thought leaders did it anyway brings us to a more fortunate present day where we have access to body literacy resources because of their efforts.*



3.

Educate



*Who is teaching body literacy?  
How are they spreading it?*



## Uncovering those who don't have this knowledge gap

In the Educate stage, I move inwards from the societal perspective toward the community to understand the landscape of people and organizations who play a role in developing body literacy for PWM. Despite all the previously explored barriers that prevent society from having access to body literacy, there is a growing global community of stakeholders who do not have this body literacy knowledge gap. Moreover, they are actively committed to expanding and spreading this knowledge. These stakeholders exist across multiple disciplines as researchers, body literacy educators, body literacy content creators, and FemTech entrepreneurs. These stakeholder groups operate at varying scales. There are independent actors, membership organizations, and collective bodies bringing multiple organizations together. This next stage of my research aims to transition from the problem space towards the solutions space, by becoming familiar with what is currently happening to address this body literacy education challenge.

I start this stage by summarizing the essential lessons I learned through my body literacy education journey as I developed my capabilities as a systems thinker. I intend to make it easier for people reading this to establish the foundation for their body literacy awareness and systems thinking. I also share these lessons to introduce critical terms and concepts relevant throughout the following stages of the research journey. Grounded in my personal body literacy development journey, I then map out some of the key actors tackling this body literacy knowledge gap to help understand the landscape of body literacy education. The lessons learned are then summarized to highlight potential opportunity spaces for systems transformation, which provide the foundation for exploration in the Act stage (section four).

The research questions I explore in the Educate section are the following:

- *What are the key lessons that are critical for developing one's body literacy as a systems thinker?*
- *Who are the key actors in the system of body literacy education who are addressing this knowledge gap? And, what resources have they produced to develop body literacy ?*

*What are the key lessons that are critical for developing one's body literacy as a systems thinker?*

Through my research and personal body literacy education journey, I've learned the fundamentals of body literacy that I believe everyone should know to live more informed and healthy lives. While I discovered how many books, tools and resources exist to help someone develop their body literacy, I also learned how nuanced and diverse each PWM's body is. Therefore, it is highly recommended to work with a certified body literacy educator to develop a personalized understanding to address one's specific health circumstances, history, goals, and needs. Currently, educators certified in this body of knowledge are within the Fertility Awareness Method (FAM) domain known as Fertility Awareness-Based Method (FABM) educators.

I've distilled a selection of scientifically proven vital lessons that I feel are essential to share. In addition to synthesizing key body literacy concepts from my research, I used pictures and diagrams to help me see my system and think about my body in a holistic and interconnected way. I also dissect my system into parts and reconnect them in new ways to understand the interconnectedness between elements and their holistic functioning. Through doing this, I learned how magnificent the human body truly is as a highly collaborative, resilient, and health-promoting system of systems. The following section summarizes nine vital lessons I learned through my research, which helped me develop the foundation of becoming more body literate as a systems thinker. These lessons were synthesized from my reading, charting, and working with a FAM certified educator. I had them reviewed and revised with a certified FAM educator and Director of Justisse College International to ensure their accuracy before sharing them with you.

### **Vital Lesson 1: Recognize we don't know what we don't know, and we have a lot to learn**

When learning something new, especially if one thought they already knew enough or understood the topic at hand, it is essential to practice intellectual humility. The journey of developing body literacy will likely require one to unlearn and relearn how our menstrual cycle works as a vital sign. Body literacy is based on a holistic paradigm, while Western medical knowledge is rooted in a reductionist paradigm. Knowing this may not make learning easier but will help one's mind prepare to receive new information in new ways. According to organizational psychologist, Adam Grant, in his book *Think Again: The Power of Knowing What You Don't Know* (2021), "the curse of knowledge is that it closes our minds to what we don't know" (p.32). Therefore, the foundational step to developing our body literacy is to first recognize there is new information that requires us to think in new ways. The challenge is to actively try to keep our minds open to challenging what we were originally taught, whether those lessons were explicitly or implicitly received.

### **Vital Lesson 2: To reclaim our bodies, we must reframe our minds**

To develop our body literacy as holistic systems thinkers, we need to shift our mindset from fragmented to holistic. To have been socialized in a patriarchal, industrialized and mechanized society, it is highly likely to have unconsciously adopted beliefs and mental models that treat our bodies as many isolated parts. These beliefs are reinforced through our culture's Western allopathic healthcare systems, which are built on a mental model that divides health from disease (Tsuei, 1978). In contrast, Eastern medicine cultures view health as a state of balance, and disease as imbalance (Tsuei, 1978). Western medicine is often good at treating illness with medication and surgery; however, it does so through a paradigm of reductionism. As a result, conventional healthcare practices often fail to acknowledge the whole system.

In reframing our minds in systems thinking, we must realize that our endocrine, digestive, and reproductive systems are inevitably interconnected and impacted by our diet, lifestyle, environment, and spirituality (Northrup, 2020; Vitti, 2014). With this perspective, we can learn the causal relationships between our menstrual cycle, fertility, and sex drive and how the endocrine, digestive, and menstrual systems promote desirable, or undesirable, health outcomes (Vitti, 2014).

### **Vital Lesson 3: Reframe our view of Fertility as Health, and Health as Fertility**

One of the first critical lessons I learned from the FABM certified educator Vienna Farlow, who brands herself as “the Cuntsultant”, is to consider our fertility and health as one and the same. Since our bodies are biologically designed to reproduce during our reproductive ages, any signal that identifies either our fertility or lack of fertility can be used as an indicator to our overall health (Ehling & Singer, 1999). This concept remains foreign if we relate to our bodies in a fragmented nature. As we begin to learn how our parts are interconnected as a whole, we become able to see that the concept of fertility goes beyond our desires and objectives of whether we want to reproduce or not. This reframe expands our view of the menstrual cycle into a vital sign that enables us to live more holistically healthy lives proactively.

Another element of this reframe is changing how one views their bodies and the secretions they make when they are operating in a healthy and fertile manner. Suppose one can begin to see their cervixes, vulvas, ovaries, etc. as beautiful, functioning, and healthy. In that case, they can start to remove the shame that has been inherited by culture throughout history. This also requires a reframing so that one views their menstrual blood and cervical mucus as health-promoting instead of dirty and shameful—the way ancient traditions did, as seen in wave one of the timeline (p.46).

### **Vital Lesson 4: We need to know the key actors in our bodies, their roles, and how they are interrelated**

Body literacy requires us to be able to accurately identify each of the parts of our bodies that play a role in our holistic health and reproductive systems. As Amanda Laird points out in *Heavy Flow* (2019), if someone mislabels their vagina for their vulva when asking a healthcare practitioner for help, it can significantly impact their ability to investigate, diagnose and get proper treatment.

To develop one’s body literacy, one needs to be confident they know their anatomy and the functions each part plays. Can you identify the following in the diagram, *Figure 14: Reproductive Anatomy of a Person who Menstruates*?

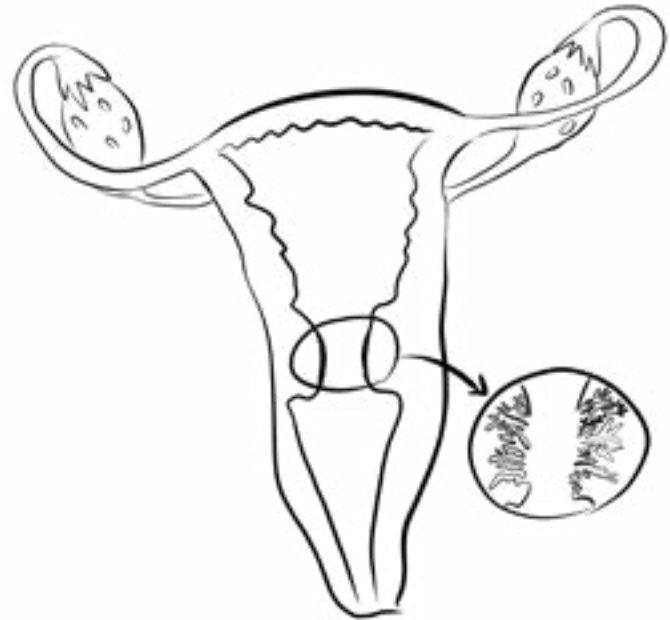
- Ovaries
- Uterus
- Cervix
- Cervical Crypts - have you ever heard of these?
- Vagina
- Fimbriae
- Oviducts (aka “fallopian tubes”)

## Reproductive Anatomy of a Person who Menstruates

Figure 14: Reproductive Anatomy of a Person who Menstruates

Most anatomy drawings of internal genitalia inaccurately suggest that the ovarian ducts, ovaries and fimbriae are situated on either side of the uterus, side by side. In reality, as shown in this image, the ovarian ducts curve behind the uterus, and the organs are compactly tucked towards each other.

Illustration by Angie Eriko Fleming ©



To help learn the key actors that play a role in the menstrual cycle as a vital sign, I created “Ovunculus” (seen in *Figure 16: Ovunculus*) to exaggerate and bring focus to the parts of a menstruator’s body and their relative importance to a healthy, fertile, fifth vital sign. This drawing was inspired by Homunculus Man, seen in *Figure 15: Humunculus Man* below. Homunculus is a representation of a human male whose body parts are distorted to show the relative area in the cerebral cortex devoted to each part (“Homunculus”, 2021).

## Homunculus Man



Figure 15: Homunculus Man

Homunculus’ hands, tongue, lips and ears are exaggerated compared to other body parts to depict how these parts take up significantly higher resources from the cerebral cortex.

Source: “The Original Homunculus Company”

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# Ovunculus

A system of interconnected systems

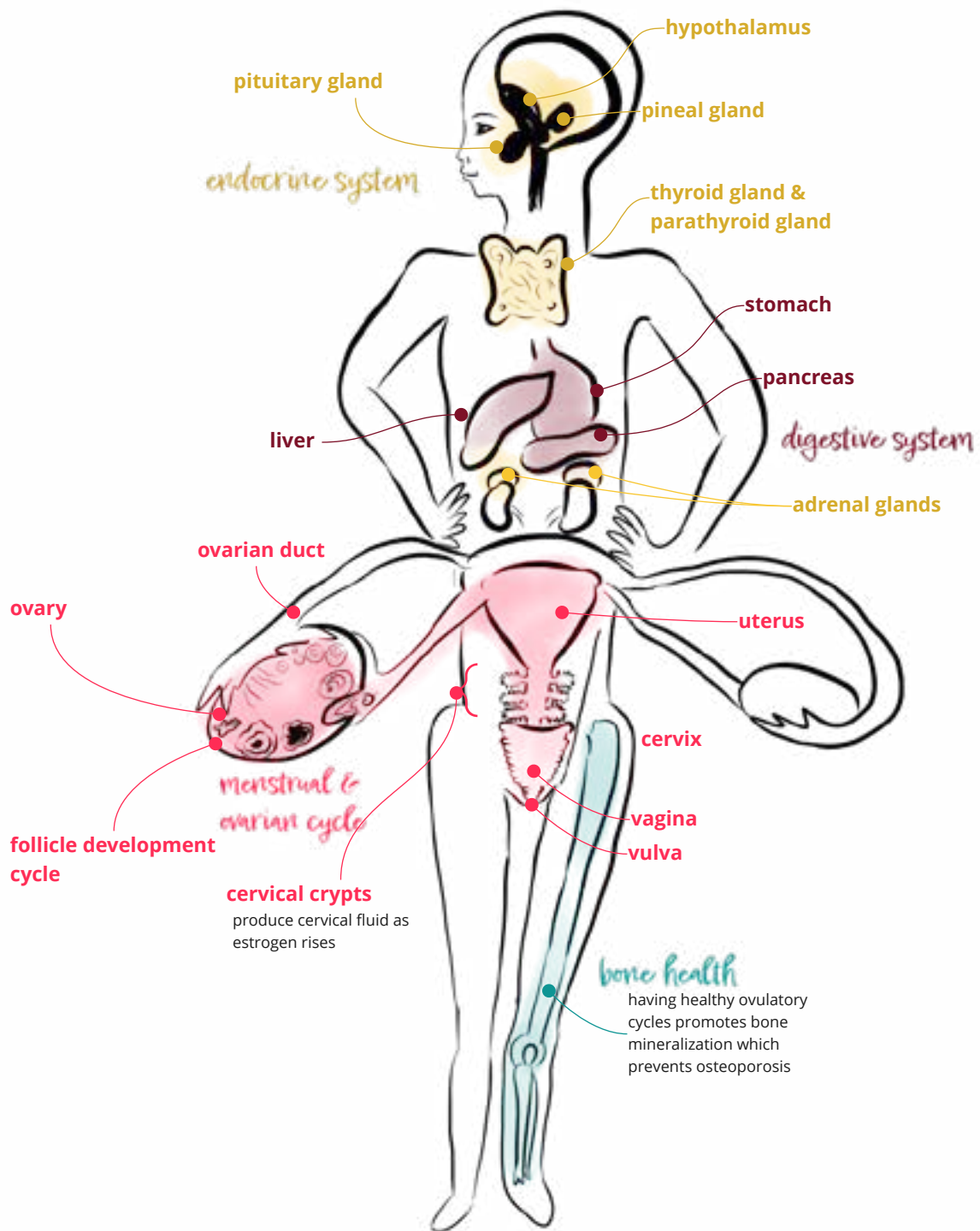


Figure 16: Ovunculus  
Illustration by Angie Fleming ©  
Ovunculus has the menstrual, endocrine, digestive and bone systems exaggerated to show their significant roles in operating as a fifth vital sign.

The goal of drawing Ovunculus was to highlight the relevant systems of the fifth vital sign and understand the various parts, their roles, and causal relationships within the body. While I won't detail every piece, I'll focus on some critical elements of our fifth vital sign, and the areas unknown to me before embarking on this journey to learn how the cycle operates as a system.

#### *The Glands of the endocrine system are the master controllers*

The tiny glands, the hypothalamus, pineal glands, thyroid and parathyroid glands, are blown up as they play a significant role in orchestrating the flow of hormones. The release of hormones triggers critical events such as follicle development, the release of the egg into the uterus, the development of the endometrium lining, and the triggering of the menstrual cycle, among other activities (Laird, 2019).

The adrenal glands are also critical because they are part of the sympathetic autonomic nervous system. This is the system that activates the fight or flight response that promotes survival in times of stress (Vitti, 2014). The parasympathetic nervous system takes care of digestion, immunity and fertility (Hendrickson-Jack, 2019). If the adrenals are over-activated and depleted due to high stress, this suppresses the healthy functioning of the reproductive organs (Vitti, 2014, Hendrickson-Jack, 2019).

#### *The Ovaries that are responsible for Ovulation*

The ovaries, while in reality are the size of an unshelled almond (Laird, 2019) are exceptionally exaggerated as this is where the follicle development occurs during the menstruating years. During each cycle, as the follicles mature, one (or more) egg(s) is released into the uterus for possible fertilization if there is sperm present. After the egg is released, the follicle changes structure to become the corpus luteum which triggers an increase in the hormone progesterone (Hendrickson-Jack, 2019).

#### *The Cervix & Cervical Crypts - a key biomarker that is critical for fertility*

The cervix is the smaller end of the uterus which protrudes into the vagina. It shifts in position throughout the cycle which acts as a biomarker for fertility awareness (Hendrickson-Jack, 2019). The cervical crypts are the tiny fissures and folds within the cervix and are a critical part of one's overall health and fertility. Triggered by rising estrogen levels, they produce cervical mucus that allows sperm to survive until ovulation occurs (Matus, 2009). Without being bathed in cervical mucus upon entry, "sperm are compromised within minutes and die within the hour" (Matus, 2009). Therefore, these cervical crypts play a vital role in the health and fertility of menstruators; their production of cervical fluid is the primary biomarker of fertility. It is the presence of cervical fluid that extends the fertility window surrounding ovulation to last approximately four to six days (Hendrickson-Jack, 2019).

### **Vital Lesson 5: The menstrual cycle has four phases that parallel the four seasons**

The menstrual cycle is made up of four phases- follicular, ovulation, luteal and menstruation (Laird, 2019). These phases are triggered by the orchestration of five key hormones: follicle stimulating hormone, luteinizing hormone, testosterone, estrogen, and progesterone (Hendrickson-Jack, 2019, Laird, 2019). Each of these stages contains

four unique hormonal patterns with different hormonal ratios that “change your brain chemistry week to week throughout the month” (Vitti, 2014, p.157). As a result, our energy shifts throughout our menstrual cycles and our dietary and activity choices can become more effective if we make choices based on each stage of our cycle to work with our natural physiological variations (Northrup, 2020, Vitti, 2014).

Even more interesting is how each of these phases is mirrored by a corresponding season (Laird, 2019, Vitti, 2014). Spring coincides with the follicular phase, when our physical energy rises, along with our desire to be more social; a time for creativity and new beginnings. Summer coincides with ovulation, when we’re outgoing and more interested in community and connection. Fall is the luteal phase when our energy shifts inwards, and we desire to nest. And lastly, winter aligns with menstruation, a time for rest and reflection. By understanding how our endocrine system (i.e. our hormones) relates to our menstrual cycle, we can make informed choices that align with our physiological energy levels. This can help us live in sync with our natural rhythms, instead of adding more stress to the body. When we live out of sync with the cyclic energy caused by our hormonal patterns, we can trigger our adrenal glands to set the body into sympathetic fight or flight mode. This causes downstream health issues that impact digestion, sleep, mental health, etc. Therefore, understanding our body as an integrated system enables us to make more compassionate and holistic health choices.

## **Vital Lesson 6: Cervical mucus is something to be celebrated not shamed**

There are three key biomarkers that indicate the health of our menstrual cycles, and thus the health of our bodies. When one begins to learn about their fifth vital sign they become attuned to their bodies in the subtle ways they change and speak to them on a daily basis throughout their cycles. According to the science of fertility awareness, there are three biomarkers that indicate our level of fertility or infertility throughout our menstrual cycles: 1) cervical mucus, 2) cervical positioning, and 3) basal body temperature (Matus, 2009).

Cervical mucus is the primary biomarker which is produced by the cervical crypts triggered by the rise of estrogen around the time of ovulation to bathe the sperm that enter and keep them alive (Matus, 2009). There are different types and consistencies of cervical mucus that vary in levels of fertility promotion (Matus, 2009). Therefore, the key indicator of one’s fertility is whether cervical mucus is present, and by observing and charting this presence, one develops their body literacy of how to listen to their body and make choices based on observed data on a daily basis (Hendrickson-Jack, 2019).

The second biomarker is the position and texture of the cervix. The cervix opens and closes depending on whether we’re in our infertile phase or fertile phase. It also changes position- shifting towards the vagina as estrogen rises and away and towards the rectum as progesterone rises (Matus, 2009). The texture of the cervix also changes through one’s cycle. It is firm when it’s closed during the infertile phase and is comparable in texture to the tip of one’s nose (Matus, 2009). It becomes soft when it is open and comparable to the texture of one’s lips (Matus, 2009). As a result of these subtle changes, examining one’s cervix throughout one’s cycle acts as an indicator to determine which phase of their cycle they are in (Matus, 2009).

The third biomarker of fertility and health communicated via the menstrual cycle is one's basal body temperature (BBT). BBT is one's resting temperature that is taken in the morning upon waking up (Matus, 2009). For healthy, ovulating cycles, a shift in BBT occurs after ovulation because the release of progesterone increases one's metabolism. As a result the resting temperature sees both a spike and sustained rise during the luteal phase as compared to the follicular phase (Matus, 2009).

When one tracks any or all three biomarkers through cycle charting, using paper or digital tracking apps, they become familiar with their unique patterns and determine whether they are within healthy and normal ranges. When applying this info for fertility awareness, it is important to note that used alone, only cervical fluid is a reliable marker because it helps the PWM know the status of their body in real-time. Cervical position and BBT are secondary indicators that can be used to confirm ovulation has occurred after the fact. This is significant because, as will be seen in the next section, there are many fertility apps on the market that only rely on BBT and are thus unreliable as a form of birth control, posing the risk of unplanned pregnancy.

#### *Reflections of a PWM:*

*Until developing my body literacy through learning fertility awareness, I had no clue that the white discharge was a healthy and normal indicator of my fertility, and how my body was producing it around the time of ovulation to optimize the chances of conception. This completely healthy and natural bodily fluid was something that embarrassed me, and mildly grossed me out. Nowhere had I received any lessons or messaging that this is the expected behaviour of a healthy body!*

### **Vital Lesson 7: Ovulation is the key event of the menstrual cycle as a vital sign**

While culture and society raise us to believe that our “periods” (i.e. the menstrual phase) are the key event each month, this gets challenged when one learns about their menstrual cycle as a vital sign. The key event that identifies if our bodies are operating in a healthy and thus fertile manner is whether one is ovulating. This is when one or more eggs is released from the ovary into the ovarian duct (Hendrickson-Jack, 2019). The menstrual bleed is a reaction to the egg not being fertilized. When this happens, there is a drop in estrogen which triggers the endometrium lining to be released when the body knows that it is not needed to nourish and support the early stages of life (Hendrickson-Jack, 2019).

What's more, if one is on hormonal birth control, they're actually not having a true menstrual bleed because ovulation is suppressed by the daily intake of synthetic hormones (Stein & Kim, 2009). When the user stops taking the synthetic hormones, this triggers the blood to be shed (Stein & Kim, 2009, Hendrickson-Jack, 2019). It takes learning about the menstrual cycle as a systemic series of interrelated activities to begin to appreciate the fact that ovulation is the key factor in our fertility. If one does not ovulate, there is no egg to be fertilized.



## **Vital Lesson #8: We cannot get pregnant every day of the month**

We're only able to conceive around the time of ovulation, not throughout one's cycle. In reality, an egg that is released can only survive for 12-24 hours (Hendrickson-Jack, 2019). As previously mentioned, it is due to the role of cervical mucus that enables sperm to survive for conception for a period of approximately five days each cycle. Therefore, the combined number of days that a person can get pregnant is the day of ovulation plus the five days up to ovulation when cervical fluid is present, totalling approximately six days per cycle. This is because sperm cannot survive in an acidic environment which is the normal state of the vagina, and it is the presence of cervical mucus that alkalinizes the environment for sperm to survive and have a chance at connecting with an egg (Hendrickson-Jack, 2019).

### *Reflections as a PWM:*

*For me, this was mind blowing to realize, when I looked back at the years that I chose hormonal birth control to be protected from pregnancy every day of the month. I didn't realize that there were only four to six days that I needed to focus on being protected, (recognizing this doesn't include being protected from sexually transmitted diseases). I had no idea how few days per cycle I was at risk of getting pregnant and confronting this ignorance hit me hard with regrets. While I appreciated the predictability given by hormonal birth control pills and the IUD, because I was far from ready to conceive a child when I started taking them, the side effects were brutal. Vaginal dryness was a major libido killer, but the worst was the disconnection I began to experience, numbing me and dulling out my creative spirit. I started to notice that I felt disintegrated and disinterested in things that I would typically find interesting, and I just didn't feel connected to my body. I had no idea that I had unintentionally chosen to suffer with these side effects for years, believing I was at risk of getting pregnant all the days of my cycle. Had I known the number of days was significantly less, I wonder if I would have opted out of synthetic contraceptives and avoided the life-draining and sexually painful side effects?*

## **Vital Lesson 9: Dynamic Seasons with Variability**

One of the lessons that needs to be taught when it comes to developing body literacy is to learn if your cycle falls within a healthy and normal range. However, to learn this, one first must unlearn the erroneous lessons that most PWM are taught – that a “normal menstrual cycle is always 28 days long and ovulation always happens on day 14” (Hendrickson-Jack, 2019, p.45). Lisa Hendrickson-Jack references a study conducted by Treloar et al. on the variation of the human menstrual cycles through reproductive life which shows how there are “exactly zero women on planet earth who have 28-day cycles throughout their entire reproductive lives” (Hendrickson-Jack, 2019, p.45).

These inaccurate lessons are difficult to unlearn because they are reinforced by visuals that depict the menstrual cycle which ubiquitously show a 28-day cycle with ovulation on day 14. (All one has to do is Google “menstrual cycle” to see how prevalent this is.) What these lessons and visuals imply is that the cycle is static, fixed and doesn't shift from month to month. Further, by portraying this as the healthy standard, the implicit message is that anything that falls outside of these fixed numbers must be unhealthy and irregular.

In reality, what is considered a healthy and normal range for menstrual cycles not only shifts from cycle to cycle, but also across the lifetime of the menstruator as seen in the

chart below. The normal range for a menstrual cycle varies from 24 to 35 days and each month can vary as ovulation can be delayed by dynamic factors such as stress, illness, and travel (Hendrickson-Jack, 2019). This variation in cycle length is captured in *Figure 16: Variation in menstrual cycle length* below.

	Postmenarche	Middle Life	Premenopause
Average cycle length	32 days	29 days	33 days
Range	29 to 90 days	23 to 38 days	22 to 148 days

*Figure 17: Variation in menstrual cycle length*  
 Source: Lisa Hendrickson-Jack, *Fifth Vital Sign* (2019)

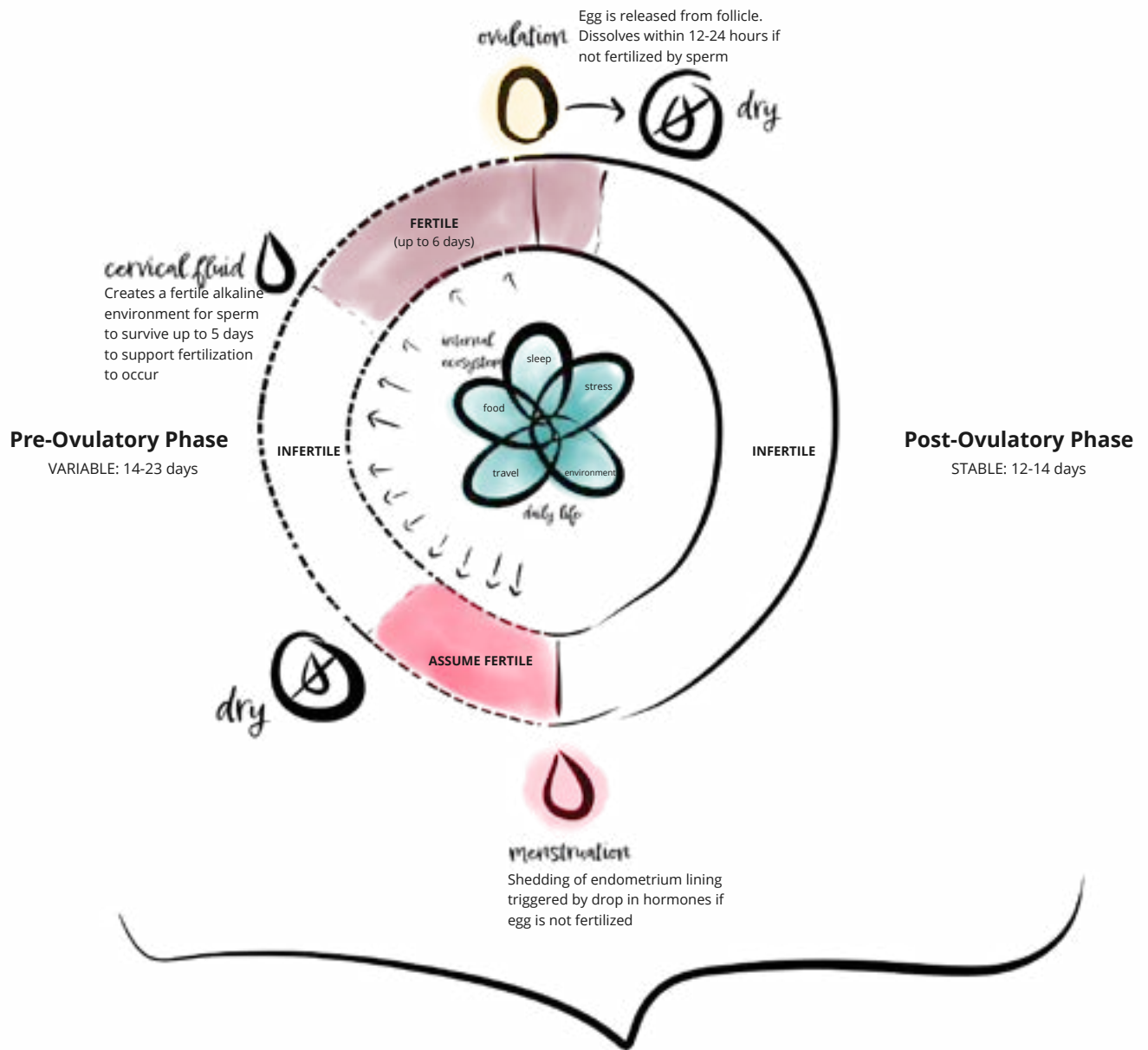
This knowledge gap is reinforced in a recent study in Croatia by Damir Sirovina and Goran Kovacevic. Their article entitled *Importance of appropriate visual presentation for avoiding a misconception of the menstrual cycle* (2019), states that “one of the key generators of misunderstandings about [the menstrual cycle], is the classical 28-day cycle diagram with ovulation shown on the 14th day” (Sirovina & Kovačević, 2018, p.303). Their results confirmed the importance of using visuals in menstrual cycle education, thereby enhancing learning outcomes, such as knowing how to predict when ovulation will occur (Sirovina & Kovačević, 2018).

Inspired by these findings, I created a mock-up menstrual cycle teaching tool, *Figure 18: Healthy Menstrual Cycle Variability*. that factors in the dynamic range of time, the four phases, and layers on the fertility information mentioned in the previous lesson. In the center are the internal ecosystem factors of daily life such as sleep, food, travel, stress, and environment. These dynamic factors can affect the variable pre-ovulatory phase; if the body’s signals indicate it may not be safe for conception, then ovulation is delayed (Hendrickson-Jack, 2019). The post-ovulatory phase is stable, and thus its length is unaffected by daily life factors. While a healthy post-ovulatory range is between 12-14 days, the number stays relatively constant for each PWM. Through this diagram, my goal is to teach this information as an integrated system in a way that is more actionable and practical for developing one’s body literacy.

### *Reflections as a PWM*

*Learning these facts about my vital sign was mind blowing and shattered my belief that I knew my body as well as I previously believed. All these years, these subtle shifts were occurring and maybe to some degree I noticed the signals, but I failed to recognize the cyclic patterns, or take the time to inquire into their significance. I was too embarrassed to ever really mention my discharge, and as a result, I didn’t know or appreciate that it was a signal of health and fertility. While there is a lot more to learn, I hope this summary of vital lessons is valuable and helps others to build their awareness and appreciation of their body in an integrated and empowering way.*

# Healthy Menstrual Cycle Variability



**Healthy\* Menstrual Cycle Range:**  
26-35 days

\*Healthy cycles can vary from 1-8 days and vary most under stress.

Figure 18: Menstrual Cycle Variability  
Illustrated by Angie Fleming ©  
Sources: Matus (2009), Hendrickson-Jack (2019)

This circular visual shows the variable nature of the menstrual cycle and how a healthy cycle ranges between 26-35 days. The dotted lines for the pre-ovulatory phase indicate the dynamic time length that is impacted by one's internal ecosystem.

# Learning Summary

This section of Educate summarized critical lessons for developing body literacy while applying systems thinking. Learning this content was challenging as it confronted my existing mental models. It required me to rethink how I related to my body and enabled me to become more self-aware and self-compassionate. Thinking in systems helped me see my body's interconnectedness as many systems within systems. Developing my body literacy has even enabled me to understand my digestive issues and hormonal imbalances more holistically. I now understand that my choices about what I eat, and when, can affect my cortisol levels (i.e. stress hormones), which may lead to changes in my menstrual cycle. The best part of learning this information has been the self-acceptance I've begun building within my own body and the confidence I feel when speaking to doctors. I have data to bring to appointments to describe what I'm experiencing.

This education was made possible because some people and organizations have recognized body literacy's systemic knowledge gap and are working to close the gap in various ways. There are educational bodies that train and certify qualified practitioners to teach body literacy grounded in science. There are more traditional educators who offer one-to-one and group teaching, books, and charting tools. There are also more modern body literacy educators promoting this knowledge digitally via podcasts, blogs, websites and online content. There are research bodies that are addressing the knowledge gap for PWM. A nascent sector is the FemTech space, where entrepreneurs innovate to make it easier for PWM to access their biomarker metrics through digital apps and wearable technologies.

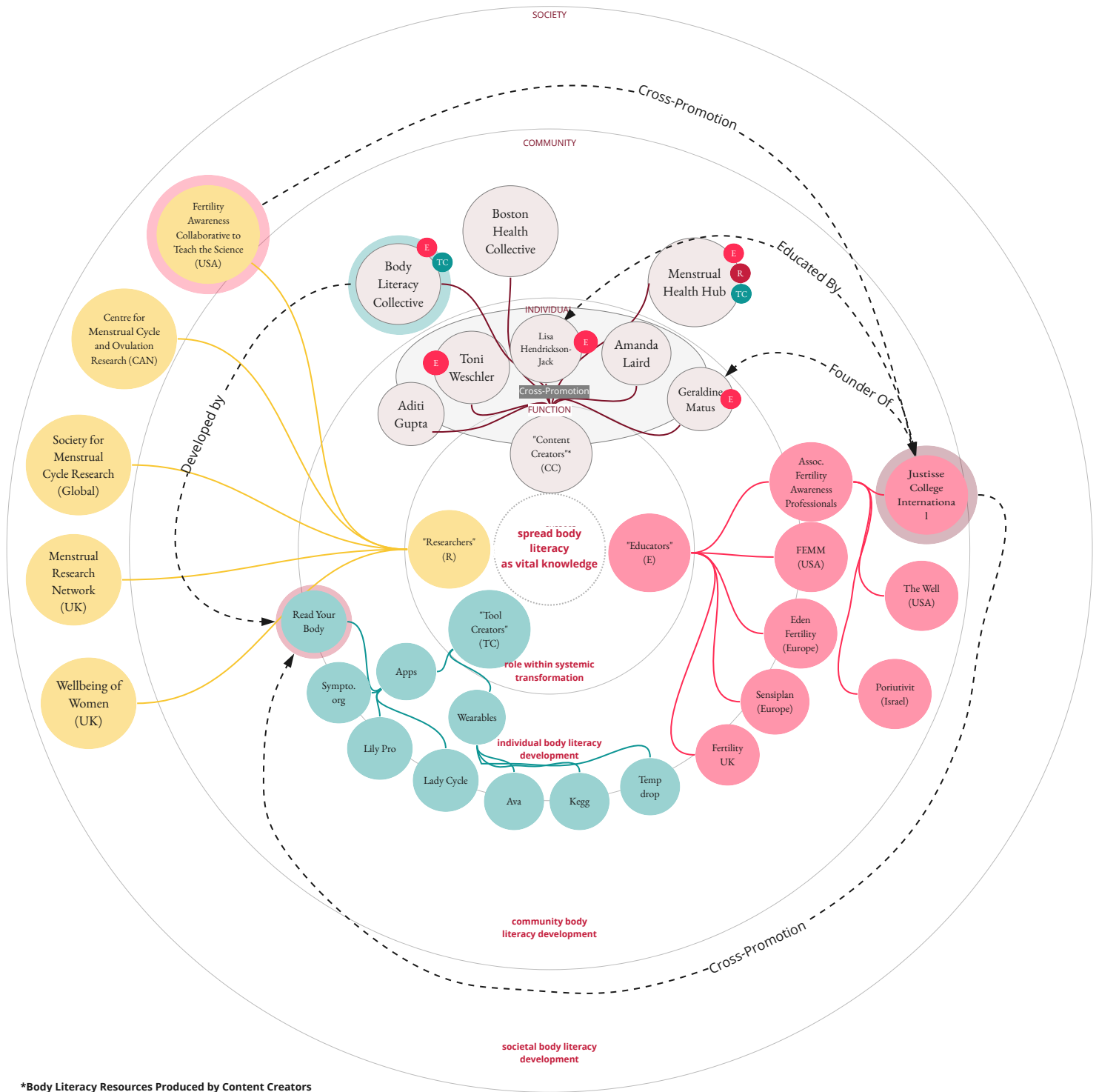
The following section aims to identify the actors working on addressing the body literacy knowledge gap. This is preparation for recommending solutions in the Act stage that can build upon the work and momentum already happening, by identifying opportunity spaces for systems-level change.

*Who are the key actors in the system of body literacy education who are addressing this knowledge gap? And, what resources have they produced for PWM to develop body literacy?*

The tool I used to answer this question is a stakeholder map a.k.a. a "key actors map." The map aims to identify the key actors within the system who are addressing this vital knowledge gap. This helps me highlight patterns and interconnections which already exist within the network. The map's goal is to provide me with a starting point for entering the solution phase. By recognizing the work, investments, relationships and efforts to address this knowledge gap, I hope to identify creative and innovative ways to advance systemic transformation.

As seen in *Figure 19: Stakeholder Map of Body Literacy Promoters*, the stakeholder map is organized into four key categories of actor groups: menstrual research organizations ("researchers"), body literacy resource producers ("content creators"), body literacy educators ("educators"), and FemTech entrepreneurs ("tool creators"). The research design principles discussed in the introduction were used to discern which organizations

# Stakeholder Map of Body Literacy Promoters



**\*Body Literacy Resources Produced by Content Creators**

- Boston Women's Health Collective: *Our Bodies, Ourselves* (Book)
- Aditi Gupta: *Menstrupedia* (Comic)
- Lisa Hendrickson-Jack: *The Fifth Vital Sign* (Book), *Fertility Friday* (Podcast)
- Amanda Laird: *Heavy Flow* (Book & Podcast)
- Geraldine Matus: *Justisse Method Fertility Awareness & Body Literacy User Guide* (Book)
- Toni Weschler: *Taking Charge of Your Fertility, Cycle Savvy* (Book & Charting Tools)

Figure 19: Stakeholder Map of Body Literacy Promoters  
Illustration by Angie Fleming ©

and individuals to include in this analysis.

For instance, my research criterion is to promote body literacy that is evidence-based and backed by the latest science. Therefore, the selection process of who to include in the stakeholder map filtered out many actors; even though they were promoting health education for PWM, it was not evidence-based. Only educators who demonstrate certification standards are included, as these certification bodies ensure training rooted in science. In addition, only well-sourced books with a strong foundation in body literacy science, and only apps that are proven to be accurate and reliable by Fertility Awareness Educators (FAE) are included in this analysis.

Another criterion is to promote inclusion and body positivity; therefore, religious-based body literacy educators were omitted from the map as their focus is too narrow.

### **Research Organizations -“Knowledge Producers”**

There are a number of research bodies across the world dedicated to promoting research on menstrual health and women’s health and wellbeing. Since the education of body literacy is highly contextual to one’s culture, I focus on the target audience of Western-based PWM and will thus hone in on organizations located within North America and Europe. The following organizations outlined below are dedicated to addressing the knowledge gap of health research for PWM:

- The *Centre for Menstrual Cycle and Ovulation Research* based at the University of British Columbia is led by Jerilynn Prior and according to its website, is the “only centre in the world that focuses on ovulation and the causes of ovulation disturbance” (“About Us”, n.d.).
- The *Menstruation Research Network* located in the UK “brings together experts from the sciences and humanities, NGOs, the arts, activists and campaigners, industry and the NHS in order to unify knowledge about medical, political, economic, psychological and cultural issues related to menstruation”(“About MRN”, n.d.).
- The *Society for Menstrual Cycle Research (SMCR)* is a global research, volunteer-led organization that was founded in 1977 as a “multidisciplinary group of women who were pioneers in understanding the centrality of menstrual cycle research to women’s health” (“About SMCR”, 2019).
- The *Wellbeing of Women* is a non-profit organization based in London, UK that are investing in pioneering research in women’s health, education and advocacy (“About Us”, n.d.). It focuses on topics that impact women’s lives including menstruation, endometriosis, fertility, pregnancy, menopause, gynecological cancers, etc.
- *Fertility Awareness Collaborative to Teach the Science (FACTS)* is a collaborative of physicians, healthcare professionals and educators based in the USA. Its goal is to share the best evidence possible with healthcare colleagues and students to raise awareness of FABM in the healthcare space while also conducting high quality research.

On the Stakeholder map, these organizations are placed in the outer ring (“society”), as the impact of their work has the broadest reach. They are operating less at an individual level as their target audience is not an individual PWM. Instead, by publishing their findings, they contribute to closing the societal knowledge gap on body literacy for PWM. Their research outputs help raise societal knowledge and become inputs for the other stakeholder groups: content producers, educators, and tool creators.

The map helps us see that investments are being made to address this knowledge gap. However, it is hard to know the degree of collaboration happening among these organizations without further research. From my review, I came across FACTS presenting their research findings at a Justisse College International conference to spread their knowledge to body literacy educators. This is noted by the arrow between FACTS to Justisse. There is likely opportunity for research investments to be optimized by sharing knowledge, lessons learned, and resources among these organizations.

### **Body literacy resource producers - “Content Creators”**

This segment highlights a selection of the content creators and the key resources they have produced to teach PWM to develop their body literacy. Some of the key books were highlighted in the historical timeline and included Toni Weschler’s, *Taking Charge of Your Fertility (TCYOF): The Definitive Guide to Natural Birth Control, Pregnancy Achievement and Reproductive Health* (2015), and *Our Bodies, Ourselves* (2011) produced by the Boston Women’s Health Book Collective. In addition, there is the *Justisse Method Fertility Awareness and Body Literacy: A User’s Guide* (2009) produced by the Justisse Method Founder Geraldine Matus. These reference books provide detailed facts about navigating health across the lifetime of people with a menstrual cycle. Additional books are included in *Appendix C: Body Literacy Resources* but have been omitted from this map as they were not included in my literature review.

Modern resources inspired by these original classics include *The Fifth Vital Sign: Master Your Cycles & Optimize Your Fertility* (2019) by Lisa Hendrickson-Jack and *Heavy Flow: Breaking the Curse of Menstruation* (2019) by Amanda Laird. These books promote the concept that their menstrual cycles operate as a fifth vital sign and educate the reader to see their menstrual cycle from a systemic perspective. The writers Lisa Hendrickson-Jack and Amanda Laird also host podcasts, *Fertility Fridays* and *Heavy Flow*, respectively, where they raise awareness of the systemic issues surrounding the topic of body literacy. Aditi Gupta has created the *Menstrupedia Comic* to tackle period stigma through medically accurate education made accessible to younger audiences for when they enter puberty (“M-pedia Comic-English”, n.d.). It is currently available in fifteen languages and presents culturally relevant information in a way that promotes body positivity (“M-pedia Comic-English”, n.d.).

Included in content creators are organizations such as the *Menstrual Health Hub* and the *Body Literacy Collective*, which each play multiple roles within this system. The Menstrual Health Hub is a community platform to unite the menstrual health community and promote education, research, policy and innovation. This means they fit into multiple categories as content creators, tool creators, educators, and researchers. The Body Literacy Collective provides information and a network of FAM Educators. It has also built an app for menstrual cycle charting called “Read Your Body.” This places them in the content creator, tool creator, and educator categories. To indicate these multiple roles, these organizations are listed under content creator and have additional coloured circles

to show their numerous roles within this system.

The stakeholder map for content creators begins to capture the variety of roles that actors are playing to address the knowledge gap. Many of these creators have produced supporting content, tools, and channels (e.g. podcasts) to promote the spread of this information. When reviewing their books and listening to their podcasts, I began to see examples of cross-promotion within this category. For instance, Lisa Hendrickson-Jack has interviewed Geraldine Matus and Amanda Laird on her *Fertility Friday* podcast. Amanda Laird has interviewed Lisa Hendrickson-Jack on her *Heavy Flow* podcast. This enables the knowledge to spread more efficiently through partnerships based on shared values and purpose. Many books and podcast episodes refer to Toni Weschler's *Taking Charge of Your Fertility*. With Geraldine being the founder of Justisse College International and Lisa Hendrickson-Jack being a Justisse certified educator, a lot of cross-promotion occurs there. This map helps us see the potential for exposure to grow when collaboration across the system occurs.

The book creators are listed in the "Individual" realm on the map, as their solutions target individual PWM. In contrast, the organizations are listed in the community as they offer more networked solutions that promote collaboration across the system.

Another observation through mapping this section is how the language used to title education materials is often focused on fertility. Since body literacy and awareness of our menstrual cycles as a fifth vital sign goes beyond reproduction and fertility, these titles may not be attractive to people who want to develop body literacy but may not consider themselves interested or ready to learn about fertility.

### **The network of certified body literacy educators- "Educators"**

While the books listed above can provide a thorough teaching of the fundamentals of body literacy, there is a learning curve to developing one's understanding to a level that they are confident to use this knowledge as a vital sign (Matus, 2009). There are networks of certified Fertility Awareness Educators who offer individual and group courses to build this vital knowledge to support PWM with this learning curve.

The *Association of Fertility Awareness Practitioners* (AFAP) is a membership organization facilitating the delivery of high-quality education that is accurate and current. Part of its mission is to promote reproductive justice, and they aspire to become a certifying body ("Mission, Vision & Goals", n.d.). Currently, there are three training organizations certified by AFAP: *Justisse College International*, *The Well*, and *Poriutivit-Natural Fertility Training*. Based out of Edmonton, Canada, Justisse College International provides Fertility Awareness educators with extensive training "that reflects the most scientifically accurate knowledge currently available, both qualitatively and quantitatively" ("About Justisse", n.d.). Both AFAP and Justisse have tools on their website to help potential body literacy students find a certified practitioner that suits their needs.

In addition to these organizations associated with AFAP, there are body literacy training organizations across the globe, such as Fertility UK, FEMM, Eden Fertility, and Sensiplan. There are also organizations that teach the science and methods of natural family planning from a religious perspective. For example, Creighton, Serena, Billings, and NFP International played a pivotal role in the development of Justisse College International to



offer a non-denominational offering to broaden body literacy to more people.

These organizations are hovering in the space between individual and community. Their impact is certifying practitioners who can work on an individual or group basis to develop body literacy. At the same time, they also create a learning community to spread knowledge and best practices among their networks.

There is a similar observation for body literacy educators as noticed with content creators. The organizations most certified to provide body literacy education position their education primarily for fertility and pregnancy-related goals (i.e., getting or not getting pregnant). While half the population menstruates, not every PWM is interested in reproducing. By framing body literacy in a limited way, most PWM may not become aware of the substantial benefits of understanding their menstrual cycle as a fifth vital sign. When listening to the Fertility Friday podcast (Hendrickson-Jack, 2022), a common theme among guests who have learned body literacy through a certified trainer is that they came to learn the information because they were experiencing fertility issues. However, once knowing it, they wish they had learned the information sooner, ideally when they first started menstruating (Hendrickson-Jack, 2022). The positioning of this vital information as predominantly fertility-focused is a barrier to the awareness that this knowledge is valuable at earlier stages of life.

## **FemTech Entrepreneurs -“Tool creators”**

This group of actors is making body literacy accessible via the development of digital apps, platforms and wearables that enable PWM to track the biomarkers of their bodies, helping to develop one’s body literacy. Having access to personalized metrics that show patterns over time, allows people to see when their markers are falling within normal ranges, and when they may indicate something is out of balance and requires medical attention. It will enable people to learn what their bodies communicate daily, and to understand the subtle shifts over time through access to aggregated trends and charts. What’s exciting is how this ecosystem of innovators is advancing the movement of ‘taking our bodies into our own hands.’ This group is powering up solutions with the latest in technologies, wearables, and data analytics to make it more convenient, accurate, and accessible for PWM to learn the fundamentals of fertility awareness methods to develop their body literacy. The following section highlights a selection of examples that are included in the stakeholder map. As this field is in a relatively nascent stage, I’ve taken a conservative approach by only listing solutions that apply the science of FABM. I will also discuss precautions surrounding this group of actors as the FemTech space is currently unregulated. Without regulations for quality or reliability, anybody can make and market an app that promotes health and wellness without requiring rigorous scientific validation. The following stakeholders are divided into fertility tracking apps and wearables.

### *FABM Tracking Apps*

In a 2016 study, the vast majority of fertility tracking apps were deemed unreliable and not grounded in the science of FABM (Duane et al.). Fertility Appreciation Collaborative to Teach the Science (FACTS) evaluated 95 charting apps. They used the following criteria to base their ratings: i) evidence-based, ii) usable for both pregnancy prevention and pregnancy promotion, iii) flexible to the user’s lived reality (i.e. they were able to override the prediction window based on their personal insights), and iv) accurately predicted the fertile window (Duane et al., 2016). They found only 29 of the 95 apps met their rigorous

criteria. Of these 29, only six scored perfectly for accuracy (Duane et al., 2016). This shows the level of unreliability in the current FemTech space, which is likely a result of the systemic knowledge gap discussed in the previous Investigate stage. Only apps endorsed by this research were included in the stakeholder map. Of the six apps approved by the study, only three are still active today: Sympto.org, Lily Pro, and Lady Cycle. In addition, the Read your Body app is also included and highlighted in the stakeholder map as it is produced by the Body Literacy Collective and is also endorsed by Justisse College International.

Currently, there are over 250 fertility apps available on the market; however, there is a meagre presence of evidence-based and reliable apps. The stakeholder map reflects the systemic knowledge gap around body literacy. It shows a need for marketing and education surrounding FABM so that PWM can learn to make accurate and informed decisions about their health and their lives. These apps could also be positioned in more holistic ways beyond fertility so that PWM can find and use them for health needs that extend beyond pregnancy goals.

### *Wearables*

In addition to fertility tracking apps are the rise of wearables that enable PWM to track their fertility bio-markers more conveniently and accurately. These devices often come with their own apps that sync up automatically to make cycle charting and body literacy a little more seamless. The primary indicator of fertility is the quality of cervical mucus. The training in the books and courses teaches how cervical mucus is easily determined by self-observation each time one goes to the washroom and uses a small square of toilet paper (Weschler, 2015, Matus, 2009). This low-tech option is the most convenient and affordable but requires more knowledge and training to discern what is considered fertile, infertile, or a potential sign of ill-health. Of the high-tech, high-cost options, the Kegg, claims to offer precise cervical tracking paired with a digital app to identify one's fertility window and claims it only takes two minutes a day (Kegg, n.d.).

The Tempdrop wearable is geared to make measuring basal body temperature (BBT) more foolproof and consistent (Tempdrop, n.d.). BBT is a signal of ovulation, as discussed in the previous section, but requires dedication from the PWM to wake up at the same time each day and measure within a consistent time span, to ensure measurements are reliable. The Ava Fertility Tracker is a bracelet that helps PWM track their fertile window and ovulation (Giuffrida, 2021). For people who wake up within a consistent window, purchasing a BBT thermometer and taking a daily temperature reading is a more affordable option.

For both the apps and wearables, these tools are hovering the line between individual and community body literacy development. This is because they are designed for individual PWM to develop their body literacy, while they simultaneously enable the FemTech creators to gather community level insights from their users by aggregating the data.

This map shows a tremendous opportunity and need to promote apps that are science-backed to compete with the less reliable apps. The less reliable apps pose risks to the reputation of the overall FemTech category by putting their users in danger of significant health and life outcomes while promoting the belief that users are becoming educated and informed. This map also helps to see the opportunity for body literacy education

among FemTech entrepreneurs so that new or existing apps can become deliberately rooted in science. This would help address the perpetuation of false information being provided to people, as this app category is popular and sees high adoption rates among PWM.

## Learning Summary

As a whole, this stakeholder map shows the developing system of body literacy education. While many people and organizations are beginning to address the knowledge gap, there are still relatively few stakeholders addressing it with a solid foundation of scientific facts. This mirrors the systemic knowledge gap investigated in the previous section and validated through the literature. It recognizes the delay in systems between cause and effect. While the ACOG recognized the menstrual cycle as a fifth vital sign in 2015, it will take time and integrated efforts for this information to spread and become absorbed across the systems of healthcare, medical research, and education.

The map shows how the current ecosystem is tapping into the power of collaboration via cross-promotion and network building to expand and reach across platforms. It also shows the potential to augment partnership efforts to amplify this reach beyond people actively searching for this vital information. As well, it shows that the current stakeholders are positioning this information within the narrow frame of fertility. This can exclude many PWM from benefiting from this knowledge before they begin actively thinking about their fertility. This framing is less inclusive for promoting access to this information for PWM who are not planning to get pregnant.

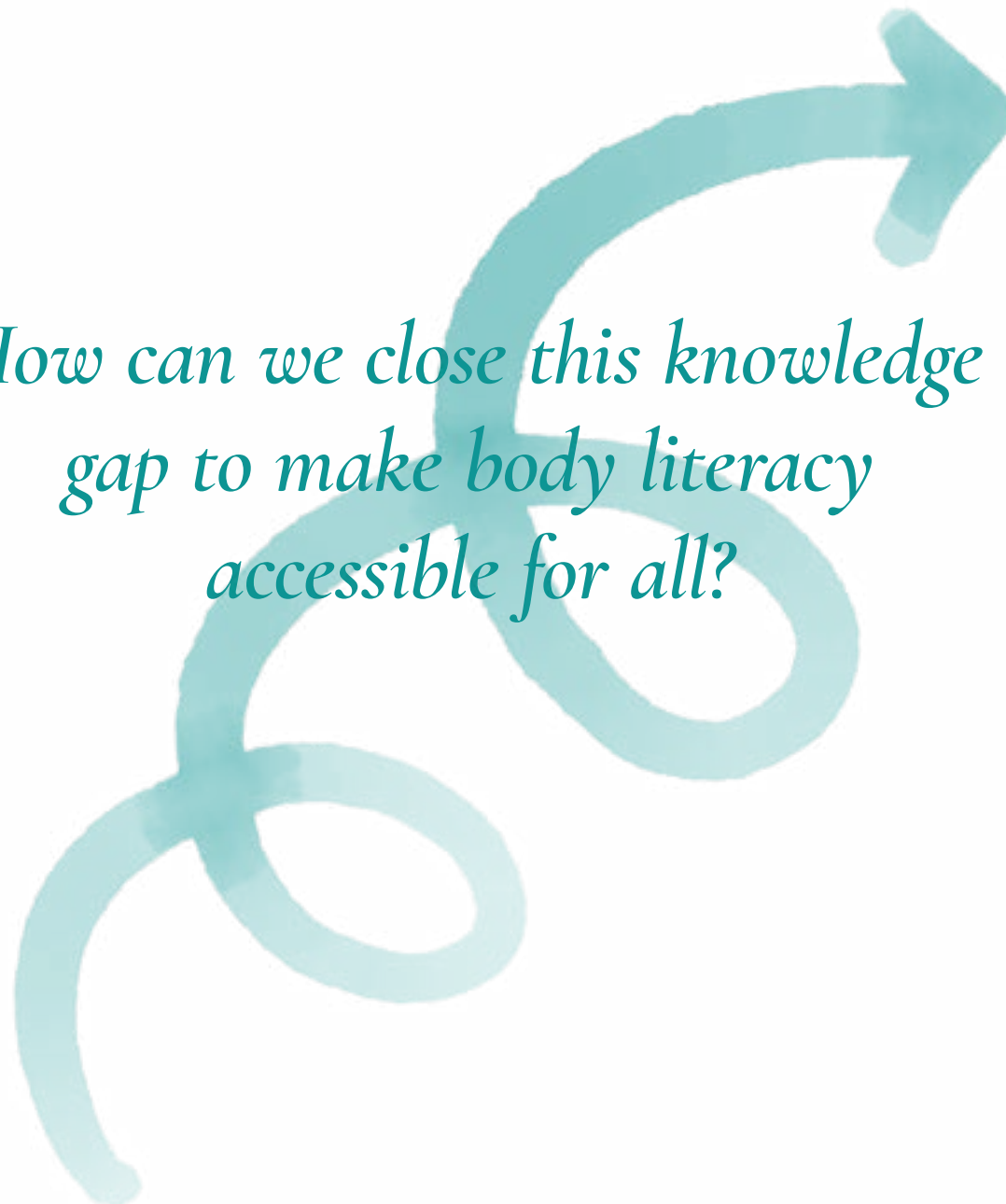
The lack of FemTech stakeholders captured in this map highlights the gap between innovators who have access to this vital knowledge and those who do not. Less than two percent of fertility apps were included in this map which demonstrates the size of the knowledge gap. This group represents a considerable opportunity for systemic change as the digital revolution makes access to information and personalized healthcare insights more commonly adopted. However, without system-wide access to this information, the current apps perpetuate a lack of knowledge or misinformation, leading PWM to believe they know their bodies while lacking the fundamentals of body literacy.

In the next and final stage, Act, I will explore these spaces for opportunities using systems thinking frameworks that promote bringing social innovations to scale.



4.

Act



*How can we close this knowledge gap to make body literacy accessible for all?*

## Exploring ways to close this vital knowledge gap

This final Act stage is where I transition towards identifying and exploring opportunity spaces that can serve systemic transformation. At the same time, I weave together learning from the previous Investigate and Educate stages and my own personal embodied research journey. The desired future I seek to design is a world where PWM and their communities have access to this vital information early in their lives. I believe everyone should be made aware that the menstrual cycle is a fifth vital sign. Also, I think everyone (inclusive of people who do not menstruate) should receive the education to develop body literacy to serve their health goals in a way that respects their individual choices, preferences and needs. I recognize that these needs, choices and preferences are dynamic and change throughout one's menstruating life, from menarche to menopause. I believe if this foundational knowledge is developed early and proactively in people's menstruating lives, it will help to normalize this topic as a healthy holistic health function and indicator. Early education will also cultivate the openness and curiosity to continue one's development of body literacy throughout their life. This could help to reduce the cultural embarrassment, shame, and taboo by getting ahead of the silencing and ignorance that results when proactive education does not occur.

Systemic transformation requires many leverage points to be addressed simultaneously to bring forward a new paradigm that transcends the old paradigm (Meadows, 2008). To help me understand a path towards systems change, I use the Two Loops theory of change framework developed by systems thinkers and practitioners Margaret Wheatley and Deborah Frieze (2007). As seen in *Figure 20: Two Loops Theory of Change for Bringing Social Innovation to Scale*, this framework captures two concurrently existing systems: the dominant system and the emergent system.

### *Dominant System*

The dominant system is the paradigm where the fifth vital sign is not common knowledge. People and the systems they live within (e.g. economy, healthcare, education, culture) operate without this vital knowledge. As previously uncovered, most Western societies operate within the dominant system. Waves two and three of the historical timeline within the Investigate section explored systemic factors that created and maintain this dominant system.

### *Emergent System*

The emergent system is where the menstrual cycle is known as a fifth vital sign. In this paradigm, PWM and their communities are taught the foundations of body literacy. As a result, they have the confidence and agency to live with a holistic understanding of how their bodies function. Waves four and five of the historical timeline and the stakeholder map of body literacy promoters identified people and organizations working to bring about the new emergent system.

# Two Loops Theory of Change for Bringing Social Innovation to Scale

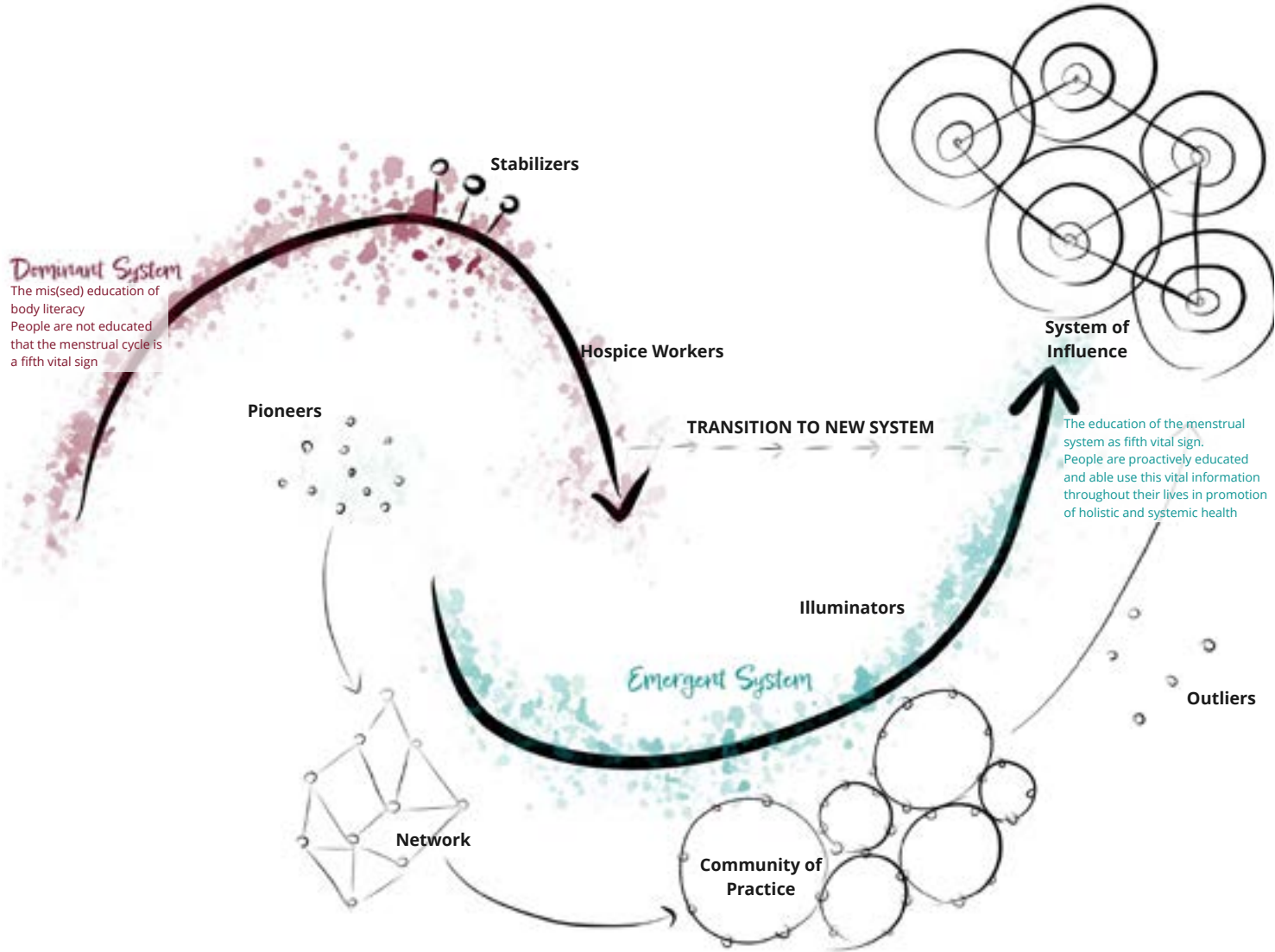


Figure 20: Two Loop Theory of Change for Bringing Social Innovation to Scale  
Framework by Margaret Wheatly & Deborah Frieze  
Illustration by Angie Fleming



According to Wheatley and Frieze, the stabilizers of the dominant system are the people, organizations, and institutions which benefit from the current system. They can intentionally or unintentionally prevent it from changing to preserve their status, privilege and power (Wheatley & Frieze, 2007). The stabilizers of the existing system include the established healthcare systems, education, and menstrual product industries which are incentivized through economic benefits to maintain the status quo. Incentivized by the goal to seek profit, these companies perpetuate the menstrual mandate of concealing the topic of menstruation, and silencing the education surrounding it. At an unconscious level, these stabilizers possibly believe the myths and metaphors exposed in the CLA that female bodies are inferior to males; therefore, they do not warrant the levels of research investment, attention and innovation. This dominant system also lacks representation by PWM in key decision-making roles. When designing solutions, these key systems are more likely to reinforce existing mental models, as they lack access to the perspectives and lived experiences of PWM that are crucial in building inclusive solutions.

To tap into the system quality of emergence, Wheatley & Frieze (2007) highlight the power of networks to bring social innovation to scale. They focus on connecting the pioneers into a network and then enabling them with access to resources to develop a community of practice. This community of practice facilitates knowledge, ideas, and innovation to be widely spread among members (Wheatley & Frieze, 2007).

In stage two, Educate, I surfaced a selection of the “pioneers” who are building the new system that promotes body literacy education. According to Deborah Frieze (2015), these pioneers are the innovators who departed from the dominant system to develop alternatives within a system that is inclined to self-preservation. The stakeholder map identified four categories of pioneers: content producers, educators, researchers and FemTech entrepreneurs. As these stakeholders become connected into a network, the conditions are established for a community of practice to evolve. This is when people deepen their commitment to realizing a shared purpose that extends their reach beyond the limited impact that an individual organization can make alone (Wheatley & Frieze, 2007).

When individuals recognize their interdependencies, the system’s characteristic of self-organization is enabled. This creates the conditions for the emergence of a global system of influence (Wheatley & Frieze, 2007). When a system of influence emerges, the paradigm has shifted. This is when “pioneering efforts that hovered at the periphery suddenly become the norm” (Wheatley & Frieze, 2007, p.4). In the emergent system, the practices of the small pioneering community become accepted as the new standard, as policies and funding begin to include the perspectives of the pioneers (Wheatley & Frieze, 2015).

This final Act stage aims to promote the emergence of this new paradigm based upon the Two Loops theory of change. Thus, the opportunity spaces explored in this Act stage are focused on proactive and systemic interventions that would teach PWM and their communities during the earlier stages of their menstruating lives, that the menstrual cycle is a fifth vital sign.

The questions guiding this stage are the following:

- *Where are the key opportunity spaces to expand the access to this vital knowledge?*
- *And, how can it reach PWM earlier in their menstruating lives?*

*Where are the key opportunity spaces to expand access to this vital knowledge? And, how can it reach PWM earlier in their menstruating lives?*

To summarize what I've learned throughout this research journey, the tool I used is a causal loop diagram (CLD) to hone into the liminal space between the dominant and emerging systems. *Figure 21: Causal Loop Diagram of Body Literacy* maps the various feedback loops across the system. The darker, left-hand side of the CLD maps out the current and dominant system and is titled "The Mis(sed) Education of Body Literacy." The light half, right-hand side, maps out the emergent system and is titled "The Education of Body Literacy." The PWM is placed in the center, surrounded by the actors that play a role in their access to knowledge about menstruation. Whether the PWM has access to this information will determine which systems and effects they encounter. However, as systems are nonlinear, a PWM may encounter any combination of feedback loops.

Moreover, their personal and cultural traits of openness and curiosity surrounding menstruation will influence how information is given and received and whether or not they actively seek out new information. The multiple concentric circles are used to show the relative level of influence that these stakeholders can have on the PWM's ability to learn about their menstrual cycle. By zooming into the direct access points for PWM to acquire this vital information, this CLD reveals opportunity spaces for intervening in this system at the level of the individual PWM within their communities of care.

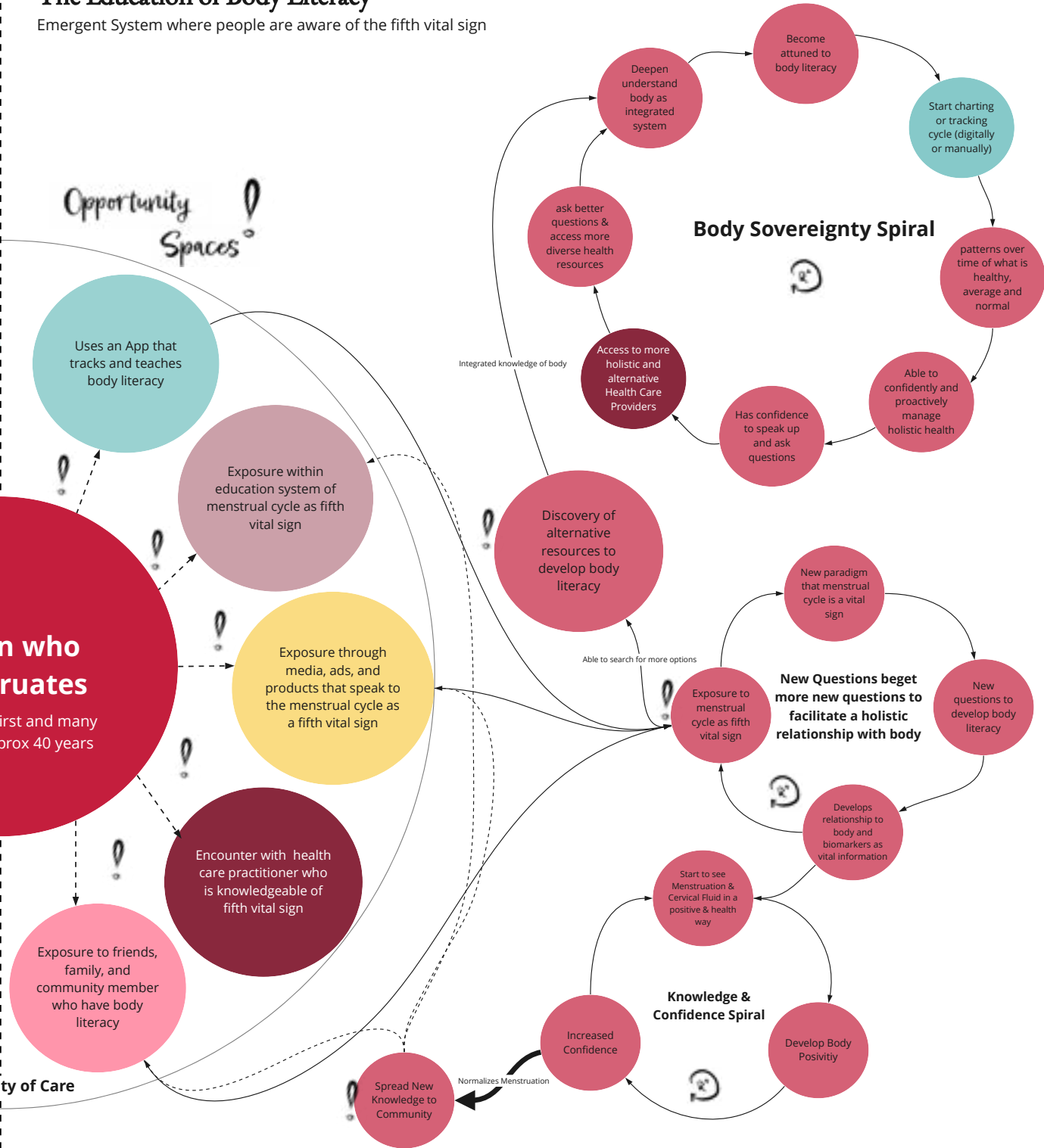
Causal loops help visualize where there are reinforcing feedback patterns that perpetuate the dominant or emergent systems of body literacy. Positive feedback loops reinforce the system dynamics as either vicious cycles or virtuous cycles; the outcome from a cycle are reinvested and perpetuated as existing patterns repeat themselves (Meadows, 2008). The result is that the pattern of behaviour of the feedback loop becomes more deeply ingrained, which then reinforces the system's strength and behaviour. These reinforcing feedback loops are indicated on the CLD by the letter "R" with a circular arrow.

The left side highlights the various feedback loops of menstrual ignorance, silencing, and the role that misinformed stakeholders such as healthcare, education, technology, and peers play in perpetuating the knowledge gap. The right side of the CLD showcases the virtuous cycles activated when any of these surrounding stakeholders have the body literacy knowledge to share with the PWM. The dotted lines show the multidirectional flow of information that can be catalyzed when learning happens within communities. Learning within a network benefits from the nonlinear nature of systems that enable impact more efficiently and at an exponential rate.



# The Education of Body Literacy

Emergent System where people are aware of the fifth vital sign



STAKEHOLDER



REINFORCING FEEDBACK LOOP

DEEPLY INGRAINED PATTERNS (unconsciously adopted)



SHALLOW PATTERNS (that deepen with time)

OPPORTUNITY SPACES

OPPORTUNITY SPACES (potential to build new patterns)

\*Hormonal Birth Control (e.g. The Pill)

The leverage points for systemic intervention revealed through this CLD are indicated by the exclamation marks to educate PWM through their relationships with the education system, the healthcare system, menstrual and fertility tracking apps (i.e. FemTech innovators), the media, and their families, friends and peers. Solutions need to address the whole system through an interconnected lens and address multiple levels to facilitate system-wide change. Therefore, the opportunities that I explore take into account a PWM's inter-relationships within their communities of care to promote knowledge to spread across their networks. These opportunity spaces aim to promote emergence that can scale to bring about a transformed system where the menstrual cycle is a known fifth vital sign. The three solutions that will be explored focus on the need to educate three key stakeholder groups in an integrative manner i) the education system, ii) FemTech innovators, and iii) advocates within the menstrual health movement.

## The Education System

The most significant leverage point for systemic change to occur earlier in PWM's lives is through the education system. By teaching the basics of body literacy through the school system, this knowledge will reach young people who do and don't menstruate. As mentioned in the introduction, menstruation covers many domains, including biology, reproduction (i.e. sexual education), and social justice. Therefore, body literacy content can be incorporated across various curricula to teach these relevant concepts holistically. This leverage point enables young people to learn within their communities as it will provide a shared starting point for PWM, their peers, and their educators. This opportunity space reprioritizes the school system to become the primary educator the way it was before the 1940's when the menstrual product manufacturers took over primary responsibility for menstrual education. It will also facilitate learning to occur upward from child to parents, caregivers, and siblings. As knowledge enters each student's household, its potential to be spread among families is also enabled. Since taboos that are established in school set the stage for later life, proactively introducing this topic earlier and often throughout middle and high school curricula will help normalize the subject.

Since changing curriculum is a complex and time-consuming effort, a near-term solution is to experiment and prototype through out-of-school programs, summer camps, and external educational programs that can partner with schools. This curriculum can be developed in partnership with the identified body literacy educators in a way that is geared towards pre-teens and teenagers. Two key resources identified in the stakeholder map are Aditi Gupta's *Menstrupedia comic* and Toni Weschler's *Cycle Savvy: The Smart Teens Guide the Mysteries of Her Body* (2006). With the rise of online learning, this content can be developed for virtual workshops delivered to students and parents simultaneously.

Innovation requires experimentation and prototyping to learn what doesn't work and to build upon what does. Through prototyping, testing, and iterating, valuable feedback is produced. This feedback data can then provide the evidence needed to present to school boards and educators to gain support to bring these programs more formally into the curriculum. It is also possible that through innovative approaches to accessing teachers, students and their families, this approach may reach educators and administrators within school boards who influence curriculum. Through this strategy, this information also has the potential to reach healthcare practitioners who may be relatives of students. This could create awareness their knowledge gaps and inspire the education required to transform their approach to treating clients.

My research and first-hand experience showed that once people learn this paradigm-shifting knowledge, they feel compelled to share it with others. A common sentiment among people who have learned body literacy is that they wish they had known it earlier in their life (Hendrickson-Jack, 2022). Therefore, I believe focusing on bringing this knowledge into the school system will have the highest leverage to transform the system.

## **FemTech Innovators (i.e. Menstruation and Fertility Tracking Apps)**

The high number of period and fertility tracking apps demonstrates the high demand and prevalent role these tools play in the lives of PWM. For people with a smartphone, body literacy education has the potential to be delivered in a personalized and private setting. In addition, many FemTech companies offer peer and professional support to their platform users via community groups.

The stakeholder map showed how the rise of these apps plays a dual role in data and research production at an aggregate level. While the individual users receive personalized patterns and insights by inputting their data, the companies gain access to macro-level trends and patterns generated across their platform's user base. Therefore, the FemTech industry's role in closing the gendered data gap and building body literacy is significant. However, for this to be realized. The actors in this system first need to become educated in the science of body literacy. This foundational knowledge will expose the need to rebuild existing apps and digital tools, or build new ones, to become grounded in the latest evidence. With the shared purpose of advancing healthcare for PWM, this opportunity space has a high potential to resonate with many FemTech innovators.

This opportunity is significant because of the lack of reliable, evidence-based apps in the market, as depicted in the stakeholder map. Out of the 250 apps on the market, only four were identified as for meeting the evidence-based criteria. While many of these apps promote a data-informed approach to body literacy, fertility, and menstrual tracking, they are not research-informed. They lack a grounding in the latest scientific knowledge of body literacy.

This disconnect between data-informed and research-informed has led to multiple apps gaining approval from the Food and Drug Administration (FDA) as safe, non-hormonal birth control solutions. For example, in 2018, a popular FDA-approved fertility app, Natural Cycles was found to mislead users (Davis, 2018). This app was heavily promoted on social media by celebrity influencers (Davis, 2018). The research referenced earlier by FACTS showed that Natural Cycle's proprietary algorithms were not based on any of the science-based FABM (Duane et al., 2016). As a result, it received a poor accuracy rating of 2.3 out of five (Duane et al., 2016). This is significant because false negatives can lead to unwanted pregnancy and the downstream impacts of living with these difficult life choices. While Natural Cycles promotes a 93% accuracy rating comparable to condoms, the impact on people's lives caused by erroneous data is substantial (Wong, 2018). This example demonstrates the systemic knowledge gap - the app received FDA status without needing to be backed by evidence.

Apps with substantial error rates have the potential to erode user trust across the entire category of body literacy apps. If a user has one bad experience using an unreliable app, it can unintentionally cause mistrust and fear surrounding all related apps. This can deter people from being selective in their app choices as they lack the requisite knowledge to

understand the risks associated with each app. The FACTS study shows how a significant number of fertility apps are based upon the rhythm method; a calendar-based method that has been proven to be inaccurate and unreliable for more than 20 years (“Calendar-based contraceptive methods”, n.d.).

This opportunity space highlights the potential for system-wide collaboration among menstrual health research organizations, body literacy educators and FemTech innovators to address the gendered knowledge gap in PWM’s healthcare research and the individual body literacy knowledge gap. The stakeholder map demonstrated how few people have access to this vital information. This network needs to grow to reach a critical mass for the new system to emerge. One way to attain this growth is through outreach and networking with FemTech innovators who have a shared purpose of advancing the health of PWM. Creating opportunities for this knowledge to spread within the community of practice can promote the need to update or rebuild the algorithms that these apps are built upon to become grounded in evidence-based practices. In addition, policy innovation to promote stronger regulations and requirements in health apps to be evidence-based could help reduce the number of apps that unintentionally provide misinformation to their users. This would help close the gap between data-informed and researched-based solutions for spreading body literacy.

## **Advocates within the Menstrual Health Movement**

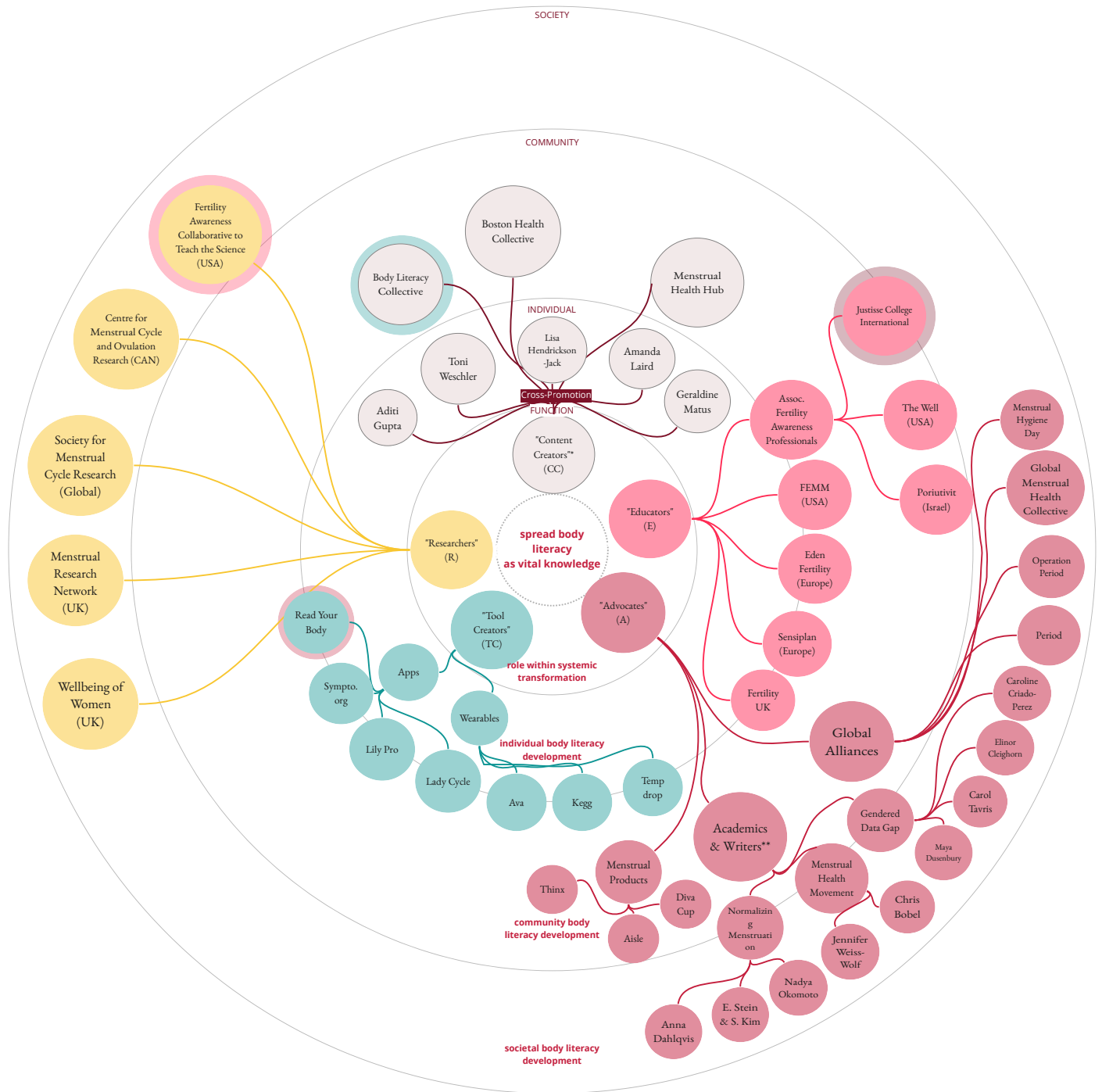
The third systemic opportunity space focuses on educating a diverse group of advocates who are raising societal awareness of the menstrual health movement. This strategy taps into the role of “illuminators” identified in the Two Loops theory of change to help make this new paradigm visible to people (Wheatley & Frieze, 2007). Wheatley and Frieze (2007) explain how it takes time and attention for people to see new systems and break out of their dominant mental models. By educating these stakeholders on the menstrual cycle as a fifth vital sign, the intent is that they will use their platforms with global reach to spread awareness about the knowledge gap, and promote people to develop their body literacy.

The stakeholder map from the Educate section has been developed to include this group of Advocates. It is seen in *Figure 22: Stakeholder Map with Menstrual Health Advocates* on the next page. The following sections highlight some examples from my research that have demonstrated shared purposes in normalizing menstruation, advancing menstrual health education, and promoting inclusion. This group of advocates includes non-profit organizations, academics, writers, and menstrual product organizations who are actively promoting the menstrual health movement, but likely do not recognize the menstrual cycle is a fifth vital sign.

### *Non-profit organizations*

Examples of non-profit organizations promoting menstrual health equity include the Global Menstrual Health Collective, Operation Period, Menstrual Hygiene Day, and Period.org. Each of these organizations is using its global platforms to normalize the topic of menstruation and promote the need for menstrual health education. Educating these organizations about body literacy and the menstrual cycle as a fifth vital sign can enable these groups to spread this knowledge across their global platforms to reach a broader audience.

# Stakeholder Map with Menstrual Health Advocates



## \*\*Books Produced by Advocates

- Anna Dahlqvist: *It's Only Blood*
- Elissa Stein & Susan Kim: *Flow: The Cultural Story of Menstruation*
- Nadya Okamoto: *Period Power*
- Jennifer Weiss-Wolf: *Periods Gone Public*
- Chris Bobel: *The Managed Body*
- Maya Dusenbury: *Doing Harm*
- Carol Tavis: *The Mismeasure of Women*
- Elinor Cleighorn: *Unwell Women*
- Caroline Criado-Perez: *Invisible Women*

Figure 22: Stakeholder Map with Menstrual Health Advocates  
Illustration by Angie Fleming ©



### *Academics & Writers*

This group includes journalists and academics raising societal awareness of the gendered data gap, as well as authors who have been highlighted throughout this research journey, such as Caroline Criado-Perez, Carol Tavris, Elinor Cleghorn and Maya Dusenbury, among others. This group also includes academics and writers promoting the menstrual health movement, such as Chris Bobel and Jennifer Weiss-Wolf. There is also a growing number of writers who are normalizing the topic of menstruation, such as Anna Dalqvist, Elissa Stein & Susan Kim, and Nadya Okamoto.

### *Menstrual Product Companies*

This group of advocates includes menstrual product makers who are tackling menstrual taboos and stigmatization through their progressive products and marketing. This group includes pioneering organizations such as Aisle, Thinx, and DivaCup, among a growing number of followers. This selection of organizations is included because they are led by PWM and deliberately use their branding and platforms to promote body positivity and inclusion.

Together, these groups represent a selection of people and organizations that can be invited to the network to amplify the reach of this vital education. A common theme across all three opportunity spaces is the need to firstly educate these high leverage stakeholders about the menstrual cycle as a fifth vital sign, allowing them to promote the emergence of a new system where this information is proactively accessible for everyone. Using the language of “fifth vital sign” and “body literacy” as opposed to “fertility” and “pregnancy” will promote inclusion and make this topic more approachable to younger and diverse audiences. The roles of pioneers collaborating with illuminators through a community of practice will set the preconditions for a new system of influence to emerge. An essential requirement to support the development of the community of practice is funding. Attracting funding and investment from organizations and individuals aligned with the criteria of science-backed and holistic health solutions for PWM is critical to bringing about the emergent system.

## Learning Summary

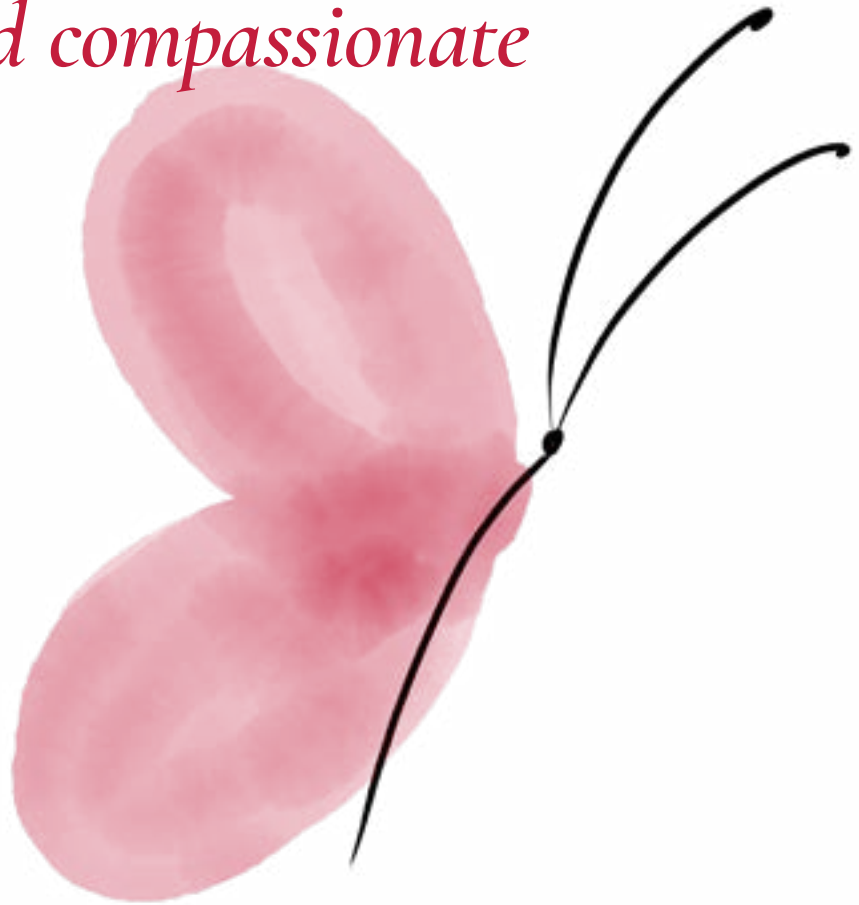
The Two Loops theory of change, causal loop diagrams (CLD) and revisiting the stakeholder map enabled me to explore opportunity spaces using systems thinking. These tools facilitated me to think holistically about how this education can be spread across multiple contexts of education, technology, and media. They also helped me see the collaboration required with research organizations and body literacy educators to ensure current and evidence-based knowledge. Applying the Two Loops theory of change helped to articulate the desired macro view of the future while deepening my understanding of the systemic patterns that reinforce the dominant system. The CLD enabled me to zoom into the micro perspective from the point of view of the individual PWM. It highlighted critical reinforcing loops that can perpetuate the dominant system or promote the emergent system.

Through mapping the inter-related causal relationships, it became clear that interventions need to be interconnected and collaborative to create a diverse community of practice that can reach PWM proactively via multiple angles. A network-based approach to promoting complex systemic transformation acknowledges that best practices may not exist in the current nascent stage. Instead, this approach invests in shared learning, experimentation, and capacity development as a collective to amplify impact beyond the scope of any individual organization.

5.

Outro

*A transformed understanding of  
my body that's evidence-based,  
holistic, and compassionate*



# New Interconnected Beginnings

Dearest Ovaries, et al.,

I first embarked on this embodied research journey to rebuild my relationship with you in a more holistic, compassionate, and body-positive way. Via my research, I intended to develop my capabilities as a systems thinker, while developing my body literacy. By applying systems thinking, I came to understand why I've lived so long not knowing how you all function. I realized how exceptionally rare it was for me to come across the knowledge that my menstrual cycle is a fifth vital sign. I learned how the current systems are not designed for this knowledge to spread; however, people and organizations (a.k.a. "pioneers") exist who know this vital knowledge, and are actively closing the knowledge gap. Looking across history showed me how systemic change takes time, along with the determined efforts of many. One of the hardest parts of this journey was seeing how far back in history the seeds of today's knowledge gaps were planted. It was tough to see how pre-scientific beliefs about PWM's bodies have been mythologized and hidden in society's collective unconscious mental models that persist today. On the bright side, mapping out the timeline showed me how change is underway, and how progress is happening with each successive wave of feminism.

While I learned that this knowledge gap is systemic, I also realized that it wasn't intentionally designed to be this way. After working through my anger and frustration about not having this information sooner, systems thinking helped me realize that my ignorance was an unintended consequence of a larger, complex, wicked problem. When PWM are not included in health research or represented in decision-making roles, over time, a series of feedback loops, incentive structures, precedents, and mental models emerge that perpetuate our collective unknowing. And when the education about the menstrual cycle shifted from schools to product makers, the biases, objectives, and outcomes were also shifted from learning to selling.

In a world where this information is rare, I needed to invest a lot of time, money, and energy to develop my body literacy and unlearn all the misinformation and false beliefs I had acquired. I recognize my privilege in being able to afford to embark on this embodied research journey in the first place. The return on my investment in learning has been tremendous. From my personal experience of developing body literacy, I feel more aware, connected, and confident in my own body. I've never felt this way before. When I go to doctor's appointments, I ask more informed questions and feel much more prepared to have conversations. My focus is on system thinking and getting to the root cause of my issues to promote health and healing, instead of symptom management. As my health issues become more complex, having body literacy has provided me with the requisite complex knowledge to understand the interconnectedness of my systems.

When half of the world's population experiences a menstrual cycle, this is not a minor issue. It is a major opportunity to promote equality and inclusion. I do not believe it should be the sole responsibility of PWM to stumble upon this information to lead more healthy, informed and integrated lives. What's needed is attention, investment, and effort to actively promote more inclusive and knowledgeable systems. The solutions explored

in this paper were designed to prevent the need for unlearning and to proactively teach PWM in a networked approach that creates positive reinforcing feedback loops to develop body literacy.

I believe this vital information should be accessible early, and frequently, to both PWM and people who do not menstruate. Only then, when people are healthy, confident, and critically self-aware, can they increase and unleash their power as individuals, communities, and societies.. As more people join the pioneers in knowing this vital information, a new system can emerge where it becomes common to have body literacy. This emergent paradigm is a system where the topic of menstruation is normalized, and people have access to a fuller range of health care choices based on their unique personal preferences and needs. Researchers, FemTech innovators, body literacy educators and advocates are leveraging the digital revolution, and collaborating across the system. They can therefore begin closing this knowledge gap, advance research into PWM's bodies, and raise healthcare standards to become more inclusive and equitable.

From Einstein's wisdom, we need to learn that "we cannot solve our problems with the same thinking we used that created them." So, we need systems thinking to close this systemic knowledge gap that has resulted from linear, fragmented and reductionistic thinking. We need to invest in solutions that promote collaboration across education, research, healthcare, and technology systems. We need to recognize that the systems within our bodies, communities, and society are becoming increasingly complex and interconnected. By tapping into the system properties of emergence, nonlinearity, and self-organization, this vital knowledge can be spread and made accessible to all.

# Letter to future people who menstruate

## *I have big dreams for you*

*I dream that the world you live in treats you as the subject, not the object in your life;*

*so that you can experience the liberation that comes from appreciating your body as a source of life, and not be burdened by social stigma and shame that makes you think otherwise;*

*I hope you feel strong, confident, and sovereign in your own body, and not trapped, managed, or feel you need to hide or conceal who you are and what you're going through;*

*I hope that the world you live in views menstruation as a normal, biological function akin to sneezing or going pee;*

*I hope you have access to all the vital information that feeds your confidence and agency when making important health choices so you can be in partnership with your body and know it as the sophisticatedly intelligent system that it is;*

*I hope you get to know how your menstrual cycle fluctuates and responds to your daily life choices because it's got you, and it's working with you;*

*and, if you choose to tap into its cyclical energy you can be creatively unstoppable to live out your dreams and wildest imaginations, all while bleeding.*

***That would be bloody amazing.***

body literacy = body love





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# Appendices

## Appendix A: Body Literacy Self-Assessment

The first thing we can do to begin developing our body literacy is to become curious about how our bodies work and become familiar with our parts and how they interconnect to create a healthy functioning system. We need to ask ourselves what is normal and healthy for our bodies by observing and tracking what's happening using methods such as fertility awareness method (FAM) and the tools described in stage two, Educate. As we become familiar with the cyclical pattern of events, biomarkers, hormonal shifts, and how this impacts our mood and energy levels, we begin to build the confidence and agency of our bodies that comes with building expertise in this topic.

### *Initiating a healthy conversation with ourselves...*

Here are some initial icebreaker questions I started asking myself in the beginning of my journey to develop my body literacy:

- Do I really know all the parts of my body? Am I able to identify them by their name?
- Am I willing to get comfortable using a mirror to get familiar with my body?
- Do I know what each of those parts is responsible for?
- How many days is my average cycle? Is it considered healthy? Is it normal?
- Am I ovulating?
- How long is my luteal phase?
- Do I recognize the four seasons of my menstrual cycle? Do I know how to recognize the subtle shifts between phases?
- Do I know when I'm fertile? Can I get comfortable observing and tracking my cervical fluid?
- Am I willing to take my temperature each morning to observe the shifts in my basal body temperature?
- How about my cervical position? Can I get comfortable checking the position to see if it's open or closed?
- Can I learn this all by myself using books and podcasts? Would I learn better by investing in working with an AFAP certified Holistic Reproductive Health Care Practitioner?



## Appendix B: Tidal Waves of Menstrual Knowledge

A historical timeline that layers together the five waves of menstrual knowledge showcased in the Investigate section. This visualized information promotes systems-thinking, by challenging the viewer to see time not as linear, but overlapping and interconnected. How multiple paradigms (i.e. systems) can be occurring simultaneously and nonlinear effects of events from the past persisting into modern times. In addition to layering time across a horizontal axis, it also incorporates the deeper trends and patterns through the causal layered analysis. The worldviews, myths and metaphors that underpin events in the litany are showcased below.

### *Accompanying Digital Materials*

*File: Tidal Waves of Menstrual Knowledge (PDF)*

# Appendix C: Body Literacy Resources

## Books

### **Body Literacy**

- *Our Bodies, Ourselves* by Boston Women's Health Collective (2011)
- *Taking Charge of Your Fertility: The Definitive Guide to Natural Birth Control, Pregnancy Achievement, and Reproductive Health* by Toni Weschler, MPH (2015)
- *The Billings Method: Controlling Fertility without Drugs or Devices* by Evelyn Billings & Ann Westmore (1981)
- *A Cooperative Method of Natural Birth Control* by Margaret Nofziger (1992)
- *The No-Pill, No-Risk Birth Control* by Nona Aguilar (2002)
- *Natural Birth Control made Simple* by Barbara Kass-Annese, R.N., C.N.P, and M.D (2003)
- *Her Blood is Gold* by Lara Owen (2016)
- *The Wild Genie: The Healing Power of Menstruation* by Alexandra Pope (2014)
- *Heavy Flow: Breaking the Curse of Menstruation* by Amanda Laird (2019)
- *The Fifth Vital Sign: Master Your Cycles & Optimize Your Fertility* by Lisa Hendrickson-Jack (2019)
- *Fertility Awareness Mastery: Charting Companion Workbook* by Lisa Hendrickson-Jack (2019)
- *WomanCode: Perfect Your Cycle, Amplify Your Fertility, Supercharge Your Sex Drive, and Become a Power Source* by Alisa Vitti (2014)
- *Cycle Savvy: The Smart Teen's Guide to the Mysteries of Her Body* by Toni Weschler (2011)
- *Menstrupedia Comic* by Aditi Gupta (2020)

### **Gendered Data Gap & Health of People who Menstruate**

- *Invisible Women: Data Bias in a World Designed for Men* by Caroline Criado-Perez (2019)
- *Unwell Women: Misdiagnosis and Myth in a Man-Made World* by Elinor Cleghorn (2021)
- *Doing Harm: The Truth About How Bad Medicine and Lazy Science Leave Women Dismissed, Misdiagnosed, and Sick* by Maya Dusenbery (2018)

- *The Mismeasure of Women: Why Women are Not the Better Sex, the Inferior Sex, or the Opposite Sex* by Carol Tavris (1993)
- *Ask Me About my Uterus: A Quest to Make Doctors Believe in Women's Pain* by Abby Norman (2018)

### ***Menstrual Health Movement & Normalizing Menstruation***

- *The Managed Body: Developing Girls and Menstrual Health in the Global South* by Chris Bobel (2019)
- *Periods Gone Public: Taking a Stand for Menstrual Equity* by Jennifer Weiss-Wolf (2017)
- *It's only Blood: Shattering the Taboo of Menstruation* by Anna Dahlqvist (2018)
- *Period Power: A Manifesto for the Menstrual Movement* by Nadya Okamoto (2018)

### ***Reproductive Justice, Body Politics, & Body Positivity***

- *My Body is Not an Apology: The Power of Radical Self-Love* by Sonya Renee Taylor and Ijeoma Oluo (2021)
- *The Selected Works of Audre Lorde* by Audre Lorde and Roxane Gay (2020)
- *Reproductive Justice: A Global Concern* by Joan Chrisler (2012)

### *Websites*

- *Association of Fertility Awareness Professionals*, [www.fertilityawarenessprofessionals.com](http://www.fertilityawarenessprofessionals.com)
- *Body Literacy Collective*, <https://www.bodyliteracy.co/>
- *Justisse College International*, <https://justisse.ca/>
- *Menstrual Health Hub*, <https://mhhub.org/>

### *Podcasts*

- *Fertility Friday* hosted by Lisa Hendrickson-Jack
- *Heavy Flow* hosted by Amanda Laird







**Do you want to spread this vital knowledge?**

If you're interested in collaborating on systemic solutions to close this vital knowledge gap, please email me at [angie@humanisingdata.com](mailto:angie@humanisingdata.com)

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