A Digital Kon-Tiki: Exploring the Blue Ocean of Human Connection, Informational Values, and Marketplace Needs Through the Open-Source Learning Academy Protocol

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Borders? I have never seen one. But I have heard they exist in the minds of some people.

-Thor Heyerdahl

Abstract

The Open-Source Learning Academy Protocol (OSLAP) was originally designed for deployment in American K-12 schools to align software and digital practices with the philosophical values of Open-Source Learning. Now in its second year of use with high school students in California, OSLAP is poised to expand. In accordance with the values that informed its development, OSLAP prioritizes community adoption over customer scale or a "go-to-market strategy." There is no intent to sell access to the software or extract value from the data that people create or post on the software. The relationships that support and surround OSLAP grow with the dynamics of learning. Rather than focusing on compound annual growth rate or attempting to scale adoption to the maximum number of people, OSLAP developers and practitioners seek to spread adoption through communities of development and practice, and to freely share the software to cultivate an environment of enrichment and shared value. This chapter describes how the core values of Open-Source Learning and OSLAP inform the technology, use, and strategies that are designed to raise awareness through participation and create a renewed internet of learning.

Introducing Technology to Meet Unmet Needs: Exploring the Past, Improving the Present, and Preparing for the Future

The history and current landscape of education technology define both the need and the opportunity for OSLAP.

The history of technology has always been an adventurous journey. Popular accounts portray innovators and entrepreneurs as heroes in Joseph Campbell-esque monomyths, liminal figures who respond to calls that only they hear by venturing out to forge alliances and overcome obstacles so that they can share the benefits of vision and insight with the rest of us upon their return.

However, our understandings and uses of technology have changed over time along with cultural norms and economic trends. Today's heavy emphasis on technology as a purchasable commodity — witness the line at the Apple Store — ignores the original concept of technology, which is rooted in the purposeful use of tools, not the tools themselves. The root of the word *technology* itself comes from the Ancient Greek word *techne*, which meant "cleverness."

Cleverness is a quality best illustrated through its strategic application. When Odysseus landed on the island of the Cyclops, he told the Cyclops that his name was Nobody. Later, when Odysseus blinded the Cyclops and the Cyclops ran around howling in pain, the other Cyclops asked who assaulted him so they could punish the attacker. "It was Nobody! Nobody did this!"

the Cyclops roared. The other Cyclops shrugged and went back to their business. There was Nobody to find, hiding in plain sight.

Odysseus' strategy exemplifies cleverness in practice. Techne.

The spirit of techne infused the development of the internet and the World Wide Web. People took it upon themselves to learn how new tools could be used to make free long distance phone calls and communicate on screens over phone lines. They collaborated and coalesced around ideals. The members of the longest-running online community, The Well, are united by their motto, famously known as YOYOW: "You own your own words."[1]

The culture of Silicon Valley in the 1970s famously championed values of freedom, community, creativity, and collaboration. Stewart Brand expressed the sentiment in his seminal *Whole Earth Catalog*[2]: "A realm of intimate, personal power is developing — power of the individual to conduct his own education, find his own inspiration, shape his own environment, and share his adventure with whoever is interested."

Just five decades later, however, drastic changes in our relationship with technology have transformed our business practices, personal habits, and even our environment.

Today we have more tools than clever uses. Our inboxes are clogged with messages that hype the latest app, platform, game, or productivity software, promising revolution and disruption but in a way that closely resembles the same features as 53 other options in the same space. We are constantly being encouraged and persuaded to buy someone else's cleverness, or just the idea of cleverness, rather than actually practice our own.

Many of these redundant products are designed to extract monetary value for small groups of entrepreneurs and investors. To paraphrase poet Jorge Luis Borges[3], perhaps it is best not to develop new software unless we can improve upon the deafening cacophony of overpromising, underdelivering education technology that drowns out voices of learners and educators.

And yet the alluring origin myth of techne persists. We too are called by the internet's tantalizingly unrealized, unlimited promise for communication and collaborative learning — a space for real public education that has the capacity to facilitate interdisciplinary Medici effects[4] that can create value on an unprecedented, even global scale.

On April 28, 1947, two years after Vannevar Bush wrote the seminal essay "As We May Think,"[5] Thor Heyerdahl and his crew departed Callao, Peru and set sail for Polynesia aboard the Kon-Tiki, a raft made of nine balsa tree trunks lashed together with hemp rope.[6]

Kon-Tiki was built in pursuit of understanding how people traveled the ancient world. Could people have made it from South America to Polynesia on rafts of balsa logs lashed together with hemp rope? There was only one way to find out.

As we considered building OSLAP, we didn't have to speculate or even look very far to understand the intentions, materials, or methodology of the internet's original architects. Vint Cerf, Bob Kahn, and others who built the modern internet are still here to tell their own stories. Kon-Tiki's builders could only verify its seaworthiness by setting sail. We already know that the internet's physical capacities can support a worldwide public learning architecture. We believe that members of existing communities will gravitate to that architecture when they become aware that it exists as a viable alternative to Big Tech.

However, just like the Kon-Tiki expedition, we are setting out to explore a hypothesis. We want to prove that the internet can in fact empower us to transcend the limitations of time, space, and the boundaries of existing social structures to accelerate and amplify the value of learning for individuals and communities. We believe that people will benefit greatly by making meaningful connections between the hardware, the command line software, the web interface, quantifiable evidence that documents participation, and emerging digital, cultural, and business trends. To test this hypothesis, we must build and introduce this software in alignment with the core values of Open-Source Learning itself. Our approach is consistent with the original communities that sprang up around techne decades ago when the internet first became accessible to the public.

Before embarking on this work, we asked two fundamental questions about the present moment:

1. Does existing education technology consistently help teachers and students build awareness about digital tools, strategies, and culture through the use of software that also provides opportunities to own their online identities, data, and any resulting value?
2. Does the world really need another piece of education technology software?

TL;DR answers:

1. No.

2. Yes.

In his recent book *Failure to Disrupt*, MIT Professor Justin Reich observes how difficult it really is to change the balance of power in school: "Social inequality is a tenacious feature of educational systems."[7] As we saw during the pandemic-related campus closures, education technology exacerbated pre-existing inequalities. Algorithms discriminated against already disenfranchised students of color and students who logged on from noisy home environments.[8]

However, it is an oversimplistic disservice to evaluate education technology in broad terms of "good" and "bad." The commonly expressed post-pandemic desire to "return to normal" may be a natural response to the trauma many experienced, but "normal" did a great deal of harm long before campuses closed, and many people thrived with the benefits of flexible schedules and personalized learning that online learning offered. Pitting education technology against in-person learning is a false dichotomy that ignores much of our lived experience. In addition, the "online learning" that people refer to during the pandemic was in most cases not mindfully developed, designed, or planned, but hastily implemented by people who, however well-intended, did not have sufficient experience or training for the purpose.[9]

Meanwhile, both politically imposed "normalcy" and technology adoption continue to grow in education without much critical analysis, which brings to mind the words of Paulo Freire: "It is not systematic education which somehow molds society, but, on the contrary, society which, according to its particular structure, shapes education in relation to the ends and interests of those who control the power in that society."[10]

Schools often promote core values of equity and inclusion in their vision statements, but how can a diverse campus truly be equitable and inclusive if it forces its constituents to upload their personal data and creative content onto learning management system software that profits a small, off-campus group of shareholders whose identities are unknown and unlike those in the school community?

Many like to think of education technology as "disruptive." So far, however, the commodified technology alone has not led to meaningful change. Let's :

> Christensen[11] himself has clarified that few technologies are intrinsically "disruptive technologies." Disruptive innovations, in fact, can be the result of what are fairly crude technologies. The innovation, he argues, instead comes from the business model. That's why it doesn't matter to proponents of the "disruptive innovation" framework that Khan Academy or MOOCs suck, for example. It doesn't matter that they're low quality technologies featuring low quality instruction and sometimes low quality content. What matters is that they're free (or very, very cheap). What matters is that they change the market. It's all about markets after all. Students are consumers, not learners in this framework. What matters is that these innovations initially serve non-consumers (that is, students not enrolled in formal institutions) then "over time to march upmarket." That's why they're disruptive innovations, according to Christensen, who just this weekend published an op-ed in The Boston Globe insisting, "MOOCs' disruption is only beginning." Innovating markets. Not innovating teaching and learning.[12]

These insights are consistent with our own observations as professional educators and parents. What exactly is being disrupted by education technology? The speed with which young people are moved through school board-approved, publisher-scripted content and shoved off to the assessment and data collection companies? That is not disruption. In fact, technology adoption raises serious questions about the purpose and function of education. In the words of Peter Drucker, "There is nothing quite so useless as doing with great efficiency something that should not be done at all."[13]

As we considered developing software to support learning, we conducted informal research that began with a close examination of our own lived circumstances. Our students and our own children have not been given choices about which technology to use in their schooling. Their teachers and school administrators are not experts in the design or use of the mandated software. No one in the learning communities, schools, or school districts we approached could describe the basic value propositions, management structures, or core values of the software companies with whom they did business, much less the "under the hood" code or architecture of the software itself.

We asked these questions of dozens of schools. Stakeholders were unable to provide answers beyond basic explanations of the function of the software and instructions for use. We could not even determine what schools and school districts paid for the software. These were not closely guarded secrets, merely decisions that were made by one or two individuals in large organizations that were simply undocumented or buried so deeply in budgets and meeting minutes that they were difficult to find without extensive detective work and / or a legal demand for disclosure. We could not easily ascertain the terms of schools' agreements with software companies, nor could we determine if or how student data and original content is mined by the software companies to create value for their owners and shareholders.

Given that the education technology market is projected to grow to $404 billion over the next two years[14] it stands to reason that corporate revenue streams include more than per-student

license fees. In general, school personnel haven't a clue about how ed tech software is created, deployed, or managed for profit.

If the adults in the room are not knowledgeable of the technological architectures, applications, and business models of the online tools they use, they cannot reasonably be expected to teach young people how to navigate the digital environment.

The Appeal of 'Open' in a Closed Environment

The word "open" is attractive. It connotes expansiveness. Freedom. The easy transparency that comes with integrity. Even the warmth of human connection.

Describing products and services as open and evoking these qualities can make anything more appealing, including technology. But we should be mindful that marketing campaigns sometimes belie verifiable facts in the world. Modern education-related businesses and organizational cultures are in fact not generally open — they are closed and vigorously defended through the use of privacy regulations, barriers to entry, and competition. The term "open source" came into being as a response to a context of increasing constraints.[15] The same is true for Open-Source Learning[16] and the software we have developed to support it.

Over the last 50 years the internet has become an increasingly dominant influence on global culture and economy, and even our individual psychology and decision-making. However, to this day, there is no global awareness campaign or academic curriculum that exists to help everyone understand and navigate the digital waters in which we now swim.

As a result, only those with the resources and motivation to learn become experts in the design and use of software. The rest of us are introduced to life online through the use of others' proprietary hardware and software platforms. With relatively few exceptions, social media, productivity software, learning management systems, and applications for every conceivable interest and purpose charge money and/or require "user agreements" that give them the rights to leverage the value of user-produced content and metadata in exchange for access.

Education has simultaneously accepted corporate terms and replicated traditional institutional hierarchies in a digital culture where data generates profit. When schools align themselves with investor interests, as opposed to the interests of their students and their communities, their use of technology reinforces and increases inequity. Not long ago, the only person who stood to profit from a homework assignment was the student who created the work. Today, homework assignments are the basis for analytics and data sets that become commodified assets in a market worth billions.

Freire's observation that "Washing one's hands of the conflict between the powerful and the powerless means to side with the powerful, not to be neutral"[17] is magnified exponentially in the digital world. School bears responsibility *in loco parentis* for the safety and security of students on campus; we believe that the same level of care should apply to school's online environments, in ways that honor individual identity and the value of the artifacts each person creates.

Forcing students onto software platforms that they do not choose and requiring them to create data that generates value for the platform's owners amounts to intellectual sharecropping. In today's platform-based schooling environment, students are not individuals with sovereign identities. They are assigned digital identifications that can be revoked without their knowledge or approval, along with access to the content they create. Students are directed on pain of

failure and disciplinary action to create that content, which builds value for the owners of the digital real estate where the content is stored, without sharing in that value. When students successfully complete academic programs and graduate, unless they have backed up their data onto their own drives or servers, they lose access to everything.

It seems disingenuous to promote learning communities as equitable and inclusive when those communities are built on digital infrastructure that so blatantly disregards the rights of so many for the benefits of so few.

Open-Source Learning: An Emerging Movement in Education

In the 20th century, educational philosophies and models such as Waldorf, Montessori, and Reggio Emilia enriched the field by providing meaningful alternatives and perspectives on school.

Now we are in the midst of arguably the most dramatic transformation in human history. Where are the learning philosophies and models for the Information Age? Where is the innovation?

In 2004, David Preston took a sabbatical from a management consulting practice and teaching responsibilities at UCLA to teach English at a large urban high school in Los Angeles. David encouraged the use of technology and the public internet. His students developed websites, curated content, learned from experts all over the world, and achieved extraordinary levels of success, from university admissions and scholarships to flying airplanes[18] and leading expeditions and concerts in places like Yosemite National Park.[19]

David's philosophical foundation was the restoration of our connections: with others, with high-quality information, and even with our own curiosities and interests in ways that ignite passionate curiosity. To help remove the barriers that inhibit these connections, David abandoned the use of textbooks and standardized curriculum, and instead actively encouraged mindful reflection and collaboration that transcended the temporal and spatial isolation of classrooms, geography, and the inauthentic formality of hierarchical authority.

Collectively, David's ideas and practices became known as Open-Source Learning (OSL). In schools David defined OSL as, "A guided learning process that combines timeless best practices with today's tools in ways that empower learners to ask big questions, create interdisciplinary paths of inquiry, develop communities of interest and critique, and curate their exploration in multiple media online so as to create a portfolio of knowledge capital that is directly transferable to the marketplace."[20]

Over the years, OSL has been embraced by a variety of respected learning communities. David has presented OSL at the O'Reilly Open Source Conference (OSCON), the Royal Geographic Society, the Institute for the Future, the MacArthur Digital Media and Learning Conference, the Connected Learning Summit at MIT, TEDxUCLA, and elsewhere. David's book *Academy of One*[21] is used in teacher credential programs.

However, the organizational structure and culture of school are notoriously robust and resistant to change. To comply with institutional requirements, David and other innovative practitioners integrated OSL as a complement to traditional, standardized curriculum that was defensible to administrators and boards of education. It would take a global pandemic to surface OSL as an independently viable approach.

On Friday, March 13, 2020, David was teaching classes at a high school on California's central coast. The coronavirus loomed and no one knew whether campus would open the following Monday (it would not — that campus would remain closed for more than a year). David reviewed the situation with learners. He asked his classes what would change if they all met online the following week and the answer came back in unison: "Nothing!"

David's networked learning communities proved resilient. Every network member finished the school year in much the same way they chose to begin it[22] — with Open-Source Learning.

The experience proved that: 1) Open-Source Learning is a mature standalone model for interdisciplinary education, and 2) OSL participants needed tools that were suited for the purpose, in the form of software that was powered by the same philosophical DNA as the learning practice itself.

In years past, software selection represented an opportunity for critical thinking and collaborative decision-making in OSL. David introduced a generation of students to curating on blogs and websites and using collaborative tools such as etherpads and mindmaps. Each exploration presented an opportunity to critically consider the best tools for the job.

However, software companies are driven by outcome-oriented business goals. Their core values are not in alignment with process-oriented learning models.

Corporations have become extremely sophisticated in extracting value in ways that are not transparent to the casual user. Students need more awareness and protection when selecting online software, particularly platforms that are perceived as immediately accessible because they do not require payment or explicit disclosure of personal information to create an account and get started.

Software corporations manipulate users into engagement for the purpose of concentrating profit. Open-Source Learning promotes active engagement and reframes learning community roles for the purpose of better understanding our lived experience. Classes and other organizational groupings are networks. Traditionally passive students are invited, encouraged, and challenged to become active learners. Teachers are lead learners who demonstrate what they advocate, and administrators are stewards who ensure smooth operation through an ethic of engaged care. The language that describes these roles carries specific meaning and day-to-day operational implications.

It is important to note that while Open-Source Learning is a viable programmatic option for schools, it can work for anyone, at any stage of life, in any context.[23] David is a highly visible practitioner of Open-Source Learning. As a Lead Learner, he routinely seeks out experts to inform his own understanding and practice, in full view of his network and members who are learning with and from him.[24] This practice includes learning about technology. David asked technology architect Martin Dow about the online software environment facing today's students and teachers, specifically how the software "under the hood" may influence the experience or even provide a learning opportunity.

The question started a collaborative conversation. As one might expect from the aforementioned Medici Effect, David's and Martin's diverse backgrounds, fields of expertise, and even cultures/continents of residence enriched their exchange of ideas. From their complementary perspectives, David and Martin both identified glaring problems and promising opportunities that are not being addressed in the academic or popular media, and notably not in schools or the software marketplace.

It was impossible to unring these bells or leave things the way we found them.

We began to develop a solution.

The Open-Source Learning Academy Protocol

Concept

We believe that both education programs and software applications are most effective when they are built on a foundation of empathy — a genuine understanding of people's experiences and feelings. Providing an authentic sense of empathy, of being seen and understood, begins with transparent integrity and a clear knowledge of ourselves.

Therefore, in the spirit of authenticity and transparent integrity, we set out to create software that relies and operates on the same values as the interpersonal practices that have made Open-Source Learning successful in practice.

Constructing software with this level of care is analogous to building the Kon-Tiki raft. Just as there is nothing inherently special about balsa logs and hemp rope, the materials and methods we used to build OSLAP have been available to many people for some time. What makes OSLAP unique is not the tools themselves, but the ways in which the tools are introduced, integrated, and deployed.

For example, the practice of OSL "Begin(s) with the solution of the student-teacher contradiction, by reconciling the poles of the contradiction so that both are simultaneously teachers and students."[25] There are no (passive, game-playing) students in an OSL classroom, and there are no (dependent or addicted) users on an OSLAP instance. There are Learners. Participants. Network Members. Lead Learners. Stewards.

Semantic choices and descriptors are important. Given all the attention currently being paid to Artificial Intelligence, we would do well to remember that each word, each search term, each command, and each line of code carries meaning that often stands alone in the absence of explanations or reference materials.

Consider the OSL title "steward," which connotes a level of care and responsibility not found in the use of the terms "administrator" or "sysadmin."

Language sets a tone and creates expectations that flow through the strategies and tactics that form the decisions and daily operations in the OSL environment. Each instance of OSLAP requires stewardship. The development of stewardship practice brings the use of the software to life.

With the same linguistic intentionality we use to define OSL roles, we make a clear distinction between protocols and platforms. The Open-Source Learning Academy Protocol is so named because it is an environment that consists of protocols, or "instructions and standards that anyone can use to build a compatible interface."[26]

In contrast, most education technology is platform-based, which means that it exists on private digital real estate that can only be accessed via permission granted by the owner. Nearly every learning management system, student information system, curriculum content provider, and content creation and curation software are walled gardens that have "a single set of policies and central control."[27]

In the OSLAP environment FOSS integrations are designed to support stewardship practices and ultimately the learning community itself. For example, individual naming and group formation is designed to reflect each person's stated preferences about how they want to be known and the community's priorities related to openness and security. Each individual selects their identity and their password, which is known only to them and not stored anywhere else. The individual responsibility for password management is a first step in personal security that represents a learning opportunity. For those who want to dive deeper, local lead learners and stewards are available to support their explorations, along with external partners who are developing companion software and informational resources.

Web standards are used throughout OSLAP. Therefore, the entire system itself is open and unrestricted. FOSS software implements "social protocols" that enact OSL principles. For example, when a lead learner invokes online community principles to inform a problem-solving project, the conversation about selecting tools (such as a calendar, a mind map, cards, or spread sheets) represents an immediate opportunity to practice communication, critical thinking, and collaboration.

The OSLAP software is the vehicle through which OSL community members connect, communicate, collaborate, create, and curate. Whether or not a person participates in a formal offline learning community, their deployment of OSLAP defines them as an OSL community member online, and in the process makes available an abundance of software choices that feed thought processes such as critical thinking and decision-making in ways that demonstrably support workflows and valuable integrations. Packaging makes software accessible through a dashboard that is easy to navigate.

Building the Raft

Our development process followed OSLAP's defining philosophy and reason for existence.

In terms of installed software, OSLAP is a distribution that is based on a Linux server distribution plus software configuration management and maintenance software originally under OSS (some is now "Source-Available" license), with added packages and various configurations.

Here is a partial list:

Protocol support

- LDAP – Lighweight Directory Access Protocol
  - Directory of names known by the system
  - Central lookup for the OSLAP node which ties together and mediates access to all OSLAP-compatible software applications
  - Single-sign on (SSO) with optional 2FA (Two-factor Authentication) supported for applications
  - OpenLDAP is the main FOSS component
- Email - IMAP, SMTP, POP3 and security standard (DKIM)
  - Professional grade email services including list management
- W3C ActivityPub / ActivityStreams
  - Works within Learner Networks groups but can connect outside them according to the rules / policies / preferences of each specific OSL network's Stewards, Lead Learners, and Learners

- o Integrated with Learner's journal posts to provide combined live social feed for Learners, who can choose who to follow, post directly to feed,
  - o Nextcloud supports a related standard to federate resources and documents
- Nextcloud Talk (Spreed)
  - o Video and audio communications, with strong support for groups
  - o Instant messaging environments
    - ▪ Secure protocol between sender/receiver and server
    - ▪ 1:1 conversations
    - ▪ Groups / "rooms"
    - ▪ Comment threads on *any* resource that can be referred to in the OSLAP Dashboard, such as documents, spreadsheets, project schedules and appointments
- Matrix - Matrix is designed to interconnect / interoperate between all other messaging protocols
  - o Bridges with NC:Talk
  - o [To come: Bridges with ActivityPub]
  - o Privacy-focused with end-to-end encryption (only sender and receiver can read)
  - o Strong group support protects Learners
    - ▪ Privacy method is an improvement over WhatsApp and Signal messenger
    - ▪ Much stronger privacy support than Facebook Messenger, Telegram and other popular services
- WebRTC – the W3C standard for realtime audio-visual communications over the web
  - o Big Blue Button – with Dashboard integration – a Zoom replacement, more functionality and security
  - o Nextcloud Talk – with Dashboard integration – one-click / directly-integrated and very easy to use
  - o Matrix, via Jitsi support – with Dashboard integration
    - ▪ privacy-oriented alternative to the above
    - ▪ helps support interconnects with those connected to Matrix infrastructure external to OSLAP
  - o Jitsi Meet – WebRTC standard FOSS app
  - o Optana Meet
- Git – the dominant distributed version control system
  - o GitLab – leading FOSS alternative to SaaS leaders Github and Bitbucket
  - o Gitea – emulates the Github interface and web experience
- WebDAV – distributed authoring and versioning
  - o Nextcloud fully supports via its "Files" app
- HTTP(S) – fileserving over the web
  - o Files – a simple web server with a simple web-based administration interface

Software BOM – in addition to the above:

- Identity and naming
  - o openLDAP
- Mail
  - o Server-side
  - o Choice of: Nextcloud ("Dashboard"), Rainloop and SoGo webmail clients
- Nextcloud "Dashboard" – central workspace with all apps integrated
  - o Groupware
    - ▪ Group functionality

- - - Messaging (instant/group messaging and email)
    - Calendar
  - "Deck" – functionality is analogous to Trello
  - OpenOffice – each supports collaborative realtime editing
    - Word / Google docs replacement
    - Excel / Google sheets replacement
    - Powerpoint / Google slides replacement
  - Cryptpad – quick and lightweight document collaboration
  - Markdown-based notes editing
  - Mindmapping software
- WordPress
  - Basis of Learner journals
  - Forms a portfolio for Learners – it's a "real" professional-grade web site
  - Ready to rehost with a Learner's provider of choice
  - Adapted for OSLpractices – themes, categories, menus and content structures make it ready to use for Learners yet fully customizable
  - Security-hardened – WordPress is notoriously difficult for non-experts to maintain securely
- PeerTube – video sharing and playout infrastructure and app
  - Federated with ActivityPub interoperability (Mastodon, e.g.)
  - YouTube-like interface
  - Each Learner Network can build a shareable video collection
  - Podcast potential
- Grav – full-featured web Content Management System
  - Used for static, non-journalled web content such instructions and walkthroughs, timetables, and general information
  - Can support "library" space or Lead Learner website for a Learner Network
- NodeBB – Modern forum software
  - Encourages community growth and peer support
- Bookstack – Modern documentation environment
  - Incorporates commenting abilities
  - Book-like finished quality
  - Web editing as well as markdown file support
- Wikis – modern wiki software
- Security Vault
  - Bitwarden – LastPass replacement
- Searx metasearch engine
  - From within the dashboard environment, Learners can search just like with Google but more efficiently; the software submits the search to not only Google but several other search engines (configurable), including Bing and Wikipedia, and neatly summarizes the results
  - Improved quality of Learners' research
  - Diversity of results encourages evaluation and critical thinking
  - Protects Learners from "bubbling" – i.e., whensearch engines build up databases and profile users for (their) cross-correlation sale
- Matomo analytics
  - The most sophiscticated open source analytics engine
- Kutt – URL shortener utility service (bit.ly, goo.gl etc replacement)
- Outlink, FilePizza, Nextcloud Files – link and filesharing utilities

WBS - Simple Whiteboard

We have integrated these and other elements of mature open source software based on our observations of the in-person and online learning processes of OSL individuals, groups, and classes. Our observations helped us evaluate — with learners, in real time — which FOSS software would most effectively meet their needs. Depending on the experience and skillsets of an OSL network, participants can modify and customize these elements to suit their unique needs.

What we did indicates that prioritizing the person (Learner) at the center of the learning environment leads directly to co-designing and supporting their learning according to protocols – instructions and standards that anyone can use in real life – about which they have agency and which foster healthy relationships.

So the practice of software architecture (which we have named OSLAP) necessitates mapping these protocols-for-learning to digital protocols that support information flows and allow the functioning of software. The software, the "things", are replaceable. For this reason we maintain a multiplicity of software systems, some of which have roughly the same features. Given the needs of a particular learner or learning community, we might want to prepare the digital feast with a variation or source the ingredients from somewhere else just because someone asks, or just because we are human beings and it's Wednesday. The point is that we have a choice. Human beings are in charge of the software environment. We ensure that we are – and the software is – responsive and flexible, because that sort of thing matters around here. At every turn we remind ourselves and each other that the "thing" is not a static entity, but a way of meeting our needs and serving our priorities.

Improving technology from the learning perspective leads to improved technical protocols that support learning.

Which means truly supporting diversity in all its forms. To the granularity, in principle, of each individual in any given moment.

Customizing OSLAP requires awareness of individual and community needs, along with the capacity to create forks and curating them, potentially in many varied recombinations [GNU/Linux distributions], and curating those too. It also means a culture of mutual respect, attribution, helping others to help others to help.

Building community here must be differentiated from what we see from the VC-funded open source-as-disruptor, or the thinly veiled farm systems (such as Github) that identify skilled devs and other future employees. Software may share OSS licensing terms, but the functional aims and objectives are not always clearly related.

OSLAP is NOT about features. OSLAP is NOT defined by product management around a software commodity.

As a protocol, OSLAP adapts to people.

Most education technology – products and platforms – trains people to adapt to it. They become, to some degree or other, dependents. We cannot support the Open-Source Learning Declaration of Interdependence with integrity if we are working through various distorted prisms, funnels, blockades and filters that are designed to surveil, refine and deplete dependents of their value.

Our approach is not compatible with "rentierware," "optimising dealflow," or other any other construction that reduces learners to units or eyeballs in service to profit. OSLAP is FOSS because it makes our alignment of purpose through intentional software integrations possible.

A Secure Human Software Supply Chain

OSLAP is software that facilitates human learning.

All education technology makes similar claims.

However, OSLAP is unique in that it relies upon software that is constantly evolving, and in many cases actually duplicates features or has them overlap across tools. These software dependencies represent a *supply chain* of open source software.

OSLAP's relationship with software is flow-based and process-based. It's not exactly a distribution, although this is the closest commonly known likeness or manifestation. Software can be packaged and "stirred in" as needed. Other software can be pruned. Decisions to integrate or set aside software depend on immediate needs of people. Stewards can evaluate the software's (lack of) usage, relevance, and complexity, as well as the requirements of developing the package configuration relative to the costs of time and attention required to maintain that package.

Closed source platforms are developed around a set of assumptions involving business and human psychology that point to building for people, as opposed to stewarding with people. While this makes sense when viewed through a lens of efficiency and investor/entrepreneur profit, it has also revealed some potentially dangerous vulnerabilities. According to Brian Fox, the Open Source Security Foundation Governing Board Member and CTO of Sonatype, "If you don't even know what's in your software to start with, you probably have no visibility into what's going on with the malware, which is almost a worse problem because it's not just the vulnerability that's latent, waiting for somebody to exploit."[28]

The devastation caused by the Solarwinds bug illustrates just how vulnerable closed source software can be due to its supply chain. OSS allows code inspection and opens up the whole quality assurance process to a wider community, yet at the same time allows for the engineering of novel attacks. Closed source software can suffer from quality limitations through a lack of transparency and community of interest. Organizations that are reliant on a closed source approach to meeting their digital needs must rely on excellence from digital procurement through delivery, which in the case of education technology often involves children. Using an OSS supply chain opens up OSLAP adopters to a security model that benefits from the wider security industry, the best in the business with regards to experts from OSS suppliers from NextCloud through Canonical, for example.

As a FOSS ecosystem, OSLAP allows for a flexible and adaptable security posture in the fact of a world of constant and varying security threats conducted against individuals and organizations alike.

Further, OSLAP represents an important and unique approach to "learning by doing." All OSL network participants — Learners, Lead Learners, and Stewards, as well as families and community members — can in principle take active part in securing their own software environment, with expertise close at hand. This meets a well-documented need: "According to

analysis by Sonatype, the majority of the time that a company uses a vulnerable version of any component, a fixed version of the component is available — but they're not using it. That points to a need for more education, according to Fox. '96 percent of the problem is people keep taking the tainted food off the shelf instead of taking a cleaned-up one.'"[29]

The FOSS environment enables OSLAP to offer a context for curiosity and an invitation to engage.

Intellectual Property Rights, Commercial Expressions & Sustainability

For many communities it is no longer sufficient to think in terms of code released under a "classic" open license. OSLAP values inclusivity and a reverence for the rights of creators. We hope that integrating software will raise awareness about the existence of that software and encourage success throughout the ecosystem.

The relationship between code and the data it produces and manipulates is also of interest. Groups are beginning to demand collective models beyond a simplistic commons whereby their data is first of all understood as "collective" and secondly used for known purposes (and sometimes with commercial valuation).

OSLAP supports commercial ecosystems without monopolistic practices. We believe that commercial support is entirely consistent with FOSS: "Open source software is also commercial software, not just in theory but in practice: there is commercial support available for most widely-used open source software packages, and often that support is available from more than one source."[30]

The "fit" of appropriate commercial arrangements is a function of the purpose, desired impact, and perceived value as regards the amplification and acceleration of learning, as opposed to some intrinsic value of a piece of technology.

Here it is worth noting that commercial transactions are "one-offs." Purchases and rental agreements are not optimized for building relationships over time in ways that support emerging thought processes or collaboration; they don't even facilitate interest in or building an understanding of the parties' interests that underlie their positions in the moment. Commerce is typefied by anonymity, commodification, and replaceability. Things, not people.

In contrast, as Boisot demonstrated in developing the Large Hadron Collider at CERN, human systems at chaotic boundaries self-organize at the edge. For highest quality large-scale endeavors, rather than optimized design for commerce, OSLAP intends to promote awareness of "boundary object[s] around which the energy and focus of the [participants] involved can cohere to make meaning while engaged in a common purpose."[31]

The need for a commercial code of conduct that can adapt to emerging software was highlighted recently by controversy caused by Microsoft Github's Copilot offering, in which AI was trained on openly licensed material and then sold for profit by the AI operator.[32]

Stewarding with members of the OSLAP development community, as opposed to building policies for them, can address many of these issues by inviting contribution and putting human beings in charge of the policies, instead of the other way around, which returns us to the foundational purpose of our endeavor.

Bringing Learners On Board

We introduced OSLAP in real time with an OSL network that was working completely online as a result of their physical school campus being closed due to the coronavirus pandemic. Moving online was of course a departure from the norm — and it was an important opportunity to adapt and document the process of offering the software for acceptance.

In previous years, when he taught in the classroom, David introduced OSL on the first day of school as a possibility for students (who had not yet accepted the invitation to become Learners) to consider. After making a brief presentation to the class, David would step out of the room so that everyone could voice their perspectives and come to agreement without feeling influenced or pressured by an authority figure. Then, to document the conversation and provide space for Learners to express their views, David would publish a blog post that summarized the process and invited comments.[33]

During the pandemic, when schools required students to attend sessions and post work online, one degree of freedom (whether to communicate and collaborate online) in the OSL adoption process was removed. As a result, it became immediately important to consider the environment. David and his students talked about Big Tech and the ways in which we all interact online. The result was profound.

In the process of discussing online representation (we don't feel seen by online companies) and redress (we can't get an answer or help when we have a question or something goes wrong) we connected the concept of innovation with the concept of governance. Students admitted that they knew the term "Declaration of Independence" but didn't actually know or remember anything about it. This is consistent with a recent finding that only 13% of American students are proficient in their knowledge of history.[34]

We revisited the institutionally required curriculum standard — the Declaration of Independence – by pasting it into an etherpad on OSLAP and editing it into our Declaration of Interdependence, which we then all signed electronically.[35]

Our signatures, the recording of our process, and ultimately our individual sign on to OSLAP provide three points of documented agreement in action. In the same way that David once asked classroom students to confirm their intentions in comments to a blog post, these data points signify a commitment to a learning community and protocol that is active and intentional.

OSLAP is a living ecosystem in the sense that it — through us as Stewards, Lead Learners, and Learners — responds to the needs of network members. In the same way that the brain develops through pruning, i.e., strengthening some neural pathways and losing others as we grow into patterns of more efficient, habituated thinking, each OSLAP instance evolves to integrate, prioritize, and decommission functionalities in ways that meet the needs of network members.

The next phase in OSLAP's development will be the journey from engagement with deployed and integrated software to community contribution. Stewards, Lead Learners, and Learners all stand to gain from learning more about the tools they use. Many people who interact with the internet every day are not aware of FOSS or the Fediverse, or the difference between platforms and protocols. Through "learning by engaging and doing" we want to raise awareness and support everyone's ability to make informed, reasoned choices about their online personhood and associated data. Rushkoff made waves when he wrote "Program or be programmed"[36] but

this is clearly no longer enough — we want to normalize a culture of being in "right relation" with technology.

As communities of practice emerge, we hope that some will fully integrate Open-Source Learning through the Open-Source Learning Academy model, which has been implemented for two full academic years in California. OSLAP can offer dedicated management for these organizational environments by integrating with Student Information Systems and providing additional support as needed.

Independently of who adopts OSLAP, we are planning better automation for monitoring and maintenance, a dedicated package repository, and we will continue to consider and evaluate alternatives to upstream distribution technology and community.

Paddling to Market

According to the Harvard Business School, "Good go-to-market strategies are based on understanding who the customer is, what problem you are solving for them, and their journey and purchasing process." Many graduate schools and professional advisors advocate clear, data-based paths for education technology companies who believe they are ready to "go to market."[37]

The qualitative data collection typically included in these processes presupposes that there is an existing market of prospective customers who are aware of specific needs or problems, and that they are capable of articulating those needs or problems in ways that invite reflection, proposals of potential solutions, and an assessment of fit.

We found it challenging to reconcile the apparent clarity of the typical late capitalist go-to-market strategy with the guiding principles of Open-Source Learning and the founding idealism that forms the nervous system and as-yet unrealized promise of the internet, especially in the hype-saturated red ocean that constitutes the education technology marketplace.

And yet, the question remained: How can you convince cruise ship passengers to paddle a raft?

Professors W. Chan Kim and Renée Mauborgne have drawn attention to the fact that competing for current customers is less important and productive than raising awareness and meeting needs for people who don't yet realize they are customers: "Blue ocean strategy is not about finding a better or lower-cost solution to the existing problem of an industry. Instead, it is about redefining the problem itself."[38] Educators are notoriously busy, stressed, and even traumatized by their current working conditions, and they generally do not have individual purchasing power or influence over institutional procurement, so why would we invite them to participate in this conversation? Because "noncustomers, not customers, hold the greatest insight into an industry's pain points and points of intimidation that limit the size and boundary of the industry."

Rather than attempt to compete for attention or customers in the existing red ocean marketplace, OSLAP seeks to create a new market by raising awareness. Most people who use the internet do not understand the nuts and bolts of code that make the internet work. Therefore, they are unaware of the damage being done and the existence of other available options.

OSLAP engages and prepares learners for OSL's practice of Civic Fitness.[39] Learners build a direct understanding through multiple lines of enquiry throughout the program around how our digital lives intersect and influence the physical world around us.

In contrast to many modern SaaS ("software as a service") offerings, OSLAP itself is deliberately agnostic to its installation requirements. For a good experience, a node installation requires at least one performant server and good connectivity, but this can be anywhere: public cloud, on-site, or somewhere in between. OSLAP is well-positioned to adopt machines from downstream markets.

OSLAP stands on the shoulders of giants. The software and the network / community amplify, accelerate, and contribute to other people's work as it grows. This is true of each individual Learner, Lead Learner, and Steward, as well as the developers and distributors of component software, who stand to benefit from the increased collaboration and public presence. The rising tide of awareness carries the potential to lift all boats.

OSLAP is similar to an OSS operating system distribution, except that OSLAP is installed on at least one server and for participants works within their browser (with a companion bootable OS in the lab). The advantage of the FOSS approach is that OSLAP is maintainable using a tiny fragment of person-power required of a closed, competitive software product or SaaS. An example of a similar small-scale but big-impact distribution is the offline-capable educational software Endless OS.[40] On the bootable custom operating system side, a single developer is building a radically different and very promising version of Linux called "Chimera."[41] Big impacts can come from such focus without requiring big tech-scale organizations.

This is blue ocean thinking. OSLAP is not designed to compete for existing customers based on crtieria such as features or price. OSLAP is designed to raise awareness in ways that create opportunities and solve problems that many people don't know they have. Big tech has convinced people that there is a finite world of software and their choices are limited. OSLAP invites people to explore under the hood and learn about software for themselves as they become more able to leverage its functionalities.

Navigating the Deep Blue Digital Waters in Which We All Swim

As we write this chapter, news outlets are reporting that the "godfather of AI" has stepped down from his position at Google[42] because our near-total lack of understanding and stewardship, combined with a profit-driven race to market, is creating and releasing AI sophisticated enough that it could kill humans and destroy truth, and society along with it, and we would be powerless to stop it. What if he's right? What if humanity is a passing phase in the evolution of intelligence?

It seems like a good time to learn more about technology while simultaneously putting human beings — not corporations, hardware, or software — in charge and creating value through learning.

Thor Heyerdahl and the crew of the Kon-Tiki embarked on their journey not because the Pacific Ocean was unknown at that time, but because he wanted to prove his theory that South American people could have reached Polynesia during pre-Columbian times using the tools, materials, and techne they had available. Ninety-seven days later, Kon-Tiki arrived at the Tuamotu Archipelago in French Polynesia. Today most scholars believe that Polynesia was

originally populated in a westward expansion from Island Southeast Asia. In academic circles Kon-Tiki is regarded with skepticism as deeply flawed pseudoscience. And yet, proposing the idea, building the raft, and taking the trip made possibilities accessible and memorable to this day. The hero's journey continues to enlighten by keeping the conversation alive.

So it is with FOSS and OSLAP. We are assembling materials to embark on a journey that some say has already been completed, others say isn't possible, or makes no sense without a profit model, to a place where people think they have been, to settle a bet that has already been lost.

Nevertheless, we believe that people everywhere will be better off if they learn to navigate the digital waters in which we all swim. We intend to prove the blue ocean exists by sailing it.

Notes

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