The next wave of education reform is one part of a much larger societal shift that hinges on the use of Big Data, predictive analytics, and digital profiling to control populations in a world of growing economic uncertainty and unrest. What follows is a speculative dystopian scenario, a world that could very well emerge from systems being put in place right now. It centers on two sisters, Cam and Li, who live in a near future New York where authorities have come to view human life primarily as a source from which to extract financial profit. Many elements of the story read like science fiction, but they are not. I've included links to sources at the end of each post so you can explore this reality for yourself.

The future is uncertain and unlikely to play out exactly as described. Nevertheless, we must begin to comprehend how technological developments combined with concentrated power and extreme income inequality are leading us to increasingly automated forms of oppression. My hope is that communities will begin to incorporate an understanding of this bigger picture into resistance efforts for public education and beyond. Let us join together, embracing our humanity, to fight the forces that would bring us to "lockdown." How can we preserve our lives and those of our loved ones outside the data stream? How can we nurture community in a world where alienation is becoming normalized? What do we owe one another? What are we willing to risk? I have divided my story into seven parts. I hope you'll read along and consider sharing it with others.

**Building Sanctuary**

**Part 1: Plugging In**
The year is 2040. Cam is thirteen. She should be an eighth grader, but after the government dismantled schools, lifelong online learning replaced classrooms and grades. Now she's just another free-range kid with a tablet, username and login. She dreams of building an e-portfolio that's competitive enough to land a job that will keep her out of the state's virtual reality (VR) warehouses. In a world increasingly without work, many people opt to go the avatar route. Plug in and you can curate your own online brand; refine the essence of your character into a parallel, gamified version of yourself and craft your own reality. Digital currency buys so much more in the virtual world that people choose to spend most of their waking hours there. It kills their intellect, but at least keeps them from overdosing in parks, libraries and cars, as was the case at the height of the opioid epidemic. Virtual reality is a socially acceptable addiction. Less deadly than heroin, it keeps bodies intact for continued data extraction.

It was ultimately fortuitous that the retail apocalypse shuttered so many shopping centers. Investors seized the opportunity to transform them into networks of virtual reality warehouses with connected dormitories for those who had been evicted or lost homes. Capitalism had made the leap to the digital realm the decade prior. It seemed a logical next step. Some with insider knowledge anticipated the Bitcoin crash and scrambled to invest their phantom wealth in virtual real estate on the Blockchain. Those in the know who shifted their investments made a handsome profit, but many more who did not change course lost it all. As poverty decimated the middle class, authorities rolled out a basic income program in digital currency called Global Coin. Everyone's Global Coin account was linked to a unique digital identity through a system known as Citi Badge. The Citi Badge system relies on biometric information to confirm validity of payments and other transactions associated with a particular citizen.

For several decades behaviorists had been using popular world-building games and classroom management apps to condition children to change their purchase behaviors. Rather than actual physical goods, which were becoming harder to procure as the world's resources were depleted, children were encouraged to embrace digital facsimiles. Who needed a closet full of real clothes when you could acquire a trendy wardrobe for your avatar at a much lower price? Schools eagerly embraced the concept, encouraging kids who couldn't yet read to code and program. In the minds of administrators, as long as students had a square on which to plant their avatar, they would have the freedom to choose their own version of the world, which they felt was a kindness. The real one was becoming more toxic by the day. Despite the initial novelty, there was a growing sense of unease and pushback, especially among the youth. They saw platform life for what it was, a hollow shell and a means to disempower their generation. In response they began adopting creative strategies to compromise the system by inputting bad data and refusing to comply.

There are definitely some luxurious VR warehouses outfitted with ergonomic fixtures of the finest materials and lounges where people still have the opportunity to talk face-to-face and re-anchor themselves in reality. Most, however, are really just sheds full of dinged-up headsets and grimy mats. Once immersed in their virtual worlds, people don't much notice, but it does takes a toll on the body. After months of immersion people begin to lose muscle mass and often develop bedsores and joint pain from lack of movement. Daily retinal scans are required for admission to the VR warehouses. Debt non-payment, dissident behavior, mental instability or a host of other qualifiers can shut down your Citi Badge, which permanently cuts you off from the digital economy and all services, including VR and shelter. For those who've been off-lined, access to even the grimmest VR warehouse is prohibited.

Those pushed off-line attempt to scavenge a living from the streets, but since much of the population has shifted to digital life in the warehouses, food is increasingly hard to come by. Managers of the VR dormitories use tracking sensors to keep close tabs on nutrition shipments, and nothing goes to waste. Early on the Solutionists, the authoritarian technocratic governance council that took over after the lockdown, used robotic patrols to round up off-liners and put them in work camps. With less and less physical work to be done, the authorities were disinclined to continue supplying even basic provisions and shelter and eventually shut down the camps and left the off-liners to fend for themselves. Drones with facial recognition quickly take care of the ones who pose a true threat, and having starving citizens in public view tends to keep everyone else in line. People prefer to distance themselves from this reality. The uncomfortable presence of the off-liners leads most strivers, those trying to work within the constraints of the system, to stay indoors as much as possible. No one wants to compromise their citizen score by lending aid to those in distress, and avoiding off-liners entirely has become almost impossible.

These days many kids get plugged in early, especially if they are black or brown or poor or an immigrant or have special needs. If the metrics indicate their human capital doesn't justify continued investment, they're culled from the education rolls. For every thirty children receiving online pre-k services, odds are only one will complete an educational pathway and attain regular paid employment. Investors aren't inclined to waste crypto-currency on anyone who's at risk of not meeting standards. Once a child reaches the age of nine, it's all about triage. Students whose human capital is deemed insufficient for

the actual workforce might be sent to do piece work in the data mines, or if they're lucky added to the ranks of the data generators in the VR warehouses.

Of course, there are children who never make it that far. Mortality rates for the poor surged after adoption of personalized medicine smart contracts; treatment handed over to algorithms that determined when a patient could see a human doctor, which was rare. Fewer and fewer people wanted to train to become licensed doctors because intense student loan debt, a crushing workload and bureaucratic micro-management made the profession increasingly undesirable. Now, people train to manage tele-health chatbots. These chatbots are notorious for misdiagnosis and rigid enforcement of treatment compliance whether or not it's effective or accepted by the patient. They may thoughtlessly prescribe medications that have become impossible to acquire if a person's citizen score is too low, which means many of the most vulnerable are labeled "problem patients." Because pay for performance determines how tele-health providers are paid, eventually such patients find it nearly impossible to access even online care. No health system wants to accept patients that will lower their rating.

Fortunately Cam has been blessed with good health, and her student data dashboard indicates she has potential. It updates in real time, drawing information from her online activities and a variety of education-oriented Internet of Things (IoT) sensors embedded in her learning environments. She hasn't given up hope that she will be able to maintain her striver status, get a job, and keep her family out of the virtual world. She knows it won't be easy and is steeling herself for the many challenges that living life in the real world will pose. She was assigned to the healthcare training pathway on her tenth birthday. That was when the ledger ran her academic, social-emotional, and genomic profiles and made the decision. She uploaded a year early, because participating in online pre-kindergarten gave her a head start building the dataset required. Healthcare is one of the three industry sectors assigned to her community. If she can earn enough badges in higher-level science and mathematics she just might be able to jump from the home health aide track to one for personalized medicine analytics. Those are the sought after jobs, some of the few that pay more than the Global Coin stipend.

Cam has always been motivated, so plowing through the soul-crushing online modules has been tolerable, but her younger sibling Li chafes against digital life. Li draws her energy from being with people, but opportunities for real interactions are few and far between. In a world where digital interactions are prized above face-to-face encounters, where control is valued over serendipity Li doesn't really fit in. She's the type of kid who has never met a stranger. She engages with everyone, which sometimes causes problems when the family leaves the house. Li doesn't really understand the difference between strivers and off-liners. Countless times her mom, Talia, has had to drag her away from street games with offline kids when they were out running errands. Play, in public? Even though one could make a case for it developmentally, this type of unstructured socializing was considered a spectacle, a dangerous one that could attract the attention of authorities. A few moments of parental distraction is all Li needs. The family's reputation score is marginally above average, but they can't risk being dragged down by her antics. Now that Cam is older she's been assigned to be Li's minder when they go out, which feels unfair. She'd much rather plug into edu-casts and get ahead on her modules than have to try and contain her sister's exuberant energy.

Global Education Futures Forum Agenda: Link
Pain Management / Virtual Reality: Link

Learning Ecosystems: Link
Blockchain and Universal Basic Income: Link
E-Portfolios / Badges: Link
Cities of LRNG / Badges: Link
Online Preschool: Link
Hackable High School: Link
Open Education Resources: Link
Learning Registry (Department of Defense/Department of Education): Link
Career Pathways: Link
Workforce Readiness "Soft Skills" Diploma Seals: Link
Virtual Economies: Link
Behavior Management / Classroom Economy: Link
Virtual Real Estate on Blockchain: Link
Virtual Reality Studios: Link
Virtual Reality and Neuroscience: Link
Virtual Economies: Link
Fielding Graduate University: Link
Retail Apocalypse: Link
Minecraft Education: Link
RedCritter for Teachers: Link
Human Capital Investments in Education: Link
Third Grade Reading Guarantee: Link
Student Data Dashboards: Link
Scholarchip: Link

**Part 2: A World Without (Much) Work**
As the Fourth Industrial Revolution got underway, automation wiped out more and more jobs. The disappearance of industrial work was grudgingly accepted. Then self-driving vehicles replaced truckers, bus drivers, delivery people, and car services. Even so, many were taken aback when digitization came for the service sector. As Artificial Intelligence hit its stride, teachers, nurses, therapists, paralegals, actuaries, financial advisors, film editors all found themselves cast aside, scrambling for new careers. It seemed everyone who could work switched to coding and cyber security. The threat posed by hacks to the vast Internet of Things had spiraled out of control, and they needed more and more people to build and maintain the simulations.

After tech and energy, the entertainment sector experienced some of the biggest growth from the shift to digital life. Talia supplements the family's meager digital stipend working as a Mechanical Turk. She picks up gigs, small jobs, coding bits of virtual worlds when people go off the scripts prepared by the Entertainment Software Association. Having a background in art gives her an advantage. Talia's high creativity ratings keep her near the top of the MicroWork platform where freelancers compete for short-term or even micro employment. These days, though, it's getting more and more difficult to earn hard digital credit. Many posted gigs are now issuing payment in skill points that can boost a person's citizen score but can't be exchanged for durable goods or used to pay down debt. If things don't let up soon she'll be forced to figure out some other way to meet monthly expenses that often exceed what's deposited to their Global Coin account.

As living wage jobs disappeared, social unrest grew. The Solutionists recognized it was dangerous to have young people together in one place where frustrations might coalesce into a challenge of state authority. Neighborhood schools in particular were a

point of concern, since they were one of the few remaining civic spaces where people routinely gathered. Device-based education provided an answer to this thorny problem. They would market it as "Future Ready," an innovative new approach in which students would get a "personalized" education that, incidentally, was also surveilled and isolated. It would play well to American ideals of individualism and consumerism. Promotional literature described this transformation as a learning ecosystem where "the city is your classroom;" only in reality most of the instruction took place online. Spread out in homes or small non-profit or faith-based settings, students would be easier to control, especially given universal adoption of smart home technology, always-listening AI personal assistants, and Domain Awareness public surveillance systems.

Online learning management systems also allowed authorities to carefully regulate educational content. Adoption of Open Education Resources meant Solutionists could edit, delete, or suppress information that might lead to troubling questions or dissident thoughts. Editing history could be easily accomplished with a few clicks via the Learning Registry. Orwell had laid it out years before, and now these addictive devices had evolved, as he predicted, into tele-screens that gazed out at citizens while citizens gazed in at them. A few times a week students unplugged and participated in a community-based learning program related to their career pathway, but RFID chips associated with their Citi Badges ensured they remained visible to the system. Any organization accepting even a micropayment from Global Coin vouchers like maker spaces, art studios, community theater, and apprenticeship programs had to comply with set standards and participate in evidence-based, outcomes-driven programs that fed children's data back into government systems. Student data was used to assess a program's "success" and determine payments to the service provider and those who had invested in it.

When the Solutionists rolled out learning ecosystems they also made skill dashboards public. Skills dashboards are dynamic visualizations of each person's academic, behavioral, and job training data. The dashboards, tied to Citi Badges, foster a culture of fierce competition among citizens since choice opportunities are limited, of course, to top performers. As long as most people remain strivers and focus on competing against one another to get to the top, organized resistance remains unlikely. After the lockdown, the expectation was that everyone would be required to participate in lifelong learning tied to workforce development. Industries that still employed actual people demanded a "just-in-time" labor force. No in-house training or professional development was provided. Instead, citizens were expected to self-finance their continued education, storing skills in an online learning locker with the hopes that they might successfully run the gauntlet and secure full-time employment. Few got that brass ring. Instead most were left with punishing debt for online course tuition that never led to paid work.

The decision to swap human teachers for online systems meant less money needed to be spent on salaries. As a result, more money could be directed to the tech and telecommunications industries. It also boosted data collection. All of that data allowed the Solutionists to profile citizens from very young ages. After they took control of the global economy, a decision was made to upload all digital interactions to a data network known as Oracle. Communications, interactions with gaming and instructional platforms, home-monitoring updates, work activities, and Citi Badge transactions were all funneled into the system. That way if a person was accused of a crime, all their data could be easily queried for evidence. As new laws were imposed, authorities could also run queries of past conversations, searches, and educational resources that citizens had

accessed to predict who, based on their history, was likely to break the new law and tag them for increased surveillance. Not quite pre-crime, not quite *Minority Report*, but close.

Securing all of that information was a challenge, but the ability to store digital data in DNA came just in time. Government server farms like the NSA Data Center in Bluffdale, Utah took an incredible amount of energy and water to cool. Rising fuel prices and prolonged drought made maintaining those dated systems nearly impossible. DNA storage centers were less resource-intensive. They could be distributed throughout the country, their operations largely, but not fully automated. Crews of disposable children labored around the clock finessing millions of vials of DNA into housings that linked their valuable contents to the vast dataset in the cloud. With their keen eyesight and nimble fingers, children were perfect for the work. Their little bodies darted cautiously and continuously among the tightly spaced racks and industrial processing machinery. These were kids who never got to upload or declare a pathway, but hadn't yet been off-lined. As long as they remained small, they could work in the claustrophobic data-mines doing Global Coin piecework. It was a grim existence, one evoking days of textile mills and child doffers.

In another age Talia would have been the type to homeschool her kids. Given the option, she'd prefer to stay out of the Oracle system entirely. Ironically everyone is now "homeschooled," and the freedoms the approach had originally promised have been subverted. Kids are homeschooled AND surveilled. Even though she's a gifted technologist, Talia resists the virtual. She held onto her books and even keeps a small stash of transit tokens in the junk drawer of the kitchen. Cam has caught her fingering them absentmindedly, trying to conjure memories of a time when you could move anonymously through the city; at least as far as the subway line would take you. Today access to transportation is all done through Citi Badge. Everyone's movements upload to Oracle and anything out of the ordinary could trigger a visit from a representative of the traffic analysis review board. No, anonymity is now a privilege of sanctuary citizens, the elite who live in sensor-free compounds far from Smart Cities like New York.

While Li might have liked to hang out with friends in the park, Talia doesn't want to have her identified as someone who regularly travels there. Parks are not viewed as productive spaces. Parks represent an earlier age of leisure, informal socializing, and connection to the natural world, all frowned upon under the Solutionist regime. She doesn't want to expose Li to the robot patrols either. Li is not yet savvy about the ways of the world. She must instead settle for an hour in an online chat room every once in awhile, but it's not the same. Cam sees her younger sister becoming more irritable and withdrawn, but there is no easy remedy. She keeps her worries to herself hoping Li won't be forced into a prescription video game treatment program.

Just before she goes to bed, Cam contemplates logging in to complete one more module of SkywardSkills, the supplemental program all the kids are supposed to participate in on top of their online schoolwork. If she can get enough points to bump her Lexiles, reading metrics, to the next level, maybe the system will cut her some slack and let her enjoy a book for just for fun. If she doesn't hit her projected target in a timely fashion her device starts to buzz with texts and emoticons that encourage her to login in for more "growth." But today it's late, and the dry non-fiction pieces are likely to put her to sleep, a fact that won't be lost on the algorithm that monitors her keystrokes and eye movements. Going too slow or too fast means Cam will be coded as disengaged which

will actually lower her score. So instead, she decides to turn out the light and call it a night.

**Supplemental Links:**
Fourth Industrial Revolution: Link
Jobless Economy / Automation: Link
Just In Time Labor: Link
Amazon MTurk Wages: Link
Orwell's Technology: Link
Learning Registry: Link
Oracle: Link
Virginia CyberRange: Link
IoT Home Monitoring: Link and Link
Automated Drones: Link
Mechanical Turks: Link and Link
Gamified Human Resource Platforms: Link
Entertainment Software Association: Link
UpWork: Link
Koru Predictive Hiring: Link
Unilever Game Based Hiring: Link
Online Reputation Management in the Gig Economy: Link
Universal Basic Income and Blockchain: Link
Biometric Government ID Systems / Aadhar: Link
Sesame Credit China: Link
Social Media Ranking Systems/ Black Mirror "Nosedive" Episode: Link
Online Skill Portfolios: Link
Bluffdale Data Center: Link and Link
Storage of Data Inside DNA: Link and Link
Foreign Intelligence Surveillance Court (FISA Orders): Link
IoT Transit / Parking: Link
Prescription Video Game Treatments: Link

**Part 3: "Smart" and Surveilled**
Cam and Li have grown up in a world controlled by sensors and data. All day, every day sensors watch, track and transmit information. The devices that make up the vast web of Internet of Things are tiny, but their combined power is incalculable. The most common IoT sensor in the pre-lockdown years was the smart phone. Practically anyone over the age of ten had one. Acting as a sensor, people's phones were a primary means of data collection, logging information about how people interacted with each other, with systems, and their physical world. The first sensors were created to monitor global supply chain shipments. Then, corporate, government and academic researchers devised a dizzying array of sensors to transmit data about most aspects of the physical world and how people live their lives in it. Instead of tracking pallets on cargo ships, they now track people, buses, energy, animals, art, storm water runoff, even sounds and footsteps. Each processor gathers a particular type of information that can be merged into the data stream for analysis. Predictive analytics algorithms, complex mathematical equations that anticipate future outcomes, tap into the data stream. Such algorithms can be used to predict when the bulb in a streetlight will fail, when a storm sewer will overflow, or even where a crime will happen.

For years authorities quietly built datasets that digitally documented community life using police body cameras and later cameras embedded into robot patrols. It showed incredible hubris to roll out such a program under the guise of citizen protection. The cameras, of course, were always looking out at the people, not at the police. Even with footage, police were rarely held accountable for crimes committed. Meanwhile, all aspects of people's daily lives were taken in; faces, routines, social connections; anything within the field of view of the camera was absorbed by Oracle. That such data would be turned against citizens in times of civil unrest should have been anticipated. Some who lived in communities that had experienced the evolution of brutal policing were indeed skeptical, but many held on to the idea that the cameras were well intentioned. Cam's mother vividly remembers the week of the lockdown, how teams were deployed strategically throughout the city in ways that made resistance futile. All those years, the police state's neural networks had been "learning" their neighborhoods and their faces all in the name of public safety.

Post lockdown, sensors and technology have been integrated into more and more aspects of daily life, pressuring people to make "good decisions." Strivers feel less and less in control of their daily activities. They await the next haptic pulse that will direct their attention and actions. Cam might crave a pint of chocolate ice cream, but her minder is watching the refrigerator and uses guilt to pressure her into choosing carrots and celery instead. If she doesn't comply, it will most certainly go into her health data log. Maybe Li wants to sleep late. Well, the sleep monitor strives to keep her on a productive R.E.M. cycle, so it raises the shades in her bedroom and turns on the shower down the hall at the appropriate hour. Is Talia driving to the corner store when she should be walking? Well, her auto tracker knows, as does her step counter, which means her insurance providers know, too. Maybe she can get away with it early in the month, if she has time to make up her activity quota before the 31st. Resources for healthcare are so constrained that people must demonstrate through data that their personal routines and lifestyle choices optimize preventative health protocols.

The Nudge Unit is constantly looking for new ways to incorporate behavioral triggers and feedback loops into online education and VR platforms, too. Buzz, buzz, a text appears. "Cam needs more points on Skyward Skills. It's time to log on." Or the pulse monitor indicates Li is too tense. Buzz, buzz, "Take a mindfulness break kid," breathe and reflect. Buzz, buzz, "Talia step away from the screen and walk around the block to avoid blood clots." Action triggered, data logged, repeat has turned life into one unending Pavlovian experiment. Existence has subtly shifted to align to the Solutionist outlook. Economic forecasters rely on people being rational actors as they develop financial projections, and if technology can be used as a tool to shape human behaviors and enforce "rationality," it is all the better for the global financiers who generate their wealth by speculating on the lives of everyday people. For the strivers, optimization has erased freedom and personal agency.

In the post-labor era, people have become more valuable for the data they produce than for their capacity to do physical work. Thus all but the off-liners have been integrated into the global corporate value chain as commodities. With biometrically-enabled Citi Badges, Cam and Li are not unlike tagged calves or farmed salmon, managed and processed without agency or recourse; lives controlled for the profit of others. The bio capitalist economic model values them only to the extent that they contribute their digital labor to the Solutionists' data-driven system of outcomes-based results. Algorithms hold tremendous power over Cam and Li. Using data generated through the Internet of

Things, Oracle can make predictions about the type of adults the children are likely to become. What their cost to society will be. What they might contribute as human capital. Should their family should fall into poverty, Oracle can evaluate how much profit there could be made providing services to "impact" their situation through Pay for Success contracts. Would the predicted rate of return on their lives justify expending the Global Coin required? The Solutionists say, "Just run the data; the data will tell us."

Talia tries to shelter the family from the data stream as much as possible, but that is has proven difficult. Accessing any public services demands data. Walking outside means you are under surveillance. Even at home devices keep tabs. Data has also become a currency people use to supplement their insufficient Global Coin stipends. The pretense that a person "owns" their own data and can monetize it is supposed to make them feel better about their situation. It doesn't. Each data transaction puts another piece of one's soul on the auction block, scrutinized by a predatory system that thrives on want and suffering. And it's always a buyer's market. No person in need is going to get ahead selling bits of data. These transactions are just stopgaps until the next Citi Badge stipend hits, a release valve that has thus far kept rebellion at bay.

At first the sensors seemed innocuous, uploading information about when a trashcan was full or telling people where parking spots were available. There were sensors that monitored air quality and ones that made sure streetlights were efficiently managed. People were enthusiastic. But then came the noise sniffers, and the motion sensors, and the drones. Parks and recreation officials were brought on board and encouraged to incorporate cyborg roses into public landscape projects. When first introduced, people were astonished at Eleni Stavrinidou's work transforming plants into transistors, and now there were rumors of computational forests being grown in remote outposts. Once plants had sensors, people started to get really worried.

Teachers never imagined how sensors would alter classrooms and eventually eliminate them altogether. Adoption of 1:1 devices eroded teacher autonomy until students were spending most of their day with volunteer aides, eyes glued to screens. The teachers that remained were left evaluating student data. In classes where teachers were still allowed to lecture, movement, vibrations and sounds were monitored through sensors embedded in seats. The aim? Supposedly to provide continual feedback regarding student engagement and quality of instruction, but everyone knew it was really to keep track of the content delivered and how students responded. It was chilling. By that point, the last remaining veteran teachers abandoned the profession. Eventually teacher shortages, austerity budgets, and the corporate education lobby's campaign for "anytime, anywhere" learning ushered in IoT-enabled learning ecosystems. No one had invested in public education infrastructure for years. Sending everyone home with a device meant there was no longer the expense of feeding poor children. Students too young to stay at home and whose parents were working strivers were packed off to community partners. These partners had been carefully prepared for their role providing standards-aligned summer and out of school time programs. Plus this approach brought education completely under the umbrella of social impact investing, which pleased the financiers. All in all it was a pretty seamless transition. Given how punitive the instruction had become, most felt a sense of relief when the time came to phase out schools entirely.

Ten years out Cam and Li, like the characters in Isaac Asimov's short story "The Fun They Had," have no idea what "going to school" means. Some nights before turning out

the lights, Talia tells the girls stories that give them a glimpse into that past. Yet, it is so far removed from their reality that neither can imagine what it must have been like to learn with a group of other kids. To have a human teacher and books, and go to a school building and spend the day there is a frightening prospect. People live isolated lives. Encounters with others are carefully managed. To spend a full day as part of a group, talking no less, seems a perilous and fraught enterprise. Now everyone is assigned an Artificial Intelligence (AI) "assistant," a lifelong learning guide when they receive their first education voucher. Cam tolerates hers, but Li is another story. They have quite the adversarial relationship. Li accuses her AI of giving her assessments that underestimate her actual ability, so she has to spend days and days going over material she already knows. Her games are always shorting out at a critical moment, right before her points are logged. The algorithm gives her essays failing marks, even though her mom and Grandpa Rex both say she has a gift for creative writing. Cam says that because the companies are rolling out so many new programs, glitches just going to happen and to not take it personally. People have always had frustrations with their devices, from autocorrect fails to systems freezing unexpectedly, but now that devices control so much more of people's lives their faults are harder to tolerate. Talia often finds herself having to get up from her work and do a hard shutdown of Li's tablet to give them both a time out.

The AI conversational agents and the platforms that host them employ a variety of tactics to ensure that Cam, Li, and all the children remain on task. Devices record ISPs and timestamps for logins. Keystroke and facial recognition data is stored, too. Wearable and biometrics are part of the equation. The early headbands and wristbands were incredibly clunky, but five years in they switched to IoT temporary tattoos with sleek designs that prominently identify each child's designated pathway and rank. It's a major milestone when a student attains enough credentials in their portfolio to upload and claim a pathway. The tattoos, not unlike military insignia, help communicate social order and expected etiquette when new people meet. A picture is worth a thousand words, and in a culture that is increasingly non-verbal, a pathway tattoo is an important tool.

To maintain order, the Solutionists knew behavioral engineering had to become central to the educational system. With little meaningful work, systematic mental health training was needed. They wanted people neither too depressed nor too rebellious. Resilience, and grit were traits instilled through apps and gamification; children's mindsets tracked as closely as the knowledge they acquired. The system was calibrated to identify mental disorders and dissidents early, flagging them for intervention. Both Cam and Li knew kids who had been forcibly plugged into remediation, but it wasn't discussed openly.

The isolation that resulted from cyber education took a toll on many. Social networks withered. Kids rarely spent time with friends face-to-face. Text-support only went so far in beating back the darkness. Suicide rates climbed, affecting younger and young children. Programmers scrambled to develop new monitoring procedures. The Global Well Being Program was a leader in the field, their cutting-edge algorithms effective, but expensive. Despite the high cost, sector education officials from all but the poorest communities debited funds for the monitoring service directly from student vouchers to cover the cost. Timely intervention was a matter of life or death, and people were willing to pay. In the post-labor world, monitoring and treating depression was a growth market. Before long tele-therapy and mental-health VR surged past bio-pharmaceuticals as darlings of the venture capital investment crowd.

By 2025 most major and mid-size cities had become "smart cities," integrating IoT sensors into a wide variety of infrastructure projects. In doing so, officials created a ubiquitous layer of surveillance across the public sphere. Now, in order to access communal spaces, residents had to acquiesce to being watched. Management of the complex IoT systems required expertise far beyond the in-house capacity of most cities; as a result, outsourcing to global corporations became commonplace. Over time voters found they had less and less voice in government. Officials kept up appearances for several election cycles, but it became obvious that technology companies like Sysko were really the ones in charge. People wanted to believe elections still mattered. The history modules made a point of expressing how hard people had fought for the right to vote and to fix problems like gerrymandering, but it the years leading up to lockdown it became a hollow exercise. Talia had memories as a teen of the media stirring up outrage over voting irregularities. Looking back, they should have realized something was amiss. The solution to this "problem" was to switch to voting on the Blockchain using Citi Badges. Of course that shift effectively shut all of the off-liners, those who had no badge, out of the process. Democracy was exposed for the charade it actually had always been, and it became clear to all that they had been living under fascism for a very long time. The cloud-based computing, telecommunication, and global finance interests united under the Solutionist banner and ensured authoritarian control was firmly in place. Global law enforcement working through the Blockchain Collaborative backed the technocrats in their coup. Now for Cam and Li, voting was a topic touched upon briefly in history modules where it was framed as a messy process no longer suited to the well-structured, transparent society the Solutionists had devised.

As the end game neared, secure and exclusive sanctuaries modeled after billionaire and media mogul Richard Braddock's island home began to appear. He was among the first to bring world thought leaders together to discuss ways to build and scale Blockchain applications. These thought leaders sold everyone a utopian vision of trust, transparency and collective support. Those purported values fell by the wayside, though, shortly after the lockdown. People with knowledge of edge computing, IoT, and Blockchain deployment and who had the money constructed sensor free zones to which they could retreat. Of course kids like Cam and Li will never be able to obtain access to such sanctuaries. That world is limited to families that can afford the astronomical costs of having human teachers for their children, whose social networks are such that they don't need citizen scores or e-portfolios to assert their value to society. Sometimes Cam and Li wonder about the sanctuary kids. Surely there aren't many of them. Are they lonely? Do they feel isolated, too? Are they glad to be unplugged? Do they know about life on the outside, life on the ledger?

**Supplemental Links**
Internet of Things IBM: Link
What is Blockchain: Link
Supply Chain IoT: Link
Cash VS Digital Economy and Online Payments: Link
Sidewalk Labs: Link
Smart Cities / Noise Sniffer: Link
IoT and Predictive Policing: Link
Police Body Cameras and AI: Link and Link
Patrol Robots: Link
Street Lights and IoT: Link
IoT Parking: Link

Storm water IoT: Link
Smart Trash Cans: Link
Sensors and Smart Cities: Link
Cognitive Drones: Link
Cyborg Roses: Link
Internet of Battlefield Things: Link
Pay for Success and Big Data: Link
Blockchain Social Impact Token: Link
Human Capital Analytics: Link and
Nudge Unit: Link and Link
Game Theory, Human Resources and Social Skills: Link
AI Nudge Bots: Link
Behavior Change for Good: Link
Haptic Devices: Link
Rational Choice and Behavioral Economics: Link
Education and Biocapitalism: Link
Behavioral Science and Social Impact: Link
Making Behavior Change Stick: Link
IoT Classrooms: Link
Sensors Determining Education Quality: Link
Affectiva Emotion Sensing Software: Link
Behavioral Biometrics: Link
World Well Being Project: Link
The Fun They Had: Link
Device Use Behavior Tracking in Education: Link
Virtual Agents / USC Institute of Creative Technologies: Link
AI Conversational Agents / Amelia IP Soft: Link and Link
AI Teaching Assistant: Link
Conversational Agents / Articulab: Link
Applied Gaming and Mental Health: Link
Brainwave Data Collection: Link
IoT Tattoos / Duoskin: Link
Pathways to Prosperity / Jobs for the Future: Link
Characterlab / Grit: Link
CASEL / Social Emotional Learning: Link
World Well Being Project: Link
Serious Games and Mental Health: Link
Government as Platform: Link and Link
IBM Smart Cities: Link
Cisco Smart Cities: Link
New York Smart City: Link
Blockchain Voting: Link
Neckar Island Blockchain Summit: Link
Edge Computing: Link
Blockchain Cryptoeconomics: Link
Blockchain Alliance: Link

**Part 4: Data Mining Life on the Ledger**
Solutionists maintain control over society largely through the ledger. The ledger evolved from Blockchain, a technology first used to process digital-currency transactions like Bitcoin, Global Coin's predecessor. But corporate and government interests saw it had

far greater potential. It started out as a decentralized online system through which transactions of all sorts (purchases, education credentials, marriages, property transfers etc.) could be permanently recorded in blocks that were secured by elaborate cryptographic protocols. Over time, private blockchains came to dominate the system. These were gradually consolidated by those aligned with the Solutionist agenda. Now there is one master ledger that keeps track of everything and everyone: inputs and outputs; ownership and debt; locations, activities, functions, and compliance. The ledger is the master accountant that is everywhere and nowhere. It lives on a distributed system of computers. It's promoted as infallible, untouchable. The Solutionists suppress any information that might undermine public faith in it. In a world of uncertainty, the ledger is a held up as a symbol of unquestioning trust.

In addition to facilitating and recording transactions, the ledger also calculates citizen scores, something no one with a Citi Badge can escape. These scores rise and fall based the data each person generates within the Solutionists' "smart systems." People are constantly evaluated against the norms set by the authorities. If your behavior, or that of your family or even friends or acquaintances, deviates from these standards, your score drops. People who question the system have low scores. People with extensive social networks have low scores. People who travel widely have low scores. People who access "the wrong" online materials have low scores. People who are financially unstable have low scores. Your score can be lowered for being too educated and not educated enough. People who use public services have low scores. If you have a low score, you become a target of social impact interventions, programs underwritten by private investors designed to bring your score up and reorient you to the values Solutionist society demands.

Citizen scores determine access to jobs, housing, leisure opportunities, and social relationships. They affect the prices people pay for goods and services and even the type of education and medical treatment they get. At birth Cam and Li, like everyone born outside a sanctuary zone, were assigned unique identity numbers linked to retinal scans and were each issued a Citi Badge. Their Citi Badges are connected to the ledger and hold funds from their Global Coin government stipend, student vouchers, and data currency transactions. Both badges are tied to Talia's, so the family's citizen scores rise and fall together. When Talia or the girls make purchases in the real world or in a virtual world the cost is directly debited from their Global Coin balance after biometric authentication. This can be accomplished via facial recognition, retinal scan, thumbprint or heartbeat/ECG signature. Prices and fees paid are dynamic and influenced by their scores. Low score? You can expect to pay more for food, rent, and medical care. High score? You get across the board discounts and special perks like invitations to official receptions and preferential treatment when filing government paperwork.

The ledger asserted its influence slowly but insistently as people's quantified lives were integrated into the data stream, and the real world melded with the virtual. At first people eagerly adopted wearable technologies that augmented reality through data overlays. Phones, devices, headsets, and smart contact lenses created blended experiences that could be both innovative and disturbing. Today, wearables are no longer a novelty. People are expected to use them to manage their existence and document it through data. For instance there is now an understanding that everyone will regularly monitor their brain waves, heartbeats, sleep patterns, and other bodily functions. It calls to mind the antiquated practice of documenting oil changes and maintenance on one's car to

keep the warranty valid. Gaps in one's health data profile could be grounds for being denied medical treatment.

As the economy was digitized, transportation and movement became increasingly circumscribed. No one has personal vehicles anymore, so unless you are walking or have a bicycle, you have to use DigiGo, the autonomous ride sharing system. The system requires you to have a Citi Badge and access to different sectors of the city varies depending on your citizen score. Each sector of the city has a digital border. Many opt to get implanted Citi Badge chips, which allow you to travel across sectors without manually checking in at the crossing. Citi Badge interfaces are cumbersome, and many of the newer operating systems no longer process device-based transactions. People without chips spend a lot of time waiting; but Talia still wasn't going down that path. The girls IoT pathways tattoos are as far as she was willing to go. They are in theory temporary and can be removed. She scrupulously limits the data shared about her family to the bare minimum. She kept their outdated devices, even though they are on their last legs and barely hold a charge. Whenever possible they walk, restricting their use of DigiGo to situations that absolutely demand it. They hope one day their budget will allow them to get their hands on a few refurbished bicycles. If you have a worthwhile barter, you can often find an off liner with one to trade. They are sensor free, and if outfitted properly allow flexible travel well beyond the authorized network of corridors used by self-driving vehicles.

The planet's resources had been all but exhausted, and eventually oil and mineral mining yielded to data mining. Enormous energy demands created by the transition to Blockchain depleted the last of the petroleum reserves, forcing a rush into alternative energy infrastructure projects that could support the mining operations demanded by the ledger. Authorities had not planned ahead. Energy needs were so pressing that the systems being rolled out were not well tested, and installations often failed or created dangerous conditions for the installers and those who lived nearby. In short order, bio-capitalist data-mining operations became nearly as profitable for investors as the extractive industries they had replaced. The automation of huge swaths of labor markets initially posed a serious problem for global capitalists. With a majority of people now jobless, what good were they to the economic system? Sure, they could still consume some products since Citi Badge provided a basic income, but how else could value be extracted? Consumption on a basic income would have to go down.

Alphadata, the world's most powerful cloud-based computing company, had anticipated the answer. The company deftly maneuvered to a spot at the top of the extraction pyramid by providing "free" online services: communications, software, and data storage. Data would be the new oil, and the convenience the company prudently offered the world built a level of corporate wealth in data that was unsurpassed. The complete privatization of public sector services combined with outcomes-based government contracting created a windfall for the data-mining industry. To expand these programs, success would have to conform to specific metrics that could only be cheaply aggregated via digital platforms. As global poverty rose, prospects for the data-mining sector seemed rosy indeed. Looking back, people realized how false the narrative of "free" services had been. They had given away their most valuable assets, their identity, without blinking an eye. Their online lives, their digital shadows, were now contained within the Alphadata cloud. It was a parallel universe of millions of digital lives pooled to fuel machine learning. It was these storehouses of data that powered the company's research in artificial intelligence and led to innovations that put so many out of work.

People had been handing off their data to more companies than Alphadata, of course. All the social media platforms and e-commerce sites mined data, too. More and more people clamored for data control and ownership, which was eventually granted through digital sovereign identities stored in the ledger. Essentially, Citi Badges serve this function. The datasets they hold are private, but people have the option of making them available for a price. Progressive interests pitched digital identities as a way for people to monetize their data, perhaps enhance their meager Global Coin stipends. In the Global North, digital sovereign identity was ushered in through adoption of municipal identification programs associated with Smart City improvements, the precursor to Citi Badge. The technology had been beta-tested on the Global South and refugee populations years prior. Perpetual war and displacement created an ideal laboratory in which to refine these new technologies.

Data banks replaced blood banks. In a pinch, the poor could sell themselves to get by, while the rich could sit on their personal data treasure and maintain their anonymity. Even for those for who lived comfortably, data sharing was still a tricky matter. In the abstract you could attempt to keep your data from ending up on the ledger, but practically speaking no public services were accessible if you refused to participate in the biometric data system. Everything was tied to outcomes-based Pay for Success contracts, including public education. If you or your children wanted access to services, the price was entering the ledger's data stream.

Talia hated to relinquish the family's data, but found it necessary at times. For example when Li broke her arm in the maker space loose parts play area, Talia initiated a data currency transaction that released two years worth of the family's purchase data to cover the unexpected medical costs. And Cam and Li's educational data is, by default, part of the stream. The Solutionists have full access to it for the purposes of evaluating Cam and Li's citizen scores and pay-for-success contracts with their education providers. Talia hopes she never has to sell that to a third party; because she knows it could impact the girls' ability to access income sharing agreements in the future. But many parents in her sector have to make hard choices to pay the rent. The Citi Badge stipend only goes so far each month, and selling educational data is a common way to make ends meet. Selling that data can lead to problems for children down the line. Data that implies academic or behavioral weaknesses can lead to students being excluded from learning opportunities; being denied opportunities to secure loans to cover tuition; being relegated to the lowest paying jobs. Nevertheless, people have to eat and keep a roof over their heads, and data currency transactions are the most common fallback they have.

The only way to leave the data stream is to go offline, which means disconnecting from the Global Coin economy entirely and losing access to all public service supports, housing, and employment. It also means finding ways to be fully human outside a digital platform, to relearn how to simply be with others without a buffer, without data, to embrace speech and touch and even the written word. People are understandably fearful of off-liners. Their rebellious insistence to exist, even in such dire conditions, outside the structured confines of Solutionist society, is a fact that has the potential to destabilize the whole enterprise. Most try to ignore them, but a few harbor quiet hopes that a new non-digital economy might somehow, miraculously emerge from the lives they live. Such hope flickers in the hearts of a handful of hardy souls who hold fast to the possibility of a future built on trust in one another rather than trust in the ledger. Though

she only admits it to herself, Talia is one who still thinks another world may be possible. How could she not? She has young children whose futures are yet unwritten. Falling into despair would hurt not only herself, but her entire family, too.

**Supplemental Links**
Blockchain: Link
Blockchain Universal Basic Income: Link
Smartphone Augmented Reality: Link
Sesame Credit: Link
Entrepreneurial Finance Lab Harvard: Link
MIT Digital Currency Lab: Link
Aadhar National Identity System India: Link
Aadhar Biometric Payments: Link
Biometric Bitcoin Wallet: Link
Heartbeat / ECG Biometrics: Link
Retinal Scan Payments: Link
Biometric Capitalism Talk Keith Breckinridge: Link
Black Mirror Episode Nosedive: Link
Cambridge Analytica: Link
Blockchain Technology of Trust / Goldman Sachs: Link
Blockchain Economy: Link
Blockchain Energy Consumption: Link
Dynamic / Personalized Pricing: Link and Link
Lucyd AR Glasses: Link
AR Contact Lenses: Link
Transference VR Horror Game/Film Experience: Link
IoT Digital Health Monitoring: Link
Implantable Chips for Access: Link  and Payment Link
Biocapitalism: Link
Google's Eric Schmidt Data is the New Oil: Link
Google AI Awakening: Link
Self Sovereign Identity: Link and Link and Link
Decode Digital Identity: Link
UN ID2020: Link and Link
Blockchain Data Monetizing Platforms: Link
Municipal ID Card / Payment Programs: Link and Link
Digital Colonialism: Link and Link

**Part 5: Automated Education**
The total reinvention of public education could not have happened without the ledger. The ledger makes it possible to disconnect students from school buildings and human teachers and shift to a learning ecosystem model. For years the mantra had been "any time, anywhere learning." By the time lockdown came, deferred maintenance had resulted in such horrific building conditions that few neighborhood schools could maintain their occupancy permits. It was cheaper to send older children home with a device and farm the younger ones out to community-based partners. With IoT sensors that could sync with learning management systems through xAPI, whatever children "learned" could be recorded automatically without the need for a human instructor. Most educational content had been broken down into such small standards and micro-credentials that it was almost impossible for human teachers to keep up with all the data entry as the system transitioned.

Internet of Things technology, combined with Citi Badges, allows the ledger to control Cam and Li's access to online education resources. Besides the ability to edit or veto the content of the online modules, education administrators have the ability to adjust algorithms to steer students towards certain pathways, into VR warehouses, or in extreme cases offline entirely. Cam knows the playlists, online lists of educational activities that the algorithms provide, that Li has been accessing are very different from the ones Cam had just a few years ago. Cam isn't sure if it is because the content has been removed, or if it's just that because of her behavioral profile means Li is being fed different information. Outside the sanctuary zones, knowledge is strictly "need to know." The Solutionists have the power to decide who needs to know what and ration information accordingly.

After cloud-based computing came on the scene, the powerful ed-tech industry emerged in the education sphere. Thousands of start-ups now compete to design adaptive software systems that curate "personalized" resources for educational playlists and facilitate behavior management. Foundations and benefit corporations poured in money to ensure these markets took hold. With children reading fewer books, digital media - particularly games - have become the primary form of education delivery. Executives in the entertainment industry are thrilled since they, along with the tech executives, had long sought to eliminate local oversight of curriculum and the influence of elected school boards.

Investors need their products to demonstrate impact on student achievement. However the impacts they seek prioritize efficient human capital management, not personal fulfillment. Online programs dole out basic information aligned to set standards. Education is consumed passively, and students are expected to demonstrate "success" by improving their scores, collecting badges, and providing evidence of an appropriately resilient or gritty mindset. If their online systems can attain "evidence-based" status, they are given a preferred ranking in the Citi Badge platform, which means significant profits. It is every programmer's dream to create the next Skyward Skills, the global ed-tech giant that has dominated the market since it had been introduced into regular schools twenty years ago as a blended learning program.

The ledger also links the sisters to project-based learning opportunities in their community. Algorithms match Cam and Li's varied learning styles, academic talents and behavioral factors with available placements. These placements have taken on great importance as education has moved away from intellectual engagement towards a program of workforce-aligned skill development. Coding is king, and education administrators have complied with industry demands, stripping arts and humanities from the curriculum and giving exclusive attention to STEM (science, technology, engineering and mathematics). Most project-based learning programs are STEM-aligned.

Talia remembers the shift to community-based learning. It was pitched as a way to reduce education costs and provide free labor for local companies. Parents wanted to believe the reformer's pitch that their children would be able to "follow their passion" through "hands-on learning" opportunities. But it was hard to rouse much passion for the job placements provided. The apprenticeships were rarely as exciting as those featured in the exuberant promotional videos. Corporate partnerships tailor students' educational experiences to very specific industry needs. This model permits companies to have the

public underwrite their training costs and gives them opportunities to screen potential employees.

Now, starting in middle school, children are matched through Future Jobs+ to apprenticeships. Apps track and evaluate their performance according to character trait metrics associated with workforce readiness. Project-based learning opportunities allow Solutionists to monitor skills like empathy and collaboration through face-to-face encounters and compare that information with the data gathered by gamified education platforms. Cam has participated in three Future Jobs + programs so far, most of them related to the community's assigned labor sector of healthcare. Li, age 10, is still too young for an apprenticeship, but she's been doing maker space programs since she was three. Since she hates online learning, her hours at the maker space are some of the few enjoyable moments of her week.

Whenever Cam or Li demonstrate mastery of a certain standard, a smart contract written in computer code sends a Global Coin payment to the online provider or project-based learning partner. Through the ledger, payments are debited from their Citi Badge accounts, and badges and micro-credentials are uploaded. IoT sensors monitor all educational activities. For years activists had petitioned the government to implement weighted student funding: this meant allocating more money to students living in poverty as well as to students whose first language was not English and students with special needs. No one realized then that education funds would wind up in Citi Badges rather than school budgets; that weighted funding would make vulnerable children targets of predatory education schemes; and that in short order school buildings would disappear entirely. No one expected Artificial Intelligence philanthropy would replace public funding for education, either.

As austerity ate away at funding for education, foundations, benefit corporations, and impact investors used outcomes-based smart contracts to direct private dollars into communities using the ledger. Dwindling public funds opened the doors to this private investment, but a condition of that investment was that it had to yield measurable results. Education administrators in the various sectors now redistribute private education investments into students' digital wallets according to weighted formulas.

At first the program was well received. Once Pay for Success rate cards were approved by municipal procurement, and learning management systems were selected, the process of securing online learning services became fully automated. Now it is the ultimate free market with deliverables in student data driving access to and pricing of various platforms. Payments are contingent on student performance. If an educational app is not meeting required growth targets among users it can be put on probationary status and may ultimately become ineligible for Citi Badge compensation. The most popular apps tend to be the least expensive, but for strivers who have money to supplement their account, specialized instruction is available at higher price points.

Of course that means most instruction has to take place online, though with Tin Can API, even non-digital activities can be captured and uploaded for evaluation. Every time Cam or Li finishes an e-book, watches a video, or participates in an activity, documentation of the standards that have been met is uploaded via Citi Badge to their e-portfolio. That way Oracle can keep track of what everyone knows and what information they are accessing at all times.

No one particularly likes relying on private investors to fund public education, but the Solutionists claim it is efficient, transparent, and keeps everyone accountable. The ledger, remember, is all about trust. People's feelings changed dramatically, however, after DAOs (Decentralized Autonomous Organizations) took over. DAOs run smart contracts automatically, without any human control. Once put into place and activated, they draw on vast pools of capital from a growing network of benefit corporations and can run indefinitely. The system, designed to generate "impacts" upon which venture capital profits are built, completely disregards human life. When problems arise, as they inevitably do because glitches and hacks are intrinsic to the system, no humans are there to address it.

There have been years when data from Cam and Li's learning sector didn't meet the terms of the contracts. When that happened, students were cut off from enrichments and project-based learning opportunities. Turnaround sectors can use Citi Badge payments only for drill and kill online courses until scores improve. Students spend most of the day on Skyward Skills, which is enough to make any child mentally shut down. During those years, Talia opted to go into debt to pay for outside enrichment for the girls with the hope that their sector data would improve and get them out of turnaround status before the next round of payouts. At the time, the family's risk score was ok, and they were able to secure a repayment program that still left room in their budget to eat, but just barely. They have friends whose families don't have that luxury. It is not uncommon for children in turnaround status, after being force fed Skyward Skills day after day, to just drop out of public educational altogether and check into a virtual reality warehouse.

As far as education, the off-line children are an anomaly. They exist outside of the structure of the formal education system. Yet they are still connected to the real world, because the revocation of their Citi Badges means they have no access to the VR warehouses. Many spend their days pushing DNA vials through the claustrophobic corridors of the data mines. Unlike their badged counterparts, the off-line children can't be paid in Global Coin, so their labor is informally exchanged for a bit of nourishment and the chance to be out of the elements. After their shift they drift off to one of the off-liner encampments that emerged in old cemeteries in the post-lockdown years. There, tree cover and gravestones offer some protection from drones and robot patrols.

For off-liners, education is visceral and grounded in harsh life experience. Being in the real world without the safety net of digital supports is terrifying and immediate. This is a feeling those in the VR warehouses and the strivers plowing through Skyward Skills modules will never know. Off-liner children learn from peers and elders. No matter their age, citizens of the encampments generously share their skills and knowledge. They need one another. Disconnecting from the data dashboards freed them from the cutthroat competition of life on the ledger and opened space for them to find their own ways to meaningfully contribute to the eclectic communities that grew out of their expulsion from the Solutionist world. Off-liners bear witness to the grim reality the terrorist regime has imposed in a way that strivers, who have become accustomed to their oppressors' controls, cannot. Being off-line means being anchored in reality, morality, and humanity. It is in this space that the possibility for revolutionary thought is sustained.

**Supplemental Links**
Learning is Earning / Edublocks: Link
A Learning Day 2037: Link

Gig Economy / Teaching Workforce: Link
Open Education Resource Commons: Link
Beacons in Education: Link and Link
EU Blockchain in Education: Link
Blockchain E-Portfolios: Link
Learning Registry: Link
Playlist Education: Link
Jefferson Education Accelerator / UVA: Link
Educational Savings Account Debit Card Arizona: Link and Link
Reed Hastings / School Boards: Link
Smart Contracts and Learning Ecosystems / Knowledgeworks: Link
Hackable High School: Link
ImBlaze Salesforce/Big Picture Learning: Link
Big Picture Learning: Link
Bechtel Foundation / Character Development: Link
CASEL: Link
Skills Gap: Link
STEM Push: Link and Link
Coding Automation / Low Wage: Link and Link
Learning on the Block / Knowledgeworks: Link
Blockchain and Badges: Link
Digital Credentials: Link and Link
AI Philanthropy / Giving Unchained, Philanthropy and the Blockchain: Link
Weighted Funding, Digital Learning Now P. 8: Link
Pay for Success / Brookings Institute: Link
Pay for Success / Outcomes Rate Cards: Link
Municipal Smart Contracts on Blockchain / Procurement: Link
Pay for Success Rate Cards: Link
Open Badges IMS Global / Mozilla / Collective Shift: Link
Microcredentials: Link
xAPI / Tin Can API: Link and Link
IoT Classrooms / Wildflower Montessori Slippers: Link
Decentralized Autonomous Organizations: Link

**Part 6: A Community of Resistance**
It had been a challenging spring for Cam and Li's family. Uncontrolled fires burned through California, disrupting both the tech and entertainment industries. Virtual Reality and gaming companies were recycling old content rather than offering new gigs, so the family's income suffered. What made it worse was that Talia had entered into an income-sharing agreement to pay for VR classes, and their devices constantly buzzed with aggressive complaints from her investor. Cam has been logging extra hours of SkywardSkills when she normally would be reading. The college prep partner she goes to once a week is running a competition, and the student who logs the most time gets a substantial payment to their Citi Badge account. Cam has put a lot of pressure on herself to stay ahead of the other students, but everybody is desperate for Gold Coin, and as the deadline approaches it is harder and harder to keep up. She's lost a lot of sleep the past couple of weeks and it is getting harder and harder to focus.

Li responds to the stress by shutting down. She refuses to log on to her education modules, and it is getting harder and harder to drag her out of the house, even to go to her maker space placement. Her relationship with her AI learning assistant is on the

rocks. She's been entering false information into the social emotional surveys as a way of rebelling against the system, without realizing the long-term implications her actions will have. Academic participation by minors is a key indicator that affects the family's citizen score. If Li's activity levels dip any further it will likely trigger a home visit, something Talia wants to avoid at all costs. Cam harbors suspicions that Li might be cutting herself. Even though temperatures are rising, Li hadn't pulled out any t-shirts, preferring long sleeves even when it gets into the 80s. She doesn't want to alarm her mom, but clearly Li needs professional help. All the local clinic can offer is an evidence-based chat-bot therapy program. That won't be enough.

Cam is vaguely aware that her mom has been meeting with grandpa Rex online and has an uneasy feeling about it. Talia calls a family meeting to discuss a possible solution. Rex had been living alone in the family home after Talia's mom died of medical complications after the lockdown. He'd been able to hold onto his property through the Bitcoin crash, but now seemed like a sensible time to let it go. He'll move in with them into the apartment in Queens. It will be tight to have all four of them there, but the proceeds from the house will surely be enough to pay for real therapy for Li; therapy with a real person, off the books, with no data collection. They expect it will be expensive, but worth it. Through word of mouth they find Mak, a counselor who still offers a face-to-face treatment.

Mak is an outsider who keeps his personal life under wraps. He sees clients in an office located in a former library in Queens. He serves mostly off-liners, doesn't take Gold Coin, and prefers payment in bartered goods or services, especially books. Public libraries had been shut down years before the Solutionists finally seized power. As people were drawn inexorably into the digital life, fewer and fewer read actual books. Some libraries were turned into maker spaces or even micro-schools, but the Richmond Hill branch, an antiquated building dating back to the Carnegie era, was deemed too small to be useable. The city simply closed it up, locked the door and walked away. Even though the building has much more space than he needs for his practice, Mak acquired it with the intention of supporting broader organizing, political education, and resistance efforts. He eliminated all sensors and removed RFID tags from the remaining books. He doesn't take clients with chips, and no devices are allowed in the building. Anyone with an IoT tattoo must remain outside.

The building sits on a small triangle of land along a commercial corridor situated a half-mile from Forest Park between the Maple Grove and Cypress Hills Cemeteries. There are five rooms, in addition to Mak's office in the basement. One is a reading room, another a spare parts and bicycle repair space, a third holds clothing and domestic items (non-IoT) for sharing, while the fourth is set up as a communal food prep area. The fifth, locked, is used for resistance strategy meetings. An expansive arbor shades the south side of the building and provides a space where visitors who have IoT tattoos are still able to gather and join in discussions. As long as the weather cooperates, weekly political education sessions take place there in the shade of the grape, melon, and squash vines. The sound of jazz and blues emanating from the hedge is a sure sign people are sitting out. Music sets the mood and masks conversations from noise sniffers. Sometimes there is live music, but often it's vinyl recordings. They never use digital, because authorities are keen to identify those accessing revolutionary music through streaming services.

Even though Mak owns the building, the community directs how it is used and gives the space its vitality. Most people come from the cemetery encampments at Maple Hill and Cypress Grove, settlements created shortly after the work camps closed. Targeted by the authorities, people of color, immigrants, the homeless, and veterans comprised the first wave of forced labor. Disenfranchised, lacking papers, or with mental health diagnosis, they found it impossible to acquire Citi Badges. They were the original off-liners, people who never had to unplug, because they'd been written out of Solutionist society from the outset. They gathered together among the gravestones under the shelter of venerable trees to build their own community. With no stake in the old system, the cemetery contingent became the core of resistance in the borough.

They are a creative bunch, devising ingenious guerrilla tactics that target the Solutionists' surveillance and police systems. The expertise of veterans has proven invaluable, as they have direct knowledge of the technologies' military applications. A number of edge-computing technicians, software engineers, and roboticists have found their way to the encampments. Most went underground in the months prior to the lockdown, knowing that refusing to comply with authoritarian demands would lead to their execution. These experts, in collaboration with encampment residents, continue to refine low-tech ways to decommission IoT monitoring systems, robot patrol charging stations, and the solar Bitcoin dust miners that keep the ledger running. Nan is one of the Maple Hill Cemetery elders. She retired from a career in telecommunications, and saw the Internet evolve from broadband to 5G and edge computing. People look to her for her technical insight, foresight, and people skills. Nan has been a guiding force in efforts to destabilize Solutionist control of their sector. The resistance has been able to secure a corridor of relatively free movement between the encampments and Forest Park and hopes to expand its reach into Flushing Meadows once they train more teams.

The resistance cautiously embraced Mak when he arrived two years ago; access to power, water, and secure storage was a compelling reason to partner. The cemetery contingent shares provisions they scavenge and help keep the space secure, while Mak provides a satellite base of operations where members of various encampments can come together and strategize. Behind the locked door in the basement, the inner core of the resistance has been working on a lab to investigate more technologically advanced techniques to undermine the Solutionists' systems. That first year they bestowed the name "Wheel House" on the library, understanding that a wheel steering a course forward was a powerful image, even if the final destination remained unknown. Bringing people together to imagine a world in opposition to the terror of the Solutionist regime keeps hope alive. It is a space where each person, like the spokes on a ship's wheel, is essential, and by coming together around a central hub they will move in a new direction. In a surveilled, digitized world, the Wheel House offers a safe place where people can strengthen the relationships needed to build a different future.

Mak comes from a moneyed family, a sanctuary family, which is how he was able to acquire the Wheel House, and why he is so concerned about technology; he knows its power. He grew up on Gonave, an island off the coast of Haiti. Before he was born, Gonave was sold to an investment consortium that expelled the local population and remade it as a sanctuary zone. He grew up surrounded by self-absorbed people whose lives revolve around what they own. Most made their fortunes in defense contracting, software development and social impact investing, as militarism and rising global poverty created unlimited financial opportunities. Mak never fit in there. As a child, he spent most of his time reading and hanging out at the helipad chatting up pilots about the larger

world. Rather than material wealth, Mak is interested in books, ideas, and the natural world. He has a rebellious streak. His late father named him after Francois Mackandal, the eighteenth-century revolutionary who believed in freedom for all people and used his knowledge of native plants and medicine to wage guerrilla warfare against Haitian slave owners. Mackandal's weapon of choice was poison, because the slaves had no guns. He understood that you use the knowledge at your disposal to disrupt oppressive systems.

As a teen, Mak became increasingly disaffected with island life. His mother, an executive with a global VR outfit, eventually packed him off to New York for a community service placement, feeling certain the harsh environment there would be such a shock that Mak would run back home, chastened. This didn't happen. Instead, Mak trained in social work and made a life for himself in a world unlike anything he had ever known. Sanctuary kids are raised with very little technology. Being raised on an island community, the small population means everyone knows everyone else's business. You can find space to be alone, but you really have to go looking for it. When Mak first arrived in the states, the level of social isolation he felt in the midst of so many people was hard to process. Everyone was absorbed in a world of their own, mediated through devices. He'd never seen anything like it.

Mak joined a large health system once he completed his training. It was run by Alphadata and specialized in urban populations with "complex" mental health needs. He left that position after less than a year. It hadn't taken long to realize that the protocols that had been developed were intended to force to people conform to and manage themselves within the Solutionists' oppressive systems rather than lead them to healing. There was tremendous pressure on counselors to expand caseloads to the point that they were primarily data managers and had very little time with patients. Treatments like Virtual Reality, prescription video games, and text supports had taken priority over face-to-face treatment. This approach generated the data demanded by the municipal contracts, but did little for his clients, many of whom were veterans of the drone wars before operations shifted to AI and facial recognition.

After leaving Alphadata, Mak spent several more years in self-directed training, finding through informal networks elders who knew the work before it became data-driven and had experience with alternative, non-digital therapies. He returned to Queens and slowly began to build a network of contacts. He gets no algorithmic referrals, has no online reviews, no online reputation presence at all. In fact, you can only find him by word of mouth, and since few people actually speak to one another anymore, those who end up on the doorstep of the Wheel House are generally of a like mind. Mak's treatment goals are to connect his clients with their humanity and empower them to find personal agency in a world where Solutionist systems undermine both. A key part of this approach is connecting his clients to community. In this sector of Queens, a community has grown up in the encampments, at the farm, and at the Wheel House. They are a community of the unplugged. Through their connection to Mak, Li, Talia, Cam, and Grandpa Rex have been brought into the fold.

**Supplemental Links**
Income Sharing Agreement: Link and Link
Chat / Text Therapy: Link and Link
Social Impact Bonds and Behavioral Health Home Visits: Link
Gonave Island, Haiti: Link

Francois Makandal and Haitian Revolution: <u>Link</u>
Closing Libraries: <u>Link</u> and <u>Link</u>
RFID and Internet of Things: <u>Link</u>
Micro Schools: <u>Link</u>
Marronage: <u>Link</u>
Citiblock Health Care: <u>Link</u>
AI Drone Warfare: <u>Link</u> and <u>Link</u>
Drone Swarms: <u>Link</u>
Robotic Security: <u>Link</u>
Saturday Free School: <u>Link</u>
League of Revolutionary Black Workers: <u>Link</u>

**Part 7: Choices**
Mak and Li meet twice a week, and Talia brings produce from her container gardens, sketches, books, and articles in exchange. Some of the money set aside to pay for therapy is instead used to cover replacement IoT tattoos. Li cannot enter the building with one but she needs to wear one to take part in her IoT education activities. The cost adds up, but Li seems to be making real progress so no one regrets the expense. Grandpa Rex often comes along. It's crowded in the apartment with all four of them there, and like many of his generation he appreciates being in the company of other people. He strikes up a friendship with Nan. They both spent their careers in the telecommunications industry, though with competing firms. They often reflect on the promise the Internet held before it was reigned in by corporate greed, and lately have taken to retreating to the basement lab for hours at a time.

Rex put some more of their nest egg into new equipment for the lab, and though the details are not openly discussed, most are aware that efforts are underway to test more technologically advanced resistance strategies. As with Mackandal's efforts to end slavery through poison, the cemetery contingent hopes to find a way to poison the computerized systems that hold their communities hostage. They've been investigating the possibility of compromising the VR headsets with the goal of mobilizing warehoused citizens. Some of the off-liners at Maple Hill have relatives who are scraping out a miserable existence in the VR shipment terminals. Even with automation, some humans are still needed for quality control. If they can introduce a virus into enough units perhaps they can start a chain reaction that will shake those that have been plugged in out of their torpor.

Nan spends her mornings helping coordinate operations at Maple Hill. Everyone who lives there participates in tactical resistance, supply procurement, farm management, maintenance, care of children and elders, or some other communal task. It is difficult work. There is never enough food or shelter for the growing ranks of off-liners. Sanitation is a huge challenge, and with crowded conditions disease outbreaks regularly sweep the camp. Even so, people continue to stream in. Life in the gig economy has become untenable, forcing more and more families into unmanageable debt and out of their homes. The VR industry has a hard time keeping up with demand, and many of the entry-level warehouses have wait lists. Joining an encampment is preferable to being alone on the streets with DARPA and Palantir's drones and robot patrols.

Afternoons for Nan are devoted to the basement lab with the technologists, but she takes break every so often and decamps to a folding camp chair on the terrace, a basket of yarn at her side. Crocheting is meditative, and working with her hands helps her think

through difficult problems. She taught Li the basics, and now Li can make a granny square on her own. Even Rex, always up for learning something new, is giving it a try. It takes about a week to make enough squares for a scarf, a month for afghan. These items provide warmth, but more than that as handmade gifts they symbolize communal care and are treasured by their recipients. It may seem frivolous to undertake such projects, but in a world so out of control, creating something tangible and beautiful, one square at a time helps push back despair. The off-liners keep an eye out for worn sweaters they can unravel for yarn. At the Wheel House, mending and repurposing items that would have been tossed are valued skills. They embrace the sentiment of kintsugi, that there can be beauty in the repair of broken things. Life on the ledger has broken people in countless ways, so the idea that there is a possibility of repairing damage and moving forward is central to their collective hope for a better future.

Another regular at the Wheel House is Nan's sister, Vi, whose area of expertise is traditional remedies and native plants. The domesticated lands of the city are now wild and overgrown. Few are inclined to maintain yards, and there is no money to keep up the parks. There is food and medicine for those who know where to look. Vi has created raised medicinal beds around the perimeter of the Wheel House that she uses to treat residents of the encampments. She eagerly shares her knowledge with anyone who expresses even a hint of interest, and often sends Talia home with bags of chamomile and mugwort to ease a troubled sleep. Learning about these remedies has been fascinating for Cam, who has started to engage with science in a new way. She has latched onto the farm crew teens that come to the Wheel House to rehydrate. A welcoming group, they have invited her to join them whenever she can. Cam spends a couple of days each week learning the basics of soil science, seed saving and crop rotation, skills that were almost lost in the shift to indoor hydroponic IoT agriculture. These direct applications of science excite her in a way the labs in Skyward Skills cannot. Cam's online studies have started to slip; it's hard to focus on badges and modular learning when the real world is out there waiting. Perhaps Cam is more like Li than she cares to admit.

In the late afternoons, people gather to prep meals for the encampments. The Wheel House is midway between the Forest Park farm and Maple Hill, and since Mak has running water and a basic kitchen, much of the work is done there and finished on site. At least once a week, Talia's family helps with a meal. Cam is proud to see the vegetables she tends shared this way, but it pains her that it's impossible to make the produce go as far as it needs to. At home they have to stretch their budget with rice and oatmeal and sandwiches, but the level of deprivation in the encampment is staggering. As a single parent Talia has a hard time making ends meet, but until now she sheltered Cam and Li from the harshest realities of life outside their sector. Seeing the off-liners first hand makes it hard for Cam to maintain a striver mindset. Transporting food and water to sustain this growing community is taking a toll on the council of elders. Maple Hill is reaching its capacity, but it is hard to turn people away.

One of the newest members of camp arrived on stifling hot July day. A boy of about eleven wandered out of the woods and approached the farm crew. He didn't speak at first, but after downing a bottle of water in the shade of a nearby tree they were able to find out his name was Nur and that he was alone. He was feverish, with an infected wound on his hand. He'd been expelled from the data-mines because of it and had nowhere to go. Cam was working that day and brought the boy to Vi, who prepared a

poultice and found him a place to rest. Li, as usual, was eager to make a new friend, especially one her age.

From then on, whenever the family comes to camp, Li and Nur stick close together. Nur is bright and a hard worker. Soon, the time comes to test some of the developments Nan and the others have been creating in the lab. There are two programs. One is intended to compromise the effectiveness of the virtual reality systems, while the other is designed to affect the integrity of DNA data storage. The council of elders approaches Nur to be their contact with the children in the data-mines, and he agrees even though the risks are great. For two months, the Wheel House lab technologists have coordinated with their contacts in the VR shipping terminals and the Data DNA mines to test the systemic poisons they've developed. These are targeted interventions, not wide scale yet, but preliminary results seem promising.

With fall approaching, the situation is increasingly unstable. The size of the encampments makes them a threat to the authorities, and thus they are targets of escalating attacks. The Solutionists employ drone ammunition against the farmsteads, and food sources are dwindling. For Talia, the family's participation in the Wheel House community has brought its own set of challenges. While they are in a better place mentally now than they have been in a long time, paid work is elusive, and Cam and Li have all but stopped participating in badged education opportunities. There are hundreds of reminders sitting unread on their devices. An unannounced home visit from the sector's administrative services unit has thrown the family into upheaval. Nur had been visiting the apartment at the time, and having an unaccounted for off-liner in their home, on top of other parenting infractions, means Cam and Li can be taken away from Talia and Grandpa Rex and placed in privatized care. As the visitor was leaving, he said he would be following up within the week. Mak also receives bad news. His mother contacts him through private channels. The interventions the Wheel House technologists have been inserting in VR systems have been discovered and are being traced back to Queens. It is likely that agents of the Blockchain Collaborative are preparing a raid. Mak's mother is furious that he would compromise her business interests in that way. Though she still loves him, and feels compelled to warn him, going forward she has decided to cut off all contact and financial support.

Nan and the council elders know they need to have a back up plan. It was unclear how long they would be able to hold on in the encampments, and now it seemed they would have to abandon the Wheel House and lab, too. They had carefully studied the Maroon societies of the American South, Caribbean, and Latin America, those who escaped enslavement and created resilient collectives in remote and inaccessible places. There were lessons to be learned from their resistance and survival. In the years leading up to the lockdown, resistance camps had sprung up to counter petroleum pipelines as the industry gasped its final breaths. Indigenous communities had never lost touch with the land and were anchors of this movement. They sustained the core of the resistance in the years that followed. It was clear that as resistance grew in urban centers, those opposing the Solutionists would need to regroup beyond Smart City surveillance. Through her contacts, Nan had been in touch with a resistance camp in northern New Jersey that would welcome refugees from the encampments. Their ultimate goal would be for the group to make its way south, where larger communities of off-liners were coalescing in remote valleys of the Blue Ridge and the swamps of the Carolinas.

With a hurricane projected to hit coastal New York later that week, the elders feel it is the right time for them to begin that journey. Increased demands for power demanded by the ledger have resulted in countless jury-rigged systems of solar generators that mine Bitcoin dust and keep the systems going. Most of these installations have been dropped haphazardly on open surface lots and abandoned roadways. They would never survive gale force winds. After the storm passes, it will be several days before the Domain Awareness systems are entirely back online. That would provide a window of safe passage. Nan puts out a call to the community, and they gather at Maple Hill for a briefing. Leaving Queens means that life, as they know it will never be the same, even for the off-liners. They will never be able to return. Leaving likely means a shortened life and tremendous hardship, but it is the only guarantee a person has of retaining free will in a world where one's choices are fully controlled by the data stream. Not all will go in the first wave. Some members of the resistance choose to remain behind to maintain communication lines and monitor conditions on the ground. The rest will take the technologies they have developed out of New York in the hopes that they can establish a new lab and continue to grow the program.

Talia, Rex, Cam and Li have a weighty decision on their hands. For Talia, the writing is on the wall. It is unlikely that her gig employment prospects are ever going to improve, and their lifestyle will have to be supported by more and more data currency sales. Rex knows his years were counting down; but his health is still good and he's up for the journey. The group will need the perspective of elders who knew pre-lockdown life and he takes a lot of pride in the work he's been doing in the lab. Of course he would also do anything to protect his daughter and granddaughters. Li, the family rebel, is eager, especially given that Nur is leaving. The wild card is Cam, who has long been a striver. She has a data dashboard that will likely provide with her if not a prosperous future, then at least one that will keep her out of the VR warehouse. But there is the threat that if she stays, she and Li will be pulled apart and separated from Talia and Grandpa Rex. The family won't leave if they aren't in total agreement. It is all or none. No matter what, the future is fraught. To stay plugged into Solutionist society means navigating a world where she has to fight and compete to curate her life's data, forever. Leaving means a shot at community and connection, but also risk of physical hardship and uncertainty. That night Cam sleeps on her mugwort pillow. It is a night of dreams so vivid it is hard to believe they aren't real. When the morning light comes through her window, she has clarity. Badges, Gold Coin, data be damned. She nudges her mom sleeping on the sofa and says, "It's time to unplug."

**Supplemental Links**
Kintsugi: Link
Native Plants for Healing: Link and Link
IoT Agriculture: Link
Food Justice and Healing: Link and Link
Maroon Culture in the United States: Link
Pipeline Resistance Camps: Link
Solar Bitcoin Dust Miners: Link