Teacherless: the Futures of Design Education

Andrew Hladkyj
Sheridan College, andrew.hladkyj@sheridancollege.ca

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TEACHERLESS: THE FUTURES OF DESIGN EDUCATION

Andrew Hladkyj

Submitted to OCAD University in partial fulfillment of the requirements for the degree of Master of Design in Strategic Foresight & Innovation.

Toronto, Ontario, Canada
April 2019

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ABSTRACT

With the ever-growing disruption of education by technology and the trend toward self-directed and autonomous learning, how might we reimagine legacy post-secondary design education in a “teacherless” society?

Through a human-centred examination of today’s educational environment, this Major Research Project (MRP) derives 20 aspirational motivations at the heart of an independent learning model. It reframes the disconnect between design academia and industry using an ’80s computer game and a Greek myth as fresh paradigms to uncover the value of strategic partnership, addictive learning, and platform-agnostic foundational training in preparing post-secondary design education for the future. This research offers four alternative worlds built around distinct sets of motivations and presents one in detail to illustrate a higher-value ecosystem of flexible locations, virtual spaces, and re-defined roles that empower tomorrow’s independent learner.

Finally, a high-level road map outlines a stakeholder consultation and implementation plan (key activators, alliances, milestones, pitfalls, and metrics) to make this reimagined world a reality.

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As a designer, educator, and coordinator for Sheridan College’s Web Design Graduate Certificate Program, I have always been interested in how design is learned and how it will be learned in our rapidly changing environment.

With the ever-growing technological disruption of education (Gleason, 2017) and pedagogical trends toward self-directed and autonomous learning (Farkas, 2012), what will the currency and role of today’s design educator be in the not-so-distant future? How might these trends impact the value and values of future design graduates, particularly at Sheridan College?

In 1971, Ivan Illich showed formidable foresight in calling for “radical alternatives to school-centred formal education.” In his provocative tome Deschooling Society, he notes that “the inverse of school would be an institution which increased the chances that persons who at a given moment shared the same specific interest could meet—no matter what else they had in common.”

Today, hobbyist and social platforms like Pinterest and MeetUp, certainly radically different in tone and structure from traditional schools, are bringing together like-minded individuals and are learning platforms in their own right. Within formal education, shared online platforms allow students to take part in online communities where they learn from and are evaluated by not only their peers but also external experts and knowledge networks. Thus, students today are armed with a diverse knowledge repository no longer limited to the instructor. Are we teachers, then, a dying breed? With independent educational platforms offering personalized, on-demand, and “just-in-time” learning (Gleason, 2017), will education (d)evolve into an institutionally determined algorithm?

To the educator’s defence, Illich also writes about the delight and surprise in unexpected questions and how “priceless” and “true” a partnership between master and pupil can be. Furthermore, access to educators, whether online or in person, reinforces the sense of common purpose among students, which, in turn, improves retention and enrolment, the Achilles heel of many Massive Open Online Courses (MOOCs).

Along with my personal stake in shaping the future of design education at Sheridan College (I have been tasked with revamping the above-mentioned graduate certificate program), this unresolved tension between autonomy, community, and technology is the driving force behind my major research project (MRP) and its main question: How might Sheridan College reimagine post-secondary design education in a “teacherless” society?
INTRODUCTION

RESEARCH OVERVIEW

This MRP is anchored on the following objectives and methodologies:

FRAME

Establish a technological and pedagogical “lay of the land” in the realm of higher education

Build a knowledge base with breadth and depth of opinion on technology and pedagogy in tech-enabled higher education

Literature Review

Conducted comprehensive baseline study of seminal works, academic papers, and canonical texts (including those from online journals, blogs, and technology keynotes) from thought leaders in the fields of education, technology, or both

Glean insight on the current state of tech-enabled higher education and where it may be heading

Events

Attended educational seminars with diverse stakeholders—educators, students, administrators, employers, and government representatives—to obtain opinions on innovating tech-enabled education

Focus on understanding the current state of design education, the role of technology in design learning, and how design education might evolve

Expert Interviews

Moderated eight semi-structured expert interviews with college-level design educators, government, administrators, a digital pedagogy specialist, practicing designers, and design students (both current and former) to place educational innovation in a design setting

Identify considerations for building a human-centred curriculum for online-enabled post-secondary design programs

Derive high-level motivations, tensions, and levers to inform curriculum design principles

Human-centred STEEPV (HCS)

Applied STEEPV framework (Social, Technological, Economic, Environmental, Political, Values) from a human-centred perspective to structure foundational research utterances into key themes

REFRAME

Develop a new mental model for post-secondary design education

Abstract deep-rooted, systemic issues in design education to uncover unconventional paradigms for program innovation

Causal Layered Analysis (CLA)

Moderated two workshops with design educators and students (current and past) to reveal surface-level issues, sustaining conditions, cultural views, and an alternative image or narrative to inspire stakeholders to reasse their positions

Figure 0.1: Overview of Research Methods
RESEARCH OVERVIEW (CONT.)

GENERATE
Create human-centred design program concepts to support a new paradigm

<table>
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<tr>
<th>Brainstorm alternative design learning territories based on aspirational motivations and gauge their potential to incite change</th>
<th>Morphological Synthesis</th>
<th>Moderated four ideation workshops with design students and educators to “ladder up” from a new narrative and explore potential environments with unique combinations of derived program principles</th>
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| Strategic Review | Analyzed and ranked ideas by strategic fit from a design program provider’s point of view

REFINE
Unpack the winning program concept

| Visualize, empathize, and sympathize with learners operating within the reimagined design learning environment | Use Case Scenario | Illustrated a “slice of life” through storyboards and crystallized benefits of the new system through contextual depictions of empowerment |

ACTIVATE
Set up the proposed design learning future for success

| Identify critical stakeholders to engage | Influence Maps | Associated stakeholders with perceived involvement in human-centric design program outcomes or levers |
| Envision new and modified sources of value to highlight opportunities and garner stakeholder attention | Value Webs | Projected key stakeholder interactions and new, enhanced, or eliminated value exchanges under the proposed arrangement |
| Build discipline and structure into the change management process | Strategic Road Maps | Anticipated and distilled the rationale, impact, timing, and requirements of proposed future to maximize stakeholder cooperation |

Methodologies are covered in greater detail within their respective phases. See Table of Contents and Appendices.

SCOPE & LIMITATIONS

This MRP is as much about a compelling future as it is about putting forth a sound and replicable approach to envisioning and inspiring change in a design education setting. As such, it was necessarily pragmatic in shepherding insights through progressively tangible phases and acknowledges that other valid solutions exist with iteration.

All qualitative methods (e.g. expert and user interviews, workshops) were designed to elicit highly informed perspectives rather than the full spectrum of opinion.

To optimize interviews, participants were given the opportunity to represent multiple points of view depending on their experiences. For example, recent graduates who now practise design were treated as equally credible contributors of both industry and post-secondary design education insights.

Lastly, this MRP expresses the author’s personal analysis and synthesis of the current and potential states of post-secondary design education. It is not a validation, critique, or rejection of the subject educational institution, its policies, management, and/or personnel.
PHASE 1: FRAME DESIGN EDUCATION

**CONCEPTUAL BUILDING BLOCKS**

What is the current state of post-secondary design education, and which key principles might inform its reimagina-
tion for an unpredictable future?

Using a Human-Centred STEEPV (Social, Technological, Economic, Environmental, Political, and Values) framework, Phase 1 of this research de-
\rates the conceptual building blocks (i.e. major themes, motivations, levers, and tensions) that will serve as foundation-
al principles for a compelling redesign of post-secondary design education in Phase 3 of this document.
Given my goal of developing a Sheridan College technology curriculum anchored on humanistic values, I adapted the classic STEEPV framework to be more human-centred while keeping its thoroughness, re-focusing on experiences, relationships, and even perceptions between actants in the higher-ed space to yield deeper insights. As such, a political scan that would have given rise to observations about government bodies and regulations, for instance, now speaks to organizational hierarchies, power relationships, and technology as a political artifact seen through the lens of students, instructors, and administrators.

Figure 1.1 outlines the adapted Human-Centred STEEPV process followed.

They are emotional beings who engage others and have their own desires, preferences, and personalities. This research uncovered five key social dimensions (Collaboration, Self-Selection, Public Opinion, Isolation, and Interactions) that drove the insights below.

Online learning carries a social stigma. Negative educational user experiences and low retention rates (Terras & Ramsay, 2015) plague online schools and cast doubt on the quality of their instruction and credentials.

Equally (if not more) damaging, perceived lack of community or sense of the social (Lv., personal communication, August 5, 2017) as well as a sit-and-listen culture marked by forced participation and disengagement (Ch., personal communication, August 5, 2017) portray electronic course delivery and students as operating in a world devoid of interaction and nuance (Kemp et al., 2014), ultimately unfit for the workplace. This characterization extends to online course creators, who are labeled “instructional technologists,” “engineers,” or “technicians” rather than respected “designers” or “architects” (Ely, 1999). Prophetically, Illich (1971) identified a “cultural bias of a society in which technological growth has been confused with technocratic control” (the latter associated with “bureaucracy and teaching” versus “independence and learning”).

The overall effect is a privileging of courses that are taught face to face, with the implied assumption that they are better, when this may not necessarily be the case (Kemp et al., 2014).

Collaboration promotes transferable skills, employment.

Skills do not develop in isolation. “Learning awakens a variety of internal developmental processes that are able to operate only when the child is interacting with people in his environment and in cooperation with his peers” (Vygotsky, 1978, p. 90).

This cooperative ideal is a common thread among various learning theories. Constructivism proposes that students actively build on their existing worldview and gain new knowledge by interacting...
with peers and instructors. Connectivism espouses the greater importance of the quest for knowledge and rapid sense-making from networks compared with what one isolated individual currently knows (Farkas, 2012).

In practice, participatory technologies such as forums, blogs, and other content co-creation tools facilitate network-building and have been shown to hone creativity, reasoning, focus, critical thinking, and analysis (Terras & Ramsay, 2015), all sought-after skills in the workplace.

Lastly, the interpersonal skills that arise from peer-to-peer learning are crucial to job seekers as employers increasingly demand teamwork and cultural fit from new hires. In part, this may explain why jobs elude even graduates of STEM programs where learning is not necessarily about creativity and play (Swearer, 2017).

**Collaboration without planning, infrastructure yields sub-optimal results**

Collaborative efforts can fail when the right conditions and expectations are not present. Some students could be distracted or disengaged (Ma., personal communication, August 4, 2017), while others may not buy into participatory tools (Ch., personal communication, August 5, 2017; Manca & Grion, 2017; Yusop, 2017) and feel that their autonomy is curtailed by being forced to collaborate or use a technology meant only for their personal lives (Farkas, 2012). Traditional logistical or resource issues (e.g. classroom availability, scheduling) can also make collaboration more difficult.

Educators must first set the stage for collaboration to flourish by building a strong sense of community where students feel comfortable engaging and sharing knowledge online (Farkas, 2012) and modifying their practices such as how they evaluate students for collaboration (LaMonica, 2006) or communicate collaboration as a learning outcome (Farkas, 2012).

**Social interactions promote accountability, ownership of studies**

Whether on- or offline, students are more likely to commit to their studies when they have opportunities to interact with others. Participatory technologies like blogs support autonomy by providing identifiable personal spaces from which students can contribute to a larger knowledge-building community (Farkas, 2012). By fostering a sense of belonging without sacrificing identity, online communities can boost learner persistence and achievement (Hughes, 2009) and promote sharing of one’s ideas in a space where conversation is king (Farkas, 2012).

Outside online spaces, direct relationships enable individualized feedback that helps keep students engaged in their studies (Terras & Ramsay, 2015). Face-to-face contact and impromptu after-class discussions with peers remind students that they have a personal obligation to others to complete group projects as promised (Kemp et al., 2014). How might these same benefits accrue to online learning settings where disengagement and dropout rates are high?

—Ivan Illich
Social interactions outside traditional environments promote learning

The idea of learning outside the classroom is not a new one. A simple walk with students outside the classroom to practice their photography and receive immediate feedback can result in meaningful, teachable moments (Ma., personal communication, August 4, 2017). Today, interactions are no longer tied to physical locations as Illich’s vision of learning driven solely by matched interests and peers becomes a reality. Online communities and tools facilitate virtual connections to crowdsource solutions to shared problems (Swearer, 2017), and the ubiquity of participatory media in all aspects of a person’s life has cemented the notion that “learning is no longer happening solely in the classroom, and the divisions between learning, work, and recreation are becoming increasingly blurred” (Farkas, 2012, p. 84).

Interpersonal relationships are emotionally satisfying

Much emphasis is placed on students’ intellectual growth and perhaps not enough on their emotional well being. If we accept that “students leave schools, they don’t leave communities” (Kemp et al., 2014), then accountability and commitment also rest on the fulfillment of emotional needs such as personal interactions and a sense of belonging. A technical tool such as blogging can reduce students’ feelings of isolation while building an identity in the classroom (Dickey, 2004). It also lends itself well to more personal and informal writing, which leads to greater socialization (Farkas, 2012).

Students can demonstrate their learning in an open way that allows for collaborative assessment, rather than simply receiving feedback from the instructor.

Meredith Farkas

Do technologies have politics?

This research uncovered seven key technological dimensions (Digital Media, Efficiency, Ethics, Function, Immediacy, Iterative Nature, and Individual Use and Proficiency) that drove the insights below.

Technology lacks emotional nuance

Technology has yet to match the richness offered by face-to-face settings (Fischer, 2014). Subtle nuances (e.g. sarcasm, humour, body language) may not always translate well digitally, resulting in a watered down experience where instructors cannot be themselves or students misinterpret intent (Kemp et al., 2014). Technological innovation (e.g. greater connectivity, access to resources) aside, “human factor”-driven differentiators that can compete with the ease of smaller in-person classes and the relationships that develop within remain high on the Massive Open Online Courses (MOOC) agenda (Fischer, 2014).

Technology is an extension of the person, not a replacement

From blogs to wikis, innovative learning technologies facilitate content creation and sharing more efficiently than ever (LaMonica, 2006). Technology has also expanded the reach of educators, allowing them to stay in contact with their students and work around logistical constraints (Kemp et al., 2014). On the cutting edge of this trend, artificial intelligence (AI) is being tested in more basic or screening roles such as an intelligent tutor (Fischer, 2014) or chatbot responding to questions that are frequently asked by students. This frees up the educator to participate in deeper and richer conversations that draw on their personal experiences and expertise (Swearer, 2017). While the exact role of technology in education (e.g. standalone tutors, expressive tools of communication) has yet to be defined (Fischer, 2014), it seems that technology is, at best, the new TA for now.

Technology is a means, not an end. Educational content, intent matter more

Simply having access to the Internet or training educators to use computers is less important than educators’ effective pedagogic use of ICT (information and communications technology) to benefit learners (Watson, 2001; Ofsted, 2001). Striking the right balance (and knowing the difference) between learning about technology and learning how to benefit from it.
PHASE 1: FRAME DESIGN EDUCATION

(Fischer, 2014; Watson, 2001) has challenged educators since the turn of the millennium when U.S. and Canadian schools had widespread Internet access (NCES, 2002, p. 3; OECD, 2001, p. 256).

As growing evidence suggests, the use of instructional design process, not specific hardware and software, results in better learning outcomes (Ely, 1999). In education, technology is not the silver bullet (Kemp et al., 2014).

Tech’s experimental, iterative nature causes people to underestimate its potential to effect meaningful change

New technologies have a long history of being treated like Trojan horses. Socrates dismissed the written word, fearing it would force students to follow an argument rather than participate in it. He did not foresee “new pathways for the intellect” as his student Plato did (Shirvani, 2015, para. 6). Similarly, early MOOCs were poorly received as many assumed that their initial, primitive feature sets and the platform itself would not evolve over time. As today’s hyper-connected economy sees innovation cycles shorten and steepen (McGowan & Araya, 2016), new technological uses and contexts soon arise that demonstrate the true value of iterations, be they games used ex-curriculum to identify unusual talent in children otherwise labelled antisocial by school psychologists (Illich, 1971) or Facebook’s pivotal role in the Arab Spring (Kemp et al., 2014). While it may be too early to expect online course delivery to be the answer to education for everyone, it may also be too soon to completely abandon them (Kemp et al., 2014).

Little is known about students’ personal learning styles, how they actually use technology to learn

Having a fine-grained understanding of how and why students interact with technology to learn is a prerequisite to addressing the practical and psychological barriers in e-learning (Terras & Ramsay, 2015). Notwithstanding, educators grapple with obtaining this knowledge for a variety of reasons.

They may not be asking the right question when focusing on “What should someone learn?” instead of “What kinds of things and people might learners want to be in contact with in order to learn?” (Illich, 1971).

For example, learning curves for some technologies can be so steep that they take time away from actual learning (Ruth and Houghton, 2009). Yet educators may not always be aware of this dichotomy as they deliver content. The sheer size of MOOCs also challenges the feasibility of understanding individual students and creating a learning path in advance that factors in a diverse (and likely unknown) range of competencies and technological literacies (Farkas, 2014).

While the use of big data and simple surveys of students’ learning preferences and experiences have been suggested as means of shaping instructional strategy (Kemp et al., 2014; Terras & Ramsay, 2015), students’ emotional and cultural relationships with technology and each other may prove harder to uncover. When collaborative wiki sites were first used in schools, for instance, students felt uncomfortable with the idea of

Figure 1.3: Technological dimensions and motivations on which to base curriculum design

Technology is certainly not a silver bullet. How the tools are utilized makes all the difference in the world.

John Preston
edit each other’s work, and only after a strong sense of community and friendships in the classroom developed did collaborative writing emerge as intended (Farkas, 2012).

Educators are unprepared for the autonomous, customized learning that technology affords

When technology futurist John Seeley Brown argued that educators must change their teaching practices to make each new piece of technology work (LaMonica, 2006), one wonders if they were tempted to change professions given the already-high demands of teaching with existing technology and online course instructors’ complaints of having “little to no control over the scope and sequence of the syllabus, texts chosen, assessments created, and pacing of the material” (Kemp et al., 2014, p. 6). With predefined roles and areas of expertise, educators struggle to establish their relevance amidst MOOCs’ obvious targets: self-motivated students who feel responsible for their own learning and have Netflix-esque micro-genres of interest (Fischer, 2014; Swearer, 2017; Ely, 1999).

Technology makes it easier to appropriate intellectual property unethically

With culture commentators like Kirby Ferguson (2012) proclaiming that “everything is a remix,” it is easy to see how students might assume that online content is fair game for them to reuse and repurpose.

What do usage rights mean to a generation where a viral Internet meme justifies wanting image appropriation?

Desensitized to piracy and accustomed to reposted micro-content (e.g. blogs, tweets), students lack the information literacy skills required for ethical knowledge co-creation (Ravenscroft, 2011). Meanwhile, educators who are expected to guide students through this foggy terrain may themselves be baffled by the complex web of licensing and intellectual property (Farkas, 2012).

What is new is old again

Relatability is a powerful tool in getting consumers to adopt new technologies. The original Macintosh leaned on skeuomorphism to provide users with a mental model of how to accomplish a familiar task within its new GUI.

The opposite is true in the case of MOOCs. Teaching and learning are made more difficult as tried-and-true bricks and mortar curriculum models are force fit into a new medium (Ely, 1999). Educators may lack training on how to transition a traditional classroom to an online one (Kemp et al., 2014) and assume that face-to-face practices (e.g. focus on faculty content delivery, assess only at course end) (Terras & Ramsay, 2015) will be acceptable in an online setting where participation, autonomy, and constant feedback are more critical to keep students engaged from a distance and stem dropout (Baggaley, 2013; Farkas, 2012).

Technology fosters dependency, leads people to value immediacy over depth

When calculators first became affordable, schools scrambled to develop policies around their use for fear that students would depend on them to forgo analytical skills afforded by mathematics.

Fast forward to the Internet age, and dependency concerns run much deeper. Some argue that over-reliance on technology threatens the development of critical and evaluative skills needed for e-learning (Apple, 2003; Terras & Ramsay, 2015). Educators pressured by expectations of accessibility and infotainment may be enabling learners who rely on fast, bite-sized, 24/7 support from their instructors rather than “simmer” and figure out high-quality solutions on their own (Farkas, 2012; Ke, 2010, Kemp et al., 2014; Sternberg, & Zhang, 2014).

Tech enables students to learn on their own terms (How, what, when, where)

Advancements in technology dovetail nicely with new educational frameworks such as Universal Design for Learning (UDL). UDL recognizes that learners differ in how they perceive and comprehend information, the ways they navigate a learning environment, and how they can be engaged or motivated to learn (CAST, 2011).

Technology supports this framework by empowering diverse learners through accessibility tools, for those with sensory or learning disabilities; remote access to resources to learn at a desired pace; content that is available in a variety of media and retrievable from an environment that best suits the learner; support group work with participatory tools and for those who prefer to work independently.

I find myself having to tone back the sarcasm and humor [teaching online] because I realize they cannot see my facial expressions or hear the inflection in my voice so this leads me to feel as though I cannot be myself.

Steven Page
They fuel the economy with their personal skills and experience. Who determines their currency, and how is it measured?

This research uncovered five key social dimensions (Incentives, Investment, Market Forces, Pockets of Wealth, and Worth) that drove the insights below.

Schools contribute to skills shortage by keeping students too long / out of the workplace
Higher education keeps young people out of the workforce and adult society in general with lengthy degree programs that artificially suppress labour supply (Ackoff & Greenberg, 2008; Illich, 1971). In the 1950s, a two-year Associates Degree in Nursing (ADN) was the de facto requirement to become a Registered Nurse in the US. However, in 1982, the National League in Nursing declared the four-year Bachelor of Science in Nursing (BSN) as the new minimum level for the field. The impact of that declaration was dramatic. Almost a decade later, the Department of Health and Human Services had to create a commission to address the unprecedented national nursing shortage (Illich, 1971; The Sentinel Watch, 2016), thereby putting a damper on the BSN requirement. In 2010, the Institute for Medicine sparked fears of another nursing shortage with a report calling for 80% of all nurses to hold a BSN degree by 2020.

Experiences and skills = credentials and currency
Educational value chains do not need to involve money. Swearer (2017) proposes an intriguing smart credentialing system that takes into account all of one’s formal and informal life experiences. A machine agent-cum-guidance counselor would get to know a learner’s goals, acknowledge what they have done, analyze government data and hiring trends, then return highly relevant employment opportunities or specialized skills training still needed to obtain them.

Another concept, put forth by Illich (1971), takes the form of a virtual skills exchange bank that equates experience with currency. People are given basic credits with which to acquire fundamental skills, after which those who contribute their time by teaching are rewarded with more credits and access to advanced teachers.

Third parties have to subsidize enrichment programs to supplement traditional learning
Schools cannot keep up with industry.
Various governmental and bureaucratic hurdles make it necessary for educators to tap third parties to support supplemental programs that round out and update what students learn inside the classroom. Seeing the value of real-life experience to the youth, Illich (1971) suggested larger skill credit to the underprivileged as well as tax incentives for willing industry partners who take on students in what are now modern-day internships.

In the U.S., parental spending on enrichment activities outside the school system has almost tripled since the 1970s, underlining the need that people see to augment STEM-based learning with in-demand creative and team-based skills even if they...
have to pay for it themselves. Likewise, independent organizations like Project Lead the Way are also sharing the responsibility of building creative STEM-based programs into schools to help keep them free or at least affordable (Swearer, 2017).

From an economic perspective, many people believe that MOOCs will address the fundamental challenge to contain the costs of teaching more students using fewer resources.

Gerhard Fischer

Today, independents like Lynda.com and Code Academy are filling this void, while Credly and Degreed offer flexible credentialing frameworks that support a self-directed quest to learn something personally meaningful without the rigid, linear system inherent in legacy institutions (Swearer, 2017).

Financial security, incentives elude educators

Higher-education professors appear to be well-compensated but, in reality, are “overwhelmingly badly paid and frustrated by the tight control of the school system” (Illich, 1971, p. 102).

University administrators underestimate the amount of time educators devote to a course outside the classroom, particularly in rapidly changing fields like technology where content requires constant updating to stay relevant. Including office hours, marking, and professional development, the average professor works about 60 hours a week (Kroll, 2013).

How are educators financially rewarded for teaching MOOCs, where 95% of students do not attend that university (Fischer, 2014) and administrators assign fewer credits for teaching such courses? The financial picture gets murkier for adjunct professors, who generally have few benefits and little job security (Kroll, 2013; OPSEU, 2017).

This precarity will likely worsen as technology enables deschooling (Illich, 1971) and teachers can no longer “ensure their jobs by requiring students to be taught subjects they, the teachers, know” (Ackoff & Greenberg, 2008, p. 71).

Digital technology can improve education delivery, employability, efficiency

The use of digital technology for curriculum delivery has tremendous potential to raise the standards of teaching and learning (Watson, 2001). Students benefit from greater flexibility in the number of courses and schedules available (Council of Ontario Universities, 2011; Fischer, 2014), making it easier for them to enrol. Despite MOOCs’ notoriously low completion rates, sheer capacity allows them to graduate more students per instructor than traditional programs in a shorter period of time (Fischer, 2014), thereby broadening the selection of candidates from which employers can choose.

That said, technological throughput comes with opportunity costs, not the least of which are significant (and still largely unrealized) betterments of teaching ability and sustained student engagement as learning experiences get dehumanized with volume (Kemp et al., 2014). This unprecedented change could necessitate perpetual teacher training and professional development, if not radical reform of educational systems (Ely, 1999).

Required workplace skills change faster than curricula, no longer guarantee relevant jobs

Created over a century ago, our educational system prepared people with deep specialization to work in hierarchical organizations and solve relatively simple problems. We live in a much different era of dynamic, collabor-
These are big businesses. They are not colleges that are run like businesses, and they are not businesses that are run like colleges. They are big education businesses.

Ch., personal communication

ROI / Overhead matter to education, too

Education is like any other business concerned with its P&L. With domestic enrolment down, Ontario colleges are increasingly relying on international students to fill their revenue gap (Chiose, 2017), in some cases catering their courses to students from abroad strictly as a revenue stream (Ch., personal communication, August 5, 2017).

On the cost containment side, the allure of MOOCs is easy to see. Moving courses online would reduce administrative and operating expenses while greatly expanding the student (revenue) base (Contact North, 2013; Fischer, 2014; Illich, 1971; Baggaley, 2013). The Council of Ontario Universities (2011) disagrees, countering that online delivery costs are not necessarily lower. However, this may simply imply that the management of new technologies by traditional institutions is still a work in progress. Regardless, the savings from eliminating major capital expenditures like classroom construction are hard to ignore and will likely keep MOOCs on many schools’ financial agenda.

Tech availability, benefits favour the rich

Do students from certain districts perform better because they have technology, or do these districts have other influences to begin with that also encourage learning (Kemp et al., 2014)? Do MOOCs work well only for students who are already fairly well educated (Fischer, 2014)? What one does with technology matters more than just having it, but affluence certainly makes availability a non-issue.

On the flip side, schools in lower socio-economic areas must deal with pre-packaged curricula without all the necessary resources to support them (Apple, 2003). Given these limitations, and with curricula developed without educator consultation, there can also be a loss of professional dispositions associated with good teaching, further demarcating the various strata that make up the digital divide (Kemp et al., 2014).

Much like our natural environment, the educational climate is rapidly changing.

Well-worn practices and beliefs can endanger the learning ecology if left unchecked. This research uncovered four key environmental dimensions (Online Platforms, Curricular Structure, Campuses, and Legacy Organizations) that drove the insights below.

Despite tech’s potential to enrich learning, MOOCs are losing students

Technological advancements should enhance the learner experience beyond the traditional face-to-face model (Kemp et al., 2014). However, with dropout rates as high as 90% (Terras & Ramsay, 2015), MOOCs could not be farther from their potential. Poor incentives to complete the course, issues understanding the content, and a general lack of support or feedback to address these issues have all been offered as possible explanations. While not inherent in or unique to MOOCs, these weaknesses are starting to define the medium and colour expectations. Others question why or how the traditional, and mostly passive, classroom model has come to stifle a highly interactive delivery method (Terras & Ramsay, 2015). More fundamentally, however, educators themselves do not understand learner experiences, goals, technical literacy, and preferences well enough to keep MOOC students engaged (Kemp et al., 2014; Terras & Ramsay, 2015).

Physical spaces are necessary for tech-facilitated ideas to come to fruition

A compelling tweet can instantly garner thousands of likes but not necessarily action. While online platforms can reach large audiences efficiently and enable quick information exchange, nothing brings people together, allows new ideas to flourish, and galvanizes change more than a shared physical space (Kemp et al., 2014; Lopes, 2014). Taking a page from recent Egyptian history, “it was not until people were in solidarity, in the streets and voting booths, that the technology made a difference” (Kemp et al., 2014, p. 6).

Self-directed learning is much more common online

The 2.0 classroom is a “choose your own adventure” learning experience. Popular in the 1980s and 1990s, the innovative book...
Assessment standards are centrally prescribed, slow to change

Traditionally, performance evaluations have been quantitative and cognitive, where test scores set the standard for all students. A learner-centric environment knows when to switch to more qualitative, behavioural assessment, which gauges what students can do and how well they can do it (Ackoff & Greenberg, 2008; Ely, 1999).

While adaptable criteria can be especially useful for online, skill-based courses with diverse learner profiles and uncharted motivations (Terras & Ramsay, 2015), schools are not quick to embrace them. Tellingly, new blockchain approaches to micro-credentialing extracurricular work are direct nods to what entrepreneurs can only hope make it through the system (Swearer, 2017). The coalescence of learning environments and promote the technologies that best suit their needs, constraints like curricula, majors, and degrees (Illich, 1971; Farkas, 2012).

With instructor guidance on learning outcomes, self-motivated students select the technologies that best suit their needs, choose only subject matter that is meaningful to them, and give feedback that shapes course material (Farkas, 2012).

In contrast to the “closed classroom” model’s focus on unilateral knowledge transfer (whether through textbooks or lecturers), 2.0’s learner-centric approach recognizes that successful online course delivery hinges on whether students can learn what, when, how, and why they want (Fischer, 2014).

To this end, there are calls for universities to extend the learning experience and come up with “competence maintenance programs” that keep students and alumni abreast of key developments in their industry (Ackoff & Greenberg, 2008, p. 148).

Although technology can bring people together, it is not until people have come together in a physical community that ideas and positions coalesce and change happens.

Joseph Flynn

Online platforms expand community resources, “time on task” beyond the campus

Online platforms extend valuable resources, both tangible and intangible. They allow instructors to use communication mechanisms (e.g., Facebook Messenger, portals) to increase contact with students, circulate course materials, or send mass reminders outside designated class hours (Kemp et al., 2014). At their convenience, students can access and review as many times as needed lectures and materials, or send mass reminders outside class time (Kemp et al., 2014). Online platforms extend valuable resources, allowing students, peers, and educators. Some say that the teacher-student bond strengthens as time on task” beyond the campus. Online platforms expand community resources, beyond the campus. Online platforms extend valuable resources, both tangible and intangible. They allow instructors to use communication mechanisms (e.g., Facebook Messenger, portals) to increase contact with students, circulate course materials, or send mass reminders outside designated class hours (Kemp et al., 2014). At their convenience, students can access and review as many times as needed lectures and materials, or send mass reminders outside class time (Kemp et al., 2014).
Galileo could only gape touring NASA’s Johnson Space Center. Columbus would quake with terror in a nuclear sub. But a 15th century teacher from the University of Paris would feel right at home in a Berkeley classroom.

Larry Spence

is devoted to those who could not connect with their teacher in class (Kemp, 2014), but the question of dependency on quick hits and whether online interactions have the same “magical or meaningful” quality as in-person ones are up for discussion (Ma., personal communication, August 4, 2017).

Learner-centric environments still need structure, guidance

Even the staunchest critics of traditional schooling believe that educators should set boundaries and assert their authority no matter how motivated or autonomous the student.

Specifically, the role of “wise counsellor” is appropriate when students require expertise in navigating rough or new terrain (Illich, 1971); are faced with roadblocks or alternative methods (Illich, 1971); or respond better to praxis and feedback than theory (Ad., personal communication, August 3, 2017).

Apart from their subject matter expertise, educators have a responsibility to control the learning environment and set students up for success through active problem prevention and purposeful “laissez faire” when independent exploration is beneficial (Farkas, 2012); and establishment of common ground and understanding of local issues and ways of thinking before students dive in, especially when MOOCs cross into unfamiliar international territory (Fischer, 2014).

Schools are frozen in time

Former University of California president Clark Kerr observed that starting from the year 1520, only 75 Western institutions still exist today in recognizable form: churches, parliaments, and 70 universities (Shirvani, 2015), all legacy institutions steeped in ritual, hierarchy, and tradition.

Indeed, the stoic lecture hall has withstood the test of time, with tenured professors seemingly oblivious of the agile and innovative workplaces awaiting unsuspecting graduates. Is the classroom model broken? (Ma., personal communication, August 4, 2017; Lv., personal communication, August 5, 2017).

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Schools are isolating places detached from the real world

The words “confinement”, “magic womb” (Illich, 1971), and “bubble” (Lv., personal communication, August 5, 2017) have all been used to describe the school environment.

Schools shelter learners from reality and stunt their creativity and critical thinking by teaching them how to learn about (vs. be) themselves in their own world, all the while using a pre-packaged process (Illich, 1971; Fischer, 2014). Further, skills are taught without real-world context or application (Fischer, 2014), resulting in an “unbridgeable gulf” between how people learn and how they are expected to function in the workplace (Watson, 2001, Lv., personal communication, August 5, 2017). Lastly, schools tackle issues in artificial silos that correspond to academic majors, thereby robbing students of a multidisciplinary approach to problem solving (Ackoff & Greenberg, 2008).

A self-selected environment (peers, topics, modes) is an ideal environment

The higher education experience is predetermined and offers little choice. Students follow a prescribed program map of prerequisites and co-requisites and are assigned professors and classmates. With such a system so entrenched, it is hard to imagine an alternative model.

Illich (1971) proposes an arrangement where learners are empowered to choose a topic of interest independent of any pre-programming, find matches in motivated mentors and peers with like interests, share information, and co-construct new knowledge by exploring and debating each other’s point of view (Farkas, 2012). The result is an engaging, congenial atmosphere that recognizes the importance of the individual, not the institution, in charting their path and achieving their social role in life.

Schools are set up to dispense knowledge in pre-defined blocks

Universities have long been compartmentalizing education around well-worn genres, focusing on the accumulation of specialized intellectual capital (Fischer, 2014) and teaching students to deploy these stocks of knowledge within their field of study rather than cross-pollinate with other disciplines to solve broader issues (Watson, 2001).

Meanwhile, the world has moved on from Industrial Revolution-inspired “learning to do” approaches to more “doing to learn” models of knowledge discovery, which acknowledge that today’s complex problems will be better served not by 30 or 40 classic academic majors but by branching pathways of micro-genres of interest that may not even have names today (Ackoff & Greenberg, 2008; Swearer, 2017; Watson, 2001).
Disgruntled students, outsiders see a better way.

After centuries of unchallenged rule, higher education’s leaders and administrators are facing resistance. This research uncovered six key political dimensions (Administrators, Autonomous Learning, Educational Feudalism, Entrepreneurial Sub-ecosystems, Policy, and Technologies) that drove the insights below.

The road to fully entrepreneurial ecosystems is riddled with obstacles (administrative).

Entrepreneurial ecosystems are difficult to introduce, let alone incorporate cohesively, into legacy environments.

Attitudinally, academics can be skeptical of new technologies and reluctant to adopt changes to established procedures (Watson, 2001; Farkas, 2012). Structurally, there are complications as well. Faculties are housed separately on campus and set up to function in isolation rather than collaborate with other academic sectors and disciplines (Swearer, 2017). Students themselves have been trained to accept hierarchical teaching and administration and may not do well in a flat, fluid, and free learning environment (Farkas, 2012; Swearer, 2017). Finally, privacy concerns stand in the way of open sharing of information both internally and to outside parties.

Schools are discriminatory to students, teachers

Higher education is not open to all. Universities require a secondary level of education, which effectively shuts out younger teens who want to learn. While mature students would qualify, the culture is decidedly youth-oriented and can leave older adults feeling out of place.

Under the cloak of standards and fairness, students are mandated to receive pre-determined content in set ways regardless of their individual interests and learning preferences. Instruction is still mostly tied to the classroom and built around the goals and expertise of teachers who, in turn, are subject to specific guidelines of when and where they can teach. As such, instructors are restricted in their ability to share their skills and knowledge even if there is a market for them (Illich, 1971).

Flawed policy, leadership undermine success and change

Standards for good online education is a case of the “blind attempting to lead the sighted” (Baggaley, 2013, p. 137). Rather than seek the guidance of interaction designers, online educators, and of course, tech-savvy students, administrators, engineers, and “bricks and mortar heavyweights” stumble as they try to understand and develop a usable online learning platform (Baggaley, 2013, p. 137).

Schools also grapple with dichotomous rationales for teaching technology. While there is a clear focus on the mastery of ICT skills used in the workplace, there is no clearly stated mandate to use this mastery to

Figure 1.6: Political dimensions and motivations on which to base curriculum design
further the rest of the curriculum, thus creating a silo within a silo. This confusion of purpose reflects the difficulty of implementing flawed policies in schools (Watson, 2001).

**Participate and co-create, don’t simulate**

When Illich (1971) met with a high school resistance movement demanding more education, he was struck by their clever slogan “Participation not Simulation,” which was, unfortunately, misunderstood to be a demand for less. The spirit of that motto lives today in instructional technology built on an “architecture of participation” (Farkas, 2012, p. 83).

Undoubtedly, participatory technologies have disrupted educational dynamics. Learners are now simultaneously consumers and co-constructors of knowledge with their peers (Farkas, 2012; Fischer, 2014), resulting in greater comfort with uncertainty and less reliance on instructors. With more hands-on, informal types of learning, the days of passive knowledge transfer may be numbered (LaMonica, 2006).

**Technology up-ends current beliefs, power structures (Tech has politics)**

Outside the classroom, Internet technologies have been accused of large-scale circulation and politicization of information, even maneuvering people into “behaving like mass-produced, specialized mechanisms” (Khan, 2007, p. 436).

As technology is institutionalized in education, the fine line between “teaching and learning online” and “the use of technology to augment teaching and learning” (Kemp et al., 2014, p. 6) becomes political when interpreted as a win-lose choice between having a pedagogical complement or a competitor.

For students, this privileging of technology is already repositioning them as empowered knowledge co-producers (Farkas, 2012; Fischer, 2014). Whether students use technology (or technology uses them) to spark counterculture movements that question institutionally engineered values (Illich, 1971; Watson, 2001) or mobilize around larger issues (Khan, 2007) remains to be seen.

**Autonomy in learning = motivation + accountability**

Flattening the traditional classroom hierarchy shifts the educator’s role to facilitator, presenting new ideas and concepts in a nurturing environment while students take over their own learning (Farkas, 2012) and explore the applications of new knowledge and technologies to their personal goals.

This approach is closer to the “Education for all means education by all” ideal set out by Illich (1971, p. 12), that is: drawing on peer experience and harnessing technology to create channels of personal and creative expression independent of any institution.

**Entrepreneurial sub-ecosystems are emerging within legacy environments**

Supported by faculty and experienced practitioners, students should be designing their own learning experience without the constraints of onerous curricular requirements (Ackoff & Greenberg, 2008). Taking this entrepreneurial approach to the next level, special university teams are partnering with government, not-for-profits, businesses, and other entities to set up innovation and maker spaces within campuses (Swearengin, 2017).

“Amazing, scrappy, and crazy” (Swearengin, 2017), these new spaces could not be farther in culture, activity, and composition from traditional schools. Illich (1971) famously associated the liberation of critical and creative resources with taking control back from institutions, so it is easy to see how these entrepreneurs could be seen as threats. Wisely, teams creatively work around and on top of infrastructure built for another era and stay low by not being officially connected to any one department or faculty (Swearengin, 2017).

**Democratic dialogue in classrooms promotes learning**

An environment that encourages open discussion yields greater learning than one that is solely lecture-based.

When instructors initiate informal discussions with students before class, they can gauge student progress to date, gain insight on what students want to learn, and tailor their curriculum and pedagogy with this simple formative assessment (Farkas, 2012). A shift in emphasis from concrete answers and lectures to explor-

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**The flattening of hierarchy between student and instructor is necessary to unlock the power of these technologies.**

Meredith Farkas
Rather than treat pedagogy as the transfer of knowledge from teachers who are experts to students who are receptacles, educators should consider more hands-on and informal types of learning.

John Seely Brown

...gy questions and debates develops students’ core skills and dispositions as they work with information in a safe environment (Farkas, 2012). Meanwhile, instructors can draw on their knowledge (or address their lack of it) by challenging students to ask controversial questions and actively participate in the dialogue and discourse themselves (Ackoff & Greenberg, 2008; Watson, 2001).

Education is feudalistic, one-way

Traditional pedagogy formed in an era when expert knowledge was scarce (Farkas, 2012). The result is the familiar teaching (not learning)-centered scenario of a “sage on the stage” transmitting information to a captive audience waiting to receive it (LaMonica, 2006). Ackoff & Greenberg (2008) describe schools as “the only major institution in our country that officially recognizes autocracy,” where students are at the bottom and feel that they must conform to instructor expectations to get a good mark (Farkas, 2012). Teachers themselves have to please the system, as their legitimacy and livelihood largely depend on their association with an educational institution (Illich, 1971).

Schools promote the institutionalization of values

According to Illich (1971), the existence of schools produces a demand for schooling. As the notion that “instruction produces learning” takes hold, the self-taught are met with suspicion, the value of their education marginalized due to an absence of certification. The true victims, however, may be the students who, “addicted to being taught,” now only value the result, having unlearned to “do their thing,” “be themselves,” and stay true to their lifelong mission (Swearer, 2017).

Deeply-held truths are highly personal and serve as a compass that guides each individual in their unique journey of learning. This research uncovered seven key values-related dimensions (Autonomy, Freedom, Good Pedagogy, Humanistic Values, Knowledge, True Learning, and Wisdom) that drove the insights below.

“Students” should be able to choose their “teacher” (source of learning)

Illich (1971) envisioned a deschooled society where learners are not pre-assigned any instructors. Instead, they choose their own learning partner based on skill matching and consultations with former students about their own experiences with a particular instructor. This transparent and objective peer rating system creates a level of educator accountability that would benefit higher education.

Education’s output should be wisdom and life skills, not mastery of transient tools

Pedagogy should be grounded in transferable skills (e.g. collaboration, self-direction, creativity, information literacy) that foster lifelong learning and critical inquiry (Farkas, 2012). Since students acquire so much content already from a myriad of sources, from online to peers (Ma., personal communication, August 4, 2017), a solid foundation that allows them to build wisdom from the consequences of their actions and learn from their mistakes (Ackoff & Greenberg, 2008) may be a more lasting educational legacy.

Technology dehumanizes learning, education

Education has morphed from a humane exchange of ideas to a “technological levianthan that is slowly usurping the soul of the profession” (Kemp et al., 2014, p. 4). As education becomes more dependent on technology, a greater concern for the return of humanistic values like identity, ethics, and understanding (Illich, 1971) will likely emerge as a countering force and support various aspects of instructional design (Ely, 1999). Of course, one can also...
PHASE 1: FRAME DESIGN EDUCATION

PHASE 1: FRAME DESIGN EDUCATION

PHASE 1: FRAME DESIGN EDUCATION

PHASE 1: FRAME DESIGN EDUCATION

PHASE 1: FRAME DESIGN EDUCATION

PHASE 1: FRAME DESIGN EDUCATION

LIFELONG MISSION

VALUES

CHOICE

FLUIDITY

HUMANISTIC

Figure 1.7: Values dimensions and motivations on which to base curriculum design

look to the university campus for solace, a reliable and durable constant through centuries of change (Shirvani, 2015).

A “super teacher” embraces and manages student diversity (skills, preferences, opinions)

Good pedagogy considers each student as an individual. While harder to administer in MOOCs due to their size, the learner autonomy that this platform affords (e.g., choice of resources, pace) makes an educator’s thorough understanding of the skills and psychological capacities of students even more critical so they can support independent learning (Terras & Ramsay, 2015). Successful online educators also need to be able to moderate a large online community and allow divergent viewpoints to expose learners to a range of ideas and beliefs (Farkas, 2012); curate and position student-generated content, which can be seen as excessive and less valuable than teacher-provided materials (Fischer, 2014); and be on the lookout for emerging countercultures that need to be understood (Illich, 1971).

Learning is a continuous, lifelong endeavour of (self) discovery

In today’s knowledge economy, what one needs to be considered informed is constantly changing. Knowledge is no longer defined as something learned once, but rather a lifelong endeavor (Farkas, 2012). “We need to get students to move from majors to missions. Passionate personal missions that they pursue throughout their lives” (Swearer, 2017).

Higher education can help by creating an environment that focuses less on the delivery of knowledge and more on its discovery (Ackoff & Greenberg, 2008; Farkas, 2012).

True learning happens outside the classroom

Schools have taught people the need to be taught. This lesson discourages independent growth and closes the door on life’s surprises and teachable moments that aren’t institutionally sanctioned (Illich, 1971).

However, “the objective of education is learning, not teaching” (Ackoff & Greenberg, 2008, p. 5) and a “commitment to developing the whole person” (Shirvani, 2015, para. 2).

Connecting students with others and external environments can be the “perpetual field trip” (Ma, personal communication, August 4, 2017) that students can build on to learn for life.

But what I couldn’t learn was how to think, how to form an opinion, how to argue that opinion.

Ad., personal communication

Knowledge is not fixed. It is nimble, adaptive

The perception of knowledge must change from something reliable and changeless to something that is an inquiry and activity (Hovorka & Rees, 2009).

To that end, educational institutions can adopt design learning that, in the spirit of design thinking, pushes formal education to “entrepreneurial dispositions and skills necessary to adapt to rapid social and technological change” (McGowan & Araya, 2016, para. 8).

Furthermore, universities can focus their efforts on building deep learning mindsets with machine intelligence that will help people “continually navigate complexity over the course of their lives” (Swearer, 2017).
We need to get students to move from majors to missions. Passionate personal missions that they pursue throughout their lives with and without co-created learning pathways.

Randy Swearer

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Learner autonomy + self-motivation = achievement
Teaching cannot produce learning without motivation (Ackoff & Greenberg, 2008). It is a driver that cannot be forced on students but comes from a genuine desire to learn, typically to ignite one’s career or satisfy a thirst for knowledge (Ad., personal communication, August 3, 2017).

Adding learner autonomy to motivation can make for a powerful combination. Student achievement has been shown to improve with a greater sense of responsibility (Mcloughlin & Lee, 2008).

Define learning by missions, not majors
People are looking for educators who can translate today’s complexity into meaningful skills like critical thinking and how to be better self-learners (Ma., personal communication, August 4, 2017). Educating the whole person will serve as a foundation to help prepare young people for a world of multiple careers or careers that do not yet exist (Shurvani, 2015).

To that end, more flexibility can be built into the educational system by waiving undergraduate degree requirements and restoring exit requirements only for students who need certification (Ackoff & Greenberg, 2008).

Freedom to fail is key to success. Just do it
If the consequences of failing were minimized, students would often challenge themselves to work on their weaknesses (Ackoff & Greenberg, 2008).

Trial and error, a natural problem-solving skill developed at birth and honed by Montessori schools, may unlock the secret to success in life (Ackoff & Greenberg, 2008; Swearer, 2017). It may not be a coincidence that so many Silicon Valley leaders attended Montessori and that the tech industry embraces the iterative and experimental “doing to learn” approach to design (Swearer, 2017). In the end, it is important to act. To quote Harvard educator Tony Wagner, “It is not what you know, but what you can do with what you know”.

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</tr>
<tr>
<td>The pursuit of highly personal learning outcomes through individual drive and co-creation of knowledge</td>
<td>Accountability, Ownership</td>
<td>Blame / Responsibility</td>
</tr>
<tr>
<td><strong>COMMUNITY BUILDING</strong></td>
<td>Outside Influences</td>
<td>Interaction / Isolation</td>
</tr>
<tr>
<td>An inclusive, well-organized circle that creates emotionally satisfying relationships</td>
<td>Classroom Environment</td>
<td>Skills / Workplace Culture</td>
</tr>
<tr>
<td><strong>EMPLOYABILITY</strong></td>
<td>Interpersonal Relationships</td>
<td>Competition / Co-operation</td>
</tr>
<tr>
<td>A program that is highly respected and valued by employers, students, and the public</td>
<td>Transferable Skills</td>
<td>Employment / Fulfilment</td>
</tr>
<tr>
<td><strong>TECHNOLOGICAL</strong></td>
<td>Planning Infrastructure</td>
<td>Engagement / Productivity</td>
</tr>
<tr>
<td>A Remix Culture</td>
<td>Quality of Online Learning</td>
<td>Accessibility / Recognition</td>
</tr>
<tr>
<td><strong>CODE OF CONDUCT</strong></td>
<td>Intellectual Curiosity</td>
<td>Attribution / Appropriation</td>
</tr>
<tr>
<td>Clear policies on the acceptable use of technology in interactions with people and intellectual property</td>
<td>Dependency / Autonomy</td>
<td></td>
</tr>
<tr>
<td><strong>CUSTOMIZED LEARNING</strong></td>
<td>Supporting Data</td>
<td>Variability / Scale</td>
</tr>
<tr>
<td>Efficient tools that let students create and pursue learning pathways as unique as they are</td>
<td>Unprepared Educators</td>
<td>Relevance / Engagement</td>
</tr>
<tr>
<td><strong>OPTIMAL USE</strong></td>
<td>Educational Intent</td>
<td>Availability / Effectiveness</td>
</tr>
<tr>
<td>A culture of learning that embraces iteration and experimentation in the use of technology</td>
<td>Deceptively Familiar</td>
<td>Comfort / Innovation</td>
</tr>
<tr>
<td><strong>PEOPLE FIRST</strong></td>
<td>Idealized Expectations</td>
<td>Extension / Limitation</td>
</tr>
<tr>
<td>A program that puts technology in the service of students and teachers, not the other way around</td>
<td>Instruction</td>
<td>Encouragement / Indifference</td>
</tr>
<tr>
<td><strong>WHERE TO FROM HERE?</strong></td>
<td>Traditional Constraints</td>
<td>Personalization / Constraints</td>
</tr>
</tbody>
</table>

Derived Program Redesign Principles
How might technology and pedagogy function effectively as one to serve post-secondary design learners of the future? For program redesign to be compelling, it must incorporate synergistic combinations of the following human-centred motivations, levers, and tensions:
## MOTIVATIONS

### ECONOMIC

**ACCESSIBILITY**
- Equal opportunity to have and to use technology to fuel one’s personal learning mission

**VIABILITY**
- A financially efficient business model that does not sacrifice student and faculty engagement

**CURRENCY**
- Skills and experiences that are in tune with personal goals and ahead of industry demands

### ENVIRONMENTAL

**ADAPTIVE SPACES**
- Fluid environments that mold physically, procedurally, and technologically to student feedback and the outside world

**CONDUCTIVE SPACES**
- Student-defined learning environments supported by expert guidance and venues to implement ideas

### NO BOUNDS
- An ever-opening learning landscape that is not walled in by time, space, or orthodoxy

## LEVERS

- **Tech Access and Benefits**
  - Tech Costs / Admin. Budgets
- **Supplemental Learning**
  - Public Demand / Static Curricula
- **Personal Mission**
  - Market Demand / Learner Interest
- **Proven Returns**
  - Metrics / Funding
- **Educator’s Values**
  - Compensation / Expectations
- **Curriculum Changes**
  - Market Face / Static Curricula
- **Relevant Skills & Experience**
  - Employability / Certification
- **Lengthy Degree Programs**
  - Market Demand / Tuition Income

## TENSIONS

- **Outdated Assessments / Industry Expectations**
- **Student Engagement / Legacy Culture**
- **Demand / Availability**
- **Richer Experiences / Retention Issues**
- **Ideas / Activism**
- **Personalized Environment / Legacy Culture**
- **Student-Controlled / Legacy**
- **Guidance / Autonomy**
- **Confinement / External Influences**
- **Learn To Do / Do To Learn**

## POLITICAL

### CLEAR LEADERSHIP & POLICY
- Holistic and widely understood direction built on institutional diversity and student success

### GRASSROOTS
- A willingness to take a bottom-up approach to designing the future of the program

### TWO-WAY STREET
- A democratic mindset that encourages dialogue and feedback for positive change

## VALUES

### HUMANISTIC
- A celebration of each student as a unique, whole being who wants to achieve

### FLUIDITY
- A readiness to embrace the unknown and quickly change course in the name of progress

### LIFELONG MISSION
- A tireless quest of self-discovery that doesn’t stop at graduation

## CHOICE
- The confidence to put students in the driver’s seat of their education

### ACCESSIBILITY
- (Right to) Knowledge Transfer
- Existing Beliefs, Structures
- Administrative Obstacles
- How Learning is Carried Out

### VIABILITY
- Entrepreneurial Spirit / Monopolies
- Innovation Culture
- Empowerment / Threat
- Prescribed Learning / Discrimination

### CURRENCY
- Institutionalization of Educational Values
- Dependency / Autonomy

### POLITICAL
- Muddled Objectives and Leadership
- Traditional Hierarchies
- Autonomy / Accountability

### VALUES
- Focus on Technology and Tools
- Human-Centred / Tool-Centred

### FLUIDITY
- An Active Process
- Experiment Without Censure
- Trial and Error / Failure

### LIFELONG MISSION
- Learning Life Skills
- Dependency / Discovery
- Individual Life Mission

### CHOICE
- A Desired Mentor or Learning Source
- Choice / Barriers

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WHERE TO FROM HERE? (CONT.)
PHASE 2: REFRAME DESIGN EDUCATION
PARADIGM SHIFT

For program redesign to be relevant and cohesive, the various motivations behind post-secondary design education need to coalesce around a compelling underlying truth. What, then, might this quintessential anchor be that we should focus on and innovate around? How do we reframe and solve for the core issue rather than chase down symptomatic evidence?

Through Causal Layered Analysis (CLA), Phase 2 of this research ladders down to interpret key stakeholder perceptions of a pervasive dilemma and suggests alternative paradigms for post-secondary design education.

Causal Layered Analysis

Developed by futurist and academic Sohail Inayatullah (2005), Causal Layered Analysis (CLA) was employed to uncover a powerful, metaphorical basis for program change that not only unifies our motivations into a single redesign context but also crystallizes our understanding of design education, all the while enabling stakeholders to see problems, generate solutions, tell stories, and influence others with a fresh, shared mental model (by defining and structuring its conceptual system in terms of another).

Workshops

To this end, two separate in-person CLA workshops were held at OCAD University’s graduate building. While the mechanics of each session were identical, two distinct stakeholder groups were recruited to bring forth a more holistic view of post-secondary design education:

• Recent graduates working in design, for firsthand accounts of their learning experiences and how these have prepared them (or not) for professional life
• Design educators, for an insider view of academia, including the challenges of teaching and being part of the educational system (e.g. administration, politics, the business of education)

For recruitment criteria, participant profiles, and moderator’s guide, please see Appendix E.

Choosing a Starting Point

The critical choice of problem statement from which to ladder down was driven by recurring themes that surfaced during different stages of this research, from literature review, to Human-Centred STEEPV analysis, to expert interviews. More precisely, the notion that there is a growing, undesirable chasm between design education and industry was widely held by thought leaders and design professionals consulted in this project.

A digital pedagogy specialist (Mo., personal communication, June 27, 2018) recalls a situation where a highly educated graduate lacked the skills to stay employed with a software development firm, concluding that higher education “pushes out all these learners with skills we think the industry wants.” As design workplaces deal more and more with wicked problems, students continue to be educated for deep specialties aimed at specific issues (Swearer, 2017). Students are graduating already partially obsolete (Ackoff & Greenberg, 2008). Ba. (personal communication, June 30, 2018), a working designer and educator, adds that graduates who...
have the confidence to apply their knowledge on the job are just as hard to find.

From my personal experience leading Sheridan College’s Web Design program, this disconnect between curriculum and industry also bears weighty financial consequences for the educational institution. With interfaces outgrowing the browser and the display (e.g. chatbots, smart speakers, augmented reality), “Web Design” has ceased to resonate with potential candidates, resulting in a five-year trend of declining applications and enrolment that is only now being addressed during a program suspension.

With these in mind, workshop participants started from the surface problem that “Required workplace skills change faster than curricula, and design degrees no longer guarantee desired employment.” Figure 2.1 summarizes the rhetoric, systemic issues, worldviews, and depictions revealed in the sessions. The resulting myth and metaphor are then presented in greater detail on the following pages (See “Of Bricks & Beasts”), where each mental model is broken down for moments of truth, pivotal mechanisms, emotional underpinnings, and unexpected commonalities that might translate well in a design education context.

**Figure 2.1: CLA Workshop Summary**

**Observations**
What is the common understanding of the problem?
(policy, opinions, media spin, events, trends)

**Interconnections**
What systems sustain the problem?
(contributing factors: technical, social, political, economic)

**Debates and Discussions**
What culture feeds the problem?
(dominant or marginalized opinions, values, viewpoints)

**Depictions**
What image or narrative properly depicts the problem?
gut level or emotional responses, archetypes, visual images

**Required workplace skills change faster than curricula, and design degrees no longer guarantee desired employment**

**RECENT GRADUATES**
- Workplaces want “unicorn designers” who are able to perform multiple roles
- Post-secondary education is not interdisciplinary, it is heavily siloed
- The democratization of design gives the impression that anyone can do it, so designers are less valued
- Design programs do not emphasize problem-solving skills

**EDUCATORS**
- No time for educators to understand tech’s long-term impact and cover potential consequences with students
- Schools hire cheaper part-time faculty instead of dedicated staff to craft the curriculum
- Post-secondary education prestige heightens employers’ expectations of design graduates
- Faculty have little say in time or compensation for professional development, it is hard to stay current

**Schools push student conformity for fairness and ease of administration while employers want celebrity and uniqueness to stand out in the marketplace**

**Design programs prepare students to work as technical specialists in a variety of traditional workplaces but not at any particular company or one that has yet to exist**

**Design education is a multi-year jigsaw puzzle. In contrast, industry is an interactive, fast-paced game of Tetris: an ever-changing mosaic that requires agility**

**Industry is a fearsome, hyper-complex beast that is beyond academic control. Industry demands seem to grow in number and difficulty as soon as one challenge ends**
TETRIS

Tetris is a tile-matching video game by Russian software engineer Alexey Pajitnov. Launched on June 6, 1984, it appears on nearly every game console, computer, and mobile phone OS today, making it one of the best-selling games of all time.

Gameplay
Players rotate, move, and drop a series of falling geometric shapes (Tetriminos) into a rectangular area. As the blocks complete lines, they disappear and the player earns points. When a line is filled, the game is over.

Can you earn more points than anyone else and become the Skyline, the game is over. The Skyline is the highest possible score. It is not known whether the Skyline score is the highest possible score that can be achieved, but it is known that it is possible to achieve a score of 1,000,000 or more.

Players attempt to create as many horizontal lines as possible by completing rows with no empty spaces. When the stack of Tetriminos reaches the Skyline, the game is over.

RECENT GRADUATES: Design education is a multi-yearigsaw puzzle: a single-solution endeavour where patience and ability to handle volume in a stable environment are key. In contrast, industry is an interactive, fast-paced game of Tetris: an ever-changing mosaic requiring agility, strategy, and looking ahead to win. For post-secondary design programs to evolve and become more relevant, which aspects of Tetris might we project onto academia to refresh its thinking?

TETRIS EFFECT
Coined by avid players, “Tetris Effect” is the way the game taps into “our universal desire to create order out of chaos,” marries “continuous fun with mental stimulation,” and emboldens players to face real-world challenges by seeing Tetriminos in everyday situations. In evolutionary AI, it speaks to bounded rationality, where hasty, impulsive actions trump calculated, optimal ones that are not completed in time.

CEREBRAL ADDICTION
Psychologist Vladimir Pollichko named three drivers of Tetris’ addictive appeal: the “main part is visual insight. You make your visual decision, it happens almost immediately. Insight means emotion: small, but many of them, every two, three seconds. The second is unfinished action. Tetris has many (that force you to continue and make it very addictive. The third is automatization: In a couple of hours, the activity becomes a habit, a motivation to repeat.”

WINNING STRATEGIES
wikiHow offers the following to improve at Tetris: (1) Learn to do a T-spin (craft a T-shaped gap for a T-shaped piece to be rotated into); (2) Do Tetriminos (clear four lines at once); (3) Know your playing style; (4) Avoid garbage; and (5) Push yourself (core-backrests a game that’s going poorly). These are good learning habits, personal best.

Key Learnings
Addictive experiences promote lifelong learning. Frequent hits of emotional satisfaction and long-term rewards for advancing progressively larger passion projects motivate students toward realistic and skill “power ups” for personal pleasure, not professional survival.

Method will minimize the madness. Core courses that emphasize “permanent” skills (e.g. human factors, innovation methods, analysis and synthesis, entrepreneurship) complement technical ones and better prepare students to thrive in unfamiliar and complex situations.

POWER RELATIONSHIPS
That Hera raised Hydra as Heracles’ punishment and induced the madness that led to his crimes shows a hubristic manager/damaged executive that falers in non-linear environments. “Hydra does not need a brutal Heracles-manager, but her own dangerous powers do need limits.”

Takeaway: Flamed inter, dependency, and academia, neither governance nor resistance

HYDRA OF LERNA
In Greek myth, Hydra is a serpentine monster whose tail was Lake Lerna, an entrance to the Underworld. “It had poisonous breath and blood so virulent that even its scent was deadly.” Depictions from 300 BC show multiple heads and tails, suggesting its ability to regenerate.

Second Labour of Heracles
After killing his family in a fit of madness, Heracles was ordered to serve the king of Mycenae. Eurystheus for 12 years and performed 12 impossible feats, the second of which was to slay the Lernan Hydra.

REDUCTIONISM OF TETRIMINOS
Made of the same four blocks, seven shapes (Tetriminos) can be dealt in one of 5,040 ways. Individual strategy, judgment, and skill equip players to manage the unknown, fill and clear rows given any shape, and determine how their personal Matrix ultimately looks.

WINNING AND BRAIN EFFICIENCY
Instead of reaching a pre-defined end, success in Tetris entails “making the game last indefinitely.” Psychologist Richard Haier found that while learning curves were steep, brain energy consumption normalized after four to eight weeks of daily play while performance grew seven-fold. Further, faster stimuli and harder decisions used less brain energy, especially in the best players, “the ones most efficient at dealing with Tetris’ Daedalian geometry.”

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Made of the same four blocks, seven shapes (Tetriminos) can be dealt in one of 5,040 ways. Individual strategy, judgment, and skill equip players to manage the unknown, fill and clear rows given any shape, and determine how their personal Matrix ultimately looks. Tetris: Applied learning, next-level engagement, confident problem-solving, rapid sensemaking.
PHASE 2: REFRAME DESIGN EDUCATION

PHASE 3
GENERATE
DESIGN EDUCATION CONCEPTS
What alternative futures might arise from our fresh perspective on industry and academia? How might learning environments look, feel, and function differently from today, and which human-centred motivations should they primarily serve?

**Morphological Synthesis**

Compelling aspirational futures should not only showcase the powerful human truths uncovered to date but also be at once new, well-rounded, and focused. To achieve this, Morphological Synthesis, a creative problem solving technique pioneered by astrophysicist Fritz Zwicky (Ritchey, 1998), was employed to construct unfamiliar “worlds” based on the motivations uncovered in Phase 1.

**Ideation Workshops**

Laddering up from the metaphorical depths of CLA, four one-on-one workshops were held with post-secondary design educators to generate and develop innovative program concepts. Using playing cards with a motivation on the face side (See Figure 3.1) and its corresponding colour-coded STEEPV factor on the back, participants were given all 20 cards face down and asked to randomly pick one card per colour (i.e. the lead motivation for a specific factor) to end up with six cards in total. The result is a unique world (one of 1,296 possibilities), with a set of balanced, targeted, and unbiased environmental considerations for each person to explore.

For recruitment criteria, participant profiles, and worksheets, please see Appendix F.

![Figure 3.1: Human-Centred STEEPV Cards (Face Side)](image-url)
Alternative Worlds

The workshops produced four distinct design program concepts, each with its identity driven by different motivations in combination. Figure 3.2 lists these concepts, a brief description, and the inputs that led to their creation.

Figure 3.2: Design Program Concepts

**A Bot of Coffee**

*Participant CI*

- soc Community Building
- tec Optimal Use
- eco Accessibility
- env Adaptive Spaces
- pol Two-Way Street
- val Fluidity

Open to learners from all countries and walks of life, “A Bot of Coffee” is an affordable, pay-as-you-go design program that takes place in virtual and real spaces outside of school.

Facilitated by human advisers and non-human assistants, the learning system adjusts lesson content and approach in real time as sensors interpret individual learner comprehension, mood, and feedback. “A Bot of Coffee” is incredibly social and connects design learners and leaders worldwide for dialogue, lifelong relationships, or a virtual pat on the back.

**It’s Personal**

*Participant JT*

- soc Employability
- tec People First
- eco Accessibility
- env Adaptive Spaces
- pol Clear Leadership & Policy
- val Humanistic

For design students who get lost in a “one-size-fits-all” system, “It’s Personal” is a virtual, on-demand environment that customizes learning goals, schedules, modes of engagement, and projects based on individual preferences. It uses technology and analytics to automatically align portfolios, course offerings, and internal budgets with employment needs and trends. To encourage the pursuit of self-defined success, “It’s Personal” rewards passion projects with tuition subsidies in exchange for design research.

**Enlightenment**

*Participant JA*

- soc Community Building
- tec People First
- eco Currency
- env No Bounds
- pol Grassroots
- val Lifelong Mission

For design students who march to the beat of their own drum, “Enlightenment” is a one-on-one learning system grounded in self-discovery, fit, and knowledge acquisition, not marks. Gurus (industry experts and long-time students) are matched with learners according to their interest, learning style, and personality. Based on the ingenuity displayed by the student in workshops and practical challenges, gurus personalize programs and guide students in applying new lessons to real-life design dilemmas. Students never graduate from “Enlightenment”. Instead, they learn for life and become increasingly better versions of themselves for personal and industry gain.

**Collaboration College**

*Participant RA*

- soc Community Building
- tec Optimal Use
- eco Currency
- env Adaptive Spaces
- pol Two-Way Street
- val Fluidity

For students who enjoy diversity and working in groups, “Collaboration College” is an online program built around interdisciplinary teams, complementary skills, and partner institutions. Designers and non-designers are matched and brought together remotely or in person to prototype solutions to real-world problems hackathon-style. Facilitators promote a cooperative and positive environment, while strategic alliances with outside faculties, other higher-education institutions, and industry nurture adaptable designers who are “project-lead ready” as soon as they graduate.
Finding the Right Fit

Acknowledge that a range of equally creative solutions exist, this research now seeks to converge for depth and detail by advancing one of the four concepts presented in the preceding pages as a means of sparking a conversation for change in post-secondary design education and, closer to home, elevating the program I am redesigning and coordinating at Sheridan College. Which one of these ideas has the strongest potential to open the doors of discussion and, importantly, on what basis?

Strategic Alignment as Key Criterion

Oftentimes, even the best-intentioned proposals hit a wall when they are deemed “off strat.” Indeed, conflicting priorities, lack of buy-in, concerns over resource misallocation, workplace redundancies, and unclear contextual purpose are organizational hurdles that can easily thwart fledgling initiatives. It is, therefore, imperative to not only recognize long-term plans but also deliberately set strategic fit as a major qualifier in our evaluation of alternative concepts.

In the case of Sheridan College, it has pinpointed five “Strategy Hives,” major thrusts that it hopes will position the school for competitive success in the next five years. Per its communication “Sheridan 2024: Defining Our Future” (released well into this MRP), the college offers the following goals and development areas that can (and should) now be taken into account:

- **Foster agility for the future**
  - How do we use technology to make education more accessible and relevant? What new ways of teaching and programming can support students in learning the hard and soft skills they need to be self-directed and adaptable? How can we lead in progressive work practices that enhance productivity, creativity, and service to students?

- **Invent the “learningspace” and workspaces of the future**
  - How do we create spaces where every voice matters? How do we connect people for more interdisciplinary, cross-program, cross-campus collaboration?
  - How do we deepen student/faculty and peer mentoring so everyone feels supported?

- **Offer a truly inclusive, globally aware student experience**
  - What IT and technological infrastructure would make the administrative side of campus life most seamless and free people up for the essential aspects of their work? How can the physical reality of Sheridan truly reflect and support creativity, learning, and wellness?

- **Have processes, infrastructure, and space to fully enable Sheridan 2024**
  - What kinds of integration between learning, cities, and workplaces can be created through truly transformative collaboration? How can we transform co-op, continuing education, and other forms of applied and lifelong learning to define a new hybrid space for learning, research, and community development?

- **Invent through collaboration with cities and industry**
  - How do we use technology to make education more accessible and relevant? What new ways of teaching and programming can support students in learning the hard and soft skills they need to be self-directed and adaptable? How can we lead in progressive work practices that enhance productivity, creativity, and service to students?
With these strategic objectives in mind, how do our four alternatives stack up? Figure 3.4 offers an empirical assessment of fit by looking at how directly each concept and its salient features feed the college’s various strategic thrusts.

Figure 3.4: Gauging Strength of Concept Alignment to “Sheridan 2024” Strategy

| “Sheridan 2024” Strategic Objectives | A Bot of Coffee | It’s Personal | Enlightenment | Collaboration | College |
|--------------------------------------|----------------|--------------|---------------|---------------|
| Foster agility for the future        | 🌟             | 🌟            | 🌟            | 🌟            |
| Invent the “learningspace” and workspace of the future | 🌟 | 🌟 | 🌟 | 🌟 |
| Invent through collaboration with cities and industry | 🌟 | 🌟 | 🌟 | 🌟 |
| Offer a truly inclusive, globally aware student experience | 🌟 | 🌟 | 🌟 | 🌟 |
| Have processes, infrastructure, and space to fully enable Sheridan 2024 | 🌟 | 🌟 | 🌟 | 🌟 |

- 🌟 Strongly / directly supports strategy
- 🌟 Somewhat / indirectly supports
- 🌟 Poorly supports

Choosing a Concept to Develop

Based on the above criteria, one alternative world rose above the others and dovetailed more tightly into Sheridan College’s strategic priorities. Coincidentally, it also stood out in the workshops for its cohesiveness, imaginative use of technology, and clarity of intent.

The following section unpacks our winning concept: A Bot of Coffee.
PHASE 4
REFINE
THE CONCEPT

How might A Bot of Coffee operate in the future? This section builds on the CLA and ideation workshop results by illustrating a “slice of life,” lending physical form to the motivations, key concepts, and insights at the heart of this idea. More explicitly, it seeks to (1) contextualize A Bot of Coffee as a human-centred solution, (2) visualize its moving parts, (3) bring to the fore required investments or partnerships, (4) serve as a gut check for validity, and (5) compose a narrative for communicating the new.
PHASE 4: REFINE THE CONCEPT

Use Case Scenario

Nara walks into her neighbourhood café ready to start learning. She likes the laid back, lazy feel of a Sunday afternoon and feels it is the perfect time to start her new module. With her tech in one hand and favourite beverage in the other, she is fully armed as she takes her usual spot at the communal study table.

She is excited to start her new module. At the price of a cup of coffee a day, why not? Rather than the mammoth tuition commitments of old, the price of learning is much friendlier with a pay-as-you-go model. Nara recalls the orientation pitch that got her into the Digital Product Design program:

From the comfort of a local coffee house, the Digital Product Design program offers always-on Learning In Virtual Environments (or LIVE) with a global perspective. For the price of a cup of coffee a day, students from around the world cover foundational topics such as human factors, empathic design, design strategy, sustainable design, user experience design, and evidence-based design; collaborate with like-minded peers; and partner with industry to work on real-world projects. Your learning isn’t time-boxed. You learn when and for how long you want. Plus, LIVE senses and adjusts to your comprehension and feedback, allowing you to learn at your pace.

Nara really values learning on her terms and how the program is accessible to all. Paying a little more for her modules helps ensure the LIVE virtual glasses are distributed to underserved areas.

The LIVE learning trend is certainly not her mother’s academic experience. In fact, Nara just read another article on the enrolment freefall in traditional academia. The fixed pace, one-size-fits-all education certainly doesn’t appeal to her generation.

As she takes a sip of her dark-roast coffee, she puts on her LIVE glasses and enters a personalized virtual learning environment. Since it is the first day of the new module, Nara is a little nervous. The LIVE virtual environment senses that and changes her default techno “wallpaper” environment to an ambient one. That’s better, she thinks.

Her new session focuses on Sustainable Design. This is a perfect subject for Nara. Ever since she was young, she tinkered with things, trying to make them last just a little longer. Why throw them in the waste? Given the fragile state of the planet, she wants to make things better and for a greater good. Finally, she will be in her element and dig into discussions with others who feel the same way!

She turns to see a few classmates joining her at the café’s communal table. She greets Jakob and Li, fellow classmates and now friends from a previous session. A few others just join virtually, and she looks forward to making new acquaintances. That’s the benefit of coming out to the Learning Perks coffee shop: you get to virtually collaborate with people from afar as well as peers you know locally.

Waiting for her module to start, she recalls the last one she took, Evidence-Based Design. It was more challenging than anything she
had taken before, and it was the first time she missed any achievement badges. LIVE sensed the puzzled looks Nara had with readings from her Analytics modules, so PROF-BOT came to the rescue, slowed down the pace, engaged her in banter on the subject matter, and successfully unblocked her cognitive bottleneck. It also didn’t hurt that she booked (on PROF-BOT’s suggestion) a few sessions with her in-real-life Advisor Akilah, who guided her with creative ways of approaching her Analytics assignment. Those “power-ups” surely helped her get to the next achievement level.

Back to Nara’s virtual LIVE class, Advisor Akilah introduces herself and lets the class know that she is available for collaborative sessions. PROF-BOT takes over, presenting recent research to guide the discussion on frugal innovation. A few students from remote/underserved areas of India chime in, offering a compelling take on their conditions due to limited water resources. This provides Nara with a new perspective. Her tinkering had always been about extending the life of her tech gadgets, not making daily life more manageable for other people.

Inspired by the discussion, Nara finds herself sketching out a mixed-reality screen interface that detects optimal watering for crops. That’s the thing with this program, Nara muses—it really infects you with curiosity. She tries a few more rounds of sketches to see what her peers think. Peer feedback happens so naturally in this program. She values their opinion since they are the smartest people she knows.

Without realizing it, she is on her way to completing her first assignment for the Iterative Design module. She notices this later as she browses the tasks on tomorrow’s agenda. She looks forward to starting that module. That iterative nature of design is what engages her—a venue that rewards experimentation is perfect for her tinkering disposition.

After having lunch in the west end with Jakob and Li from the morning class, Nara decides to go for the introduction to Product Design Workshop module in a Learning Perks coffee shop just a block away.

It appears that the project with Supercapacity Systems is the right fit. Judging from the kick-off meeting, the company really values her thoughts and suggestions on their newest product upgrade and expects her to take the lead! Given their own interest in sustainability and her desire to sharpen her skills, it is sure to be a fulfilling collaborative experience.

Looking ahead to next week, she can’t wait to try Design Industry Virtual Environment (DIVE) simulator, a trial run for a few weeks before her real-life industry placement. Nara hears that advisors work with industry to design the simulations, and they aren’t shy about throwing in some chaos and unanticipated curveballs. Recent graduates note that the experience is arduous at first, but everyone raves about the gains: resilience and a definite boost to emotional intelli-
They say the secret lies in trusting and using the methods PROF-BOT covers in class. And it’s not just students who benefit. Advisor Akilah immersed herself in an industry partnership earlier this year, and Nara noticed how invigorated her Advisor was when speaking about her collaboration. Current industry experience really shows at their advising sessions.

On her commute home, Nara is determined to realize the app idea she had earlier in the day. A passion project she has every intention of making a real project! She’s happy how everything came together and will ask Jakob and Li if they’d be interested in collaborating with her.

As the evening arrives, Nara, a self-described night owl, has an urge to chime in from her mobile device for one last short burst of learning. She is able to connect from the comfort of her couch. One of the perks of an always-on system is that sessions run all day with advisors from different parts of the world. She gets an answer to her query and can now rest, ready to tackle what tomorrow has in store.
Now that the conceptual building blocks for reimagining design education have assumed a prototypical form, what (and whom) would it take to move A Bot of Coffee closer to fruition?

Identifying Stakeholders

As a first step, it is critical to identify the parties who can materially impact and be impacted by A Bot of Coffee’s rollout. From a design thinking standpoint, they represent the bases whose needs and wants have to be considered. From the more pragmatic lens of change management, they are likely to be the most entrenched and “squeakiest” parties through (or around) which program change must occur. Who are emblematic of design education today?

- **Schools / Admin**: Governing bodies and administrators at higher-education institutions offering design programs
- **Instructional Techs**: Technologists who select and maintain the learning management systems (LMS), computer software, and equipment for design labs and studio classrooms
- **Students**: Learners and their peers at college or university design programs (undergraduate and graduate)
- **Educators**: Professors of college or university design programs (undergraduate and graduate)
- **Tech Industry**: Developers of education learning management systems (LMS) as well as hardware and software used in the design field
- **Private Sector / Employers**: Companies, design studios, agencies, and in-house design departments
- **Unions**: Association of school employees formed to protect and further the rights and interests of its members
- **Government**: Ministry responsible for educational funding, policies, grants
- **Family, Friends**: Learner’s immediate personal circle
- **Social Media**: User-generated content on various online platforms, virtual communities, and networks
Visualizing Influence

Given the major players in current design academia, where does influence lie vis-à-vis A Bot of Coffee’s fundamental attributes? Who has the authority to legitimize or restrict change, and where else could their influence be utilized to push this alternative future forward?

Influence Maps

To answer these questions and (more boldly) put a “face” to major issues and opportunities, the motivations, levers, and tensions from HCS were mapped back in full context to the stakeholder(s) most strongly associated with them by thought leaders and interviewees from Phase 1 as well as my professional experiences as a designer, program administrator, and design educator at Sheridan College. At first blush, the myriad connections between the various stakeholders and drivers of design education weave an expectedly tangled web of interests and accountabilities (See Figure 5.1).

Isolating each stakeholder, however, paints a much more interesting picture. Supporting the notion that academia is an “ivory tower”, Figure 5.2 shows that power and influence mainly reside in three players: Schools / Admin, Educators, and Students / Peers — visually the only stakeholders to touch (either positively or negatively) some aspect of each major factor, thereby suggesting that current design education is by and large shaped by this omnipresent triumvirate of influence.

Figure 5.1: Key Stakeholders and Their Influence on Design Education

Figure 5.2: Individual Stakeholder Influence on Design Education
Partnering for Success and Value Creation

For A Bot of Coffee to close the gap between design industry and academia, it must break the self-referential triangle of school, teacher, and student to incorporate stakeholders who lie outside the sphere of studying, offering tremendous value, and may have thus far been underused (or worse, misused). Rather than coordinating diverse Partnering for Success and Value Creation

stakeholders to manage complexity, striking new partnerships to incite change and create new value will be instrumental in getting A Bot of Coffee off the ground.

Figure 5.3: Current Value Web

Figure 5.4: Proposed Value Web

Given the significance of A Bot of Coffee’s departure from the status quo, new investments, infrastructure, and working relationships will necessarily arise. With whom
and for which components should schools partner? What types of value exchanges might these new partnerships entail? Figure 5.3 illustrates the familiar value web of post-secondary design education today, where tuition, knowledge, and academic infrastructure change hands in a closed loop. From this vantage point, one can see how enabling the current setup can be in perpetuating the misguided belief that students are low-value receptacles (i.e. receive but don’t contribute), design educators teach because they can’t do, and schools institutionalize learning for financial gain.

In contrast, Figure 5.4 puts forth a more robust, differently-connected value web driven by A Bot of Coffee. In this alternative future, (1) non-human players enter the mix to introduce value; (2) active private sector integration synchronizes academia with industry; (3) learners are equipped to generate value earlier in the process; (4) new revenue streams promote self-sufficiency; and (5) re-assignment or elimination of values result in qualitative wins and financial efficiencies. How might we realize this re-imagined value proposition?

Deconstructing the Nara-tive
Nara’s learning future hinges on four turning points - mission critical “buckets of change” that are directly linked to particular aspects of our new value story and require leadership, planning, and change management to move forward. Figure 5.5 outlines these turning points.

The next section proposes a high-level road map (from the school’s point of view) for activating each of these four turning points and moving A Bot of Coffee closer to reality. Built around the elements listed in Figure 5.6, it offers a considered initial structure to how we might think about and communicate the new for maximum acceptance and implementation.

Key Activators
“Must haves” that define the turning point

Main Objectives
Principal goals, gains to which all activities must ladder back

Partners
Parties to engage, who own resources we need / do not have

Securing Buy-in
Communicating what’s in it for partners, stakeholders

Potential Pitfalls
Watch-outs that may derail the turning point and should be anticipated

Measurement
Key performance indicators to build in, monitor, gauge success

Milestones
Important steps to take and celebrate when achieved

School Readiness
Areas to work on or leverage (money, mindset, politics, technology)

Value Context
Principal relationships that produce value

Figure 5.5: Turning Points (A Bot of Coffee)

Deconstructing the Narrative
Nara’s learning future hinges on four turning points - mission critical “buckets of change” that are directly linked to particular aspects of our new value story and require leadership, planning, and change management to move forward. Figure 5.5 outlines these turning points.

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Value Context
Principal relationships that produce value

Figure 5.6: Key Elements of High-Level Road Map
From Educator to
CONTENT ADVISOR

Shifting Educators away from course delivery and administration towards industry-based learning design and individual counsel

WHAT’S NEEDED

TO GAIN WHAT

PARTNER WITH

TO CHANGE WHAT

INTO WHAT

SO WHAT

Educators with current industry experience

Leading-edge program in line with industry trends, challenges

Private Sector (industry insight)

Few full-time faculty work outside the college, so dated knowhow, stale content transferred to students

 Learners have, apply the latest industry insight from their project consultations

Work with industry, train educators who lack the latest skills for a part-time move back to the workplace

Educators who excel at conceptualizing, making, advising (not just teaching)

Authentic programs by designers for designers

Uninspired educators have little say on role evolution

Educators, expertise put to more stimulating, higher-value use

Consult unions, educators on new job descriptions, requirements, benefits

Revise educator selection, retention criteria

PHASE 5: ACTIVATE THE FUTURE

CONTENT ADVISOR

From Educator to

Shifting Educators away from course delivery and administration towards industry-based learning design and individual counsel

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Consult unions, educators on new job descriptions, requirements, benefits

Revise educator selection, retention criteria

Private Sector

Experienced pool of respected high-level thinkers, insider access to top learner talent, corporate social responsibility

Unions

Upskilling ensures educator longevity, getting ahead of tech disruption to protect members, higher quality work life

MILESTONE 1

Consult union, new collective agreement

Inventory faculty skills, skill gaps

Seek industry partners willing to upskill faculty

Place faculty industry placement

Advisors design, adapt modules, learner counsel around industry expertise

MILESTONE 2

MILESTONE 3

MILESTONE 4

MILESTONE 5

MILESTONE 6

Evaluating and Valuing Individuals

MILESTONE 1

Advice Quality

MILESTONE 2

Placement Evaluation

MILESTONE 3

MILESTONE 4

MILESTONE 5

MILESTONE 6

Advice Quantity

MILESTONE 6

MILESTONE 3

MILESTONE 2

MILESTONE 1

MILESTONE 4

MILESTONE 5

MILESTONE 6

Learner Retention

COMMUNICATING FOR BUY-IN

Educators

Paid industry exposure, future-proof skills, new research opportunities, job security, more interesting use of time, creative challenge

Private Sector

Experienced pool of respected high-level thinkers, insider access to top learner talent, corporate social responsibility

Unions

Upskilling ensures educator longevity, getting ahead of tech disruption to protect members, higher quality work life

POTENTIAL PITFALLS

Industry Support / Availability

Private sector sees faculty as book-smart burden, cannot have new staff, do not have right roles

Fail-safe: Variety of potential roles, skills swap

Union Resistance

Union takes tough stance on new role, initiates a lengthy labour disruption

Fail-safe: Early, frequent consultation with union

Unwilling Educators

Educators refuse to intern, disrupt routine, work more, be evaluated for skills / experience gaps

Fail-safe: Paid training, no salary reduction

COMPANY // INDUSTRY // UNION // FACULTY

SCHOOL READINESS METER

VALUE CONTEXT

unds

Mindset

Politics

Money

Technology

Money

Technology

Employed part-time in industry as expert counsel, Content Advisors offer higher quality, up-to-date inputs to projects and course design, in turn letting learners and schools compete more effectively. They depend less on schools for income and entitle industry to tax breaks.
PHASE 5: ACTIVATE THE FUTURE

WHAT'S NEEDED
TO GAIN WHAT
PARTNER WITH
TO CHANGE WHAT
INTO WHAT
SO WHAT

**Simulated alternative futures for private sector planning, training**

- Integration of global private sector, academia in real world projects
- B2B income stream from licensing

**Design industry virtual environment (DIVE) simulator**

- Differentiating design industry simulation offering, global “plug and play” learners
- Private Sector (industry expertise)
- Tech Industry (digital development)

**WHAT'S NEEDED**

<table>
<thead>
<tr>
<th>POTENTIAL PITFALLS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Output Integrity</strong></td>
</tr>
<tr>
<td>Industry interprets licensing agreements as ownership of work and unilaterally dictates scope, parameters, ethics</td>
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<tr>
<td>Fail-safe: Partnership rules of engagement</td>
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<tr>
<td><strong>Bad Simulations</strong></td>
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<td>Design workplace, private sector issues are misrepresented, not thought through, cast doubt on value of simulations</td>
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<tr>
<td><strong>No Industry Participation</strong></td>
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<tr>
<td>Design industry, private sector doubt ROI, lack time, refuse to share competitive advantages / concerns / ugly side of business and withhold their support</td>
</tr>
<tr>
<td>Fail-safe: Non-disclosure agreement (NDA), success stories, tax break</td>
</tr>
</tbody>
</table>

**WHAT TO GAIN**

**TO CHANGE WHAT**

**INTO WHAT**

**SO WHAT**

**Design industry virtual environment**

- Realistic virtual environment that simulates industry challenges for learner and private sector readiness

**Government**

- Stimulate economic growth, innovative job growth initiative will satisfy voters, tax breaks for industry participation will quell “brain drain”

**Private Sector**

- Hire from global talent pool of experientially-trained candidates, prestige as community partner, investor in education, minimal risk, better decision-making, futures-based training, latest tech, corporate social responsibility

**Tech Industry**

- Multi-year service agreement, prestige of developing unique platform, corporate social responsibility

**WHAT TO GAIN**

**WHAT PARTNER WITH**

**TO CHANGE WHAT INTO WHAT**

**SO WHAT**

**Government**

- Manage legalities of licensing, intellectual property rights, agreements
- Protect academic freedom when working with private sector

**Private Sector**

- Students don’t get enough readiness, “real-world” projects, not as solution to industry problems
- Students are unprepared for design workplace realities
- Learners experience a virtual trial of a full project in fast-paced design industry, choose their best-fit internship environment
- Document a variety of challenging design studio environments, workflows to simulate Train educators who maintain, contribute to simulation platform

**Tech Industry**

- Design industry virtual environment (DIVE), Learning in Virtual Environments (LIVE)
- Prototype, test, review simulations
- Students work iteratively with partners on pilot project
- Update DIVE, LIVE based on pilot
- Launch regional, global trials

**Making it Happen**

**MILESTONE 1**

- Consult digital content, government, private sector partners
- Develop engines for Design Industry Virtual Environment (DIVE), Learning in Virtual Environments (LIVE)

**MILESTONE 2**

- Create virtual design studio, industry-specific environments
- Students work iteratively with partners on pilot project

**MILESTONE 3**

- Prototype, test, review simulations
- Students work iteratively with partners on pilot project

**MILESTONE 4**

- Update DIVE, LIVE based on pilot
- Launch regional, global trials

**MILESTONE 5**

- Document a variety of challenging design studio environments, workflows to simulate Train educators who maintain, contribute to simulation platform

**COMMUNICATING FOR BUY-IN**

**Government**

- Stimulate economic growth, innovative job growth initiative will satisfy voters, tax breaks for industry participation will quell “brain drain”

**Private Sector**

- Hire from global talent pool of experientially-trained candidates, prestige as community partner, investor in education, minimal risk, better decision-making, futures-based training, latest tech, corporate social responsibility

**Tech Industry**

- Multi-year service agreement, prestige of developing unique platform, corporate social responsibility

**VALUE CONTEXT**

- Government, Private Sector
- Employers, Private Sector
- Schools, Admin

**SCHOOL READINESS METER**

- Mindset
- Politics
- Money
- Technology

**KEY PERFORMANCE INDICATORS**

- Tightness of Simulations
- Workplace Skills Acquisition
- Licensing Revenue
- Employment Rate
- Employer Satisfaction
- Planning, Training Effectiveness

**OUTPUT INTEGRITY**

- Industry interprets licensing agreements as ownership of work and unilaterally dictates scope, parameters, ethics
- Fail-safe: Partnership rules of engagement

**BAD SIMULATIONS**

- Design workplace, private sector issues are misrepresented, not thought through, cast doubt on value of simulations
- Fail-safe: Vetting process, quality data input, futures training

**NO INDUSTRY PARTICIPATION**

- Design industry, private sector doubt ROI, lack time, refuse to share competitive advantages / concerns / ugly side of business and withhold their support
- Fail-safe: Non-disclosure agreement (NDA), success stories, tax break

Schools license out industry-specific simulations co-created by learners to support private sector planning and innovation. Schools acquire new revenue streams, enhance their profile in industry, and reduce their dependence on government funding. Learners obtain experience and value while still “in school.”
**PHASE 5: ACTIVATE THE FUTURE**

---

### WHAT'S NEEDED

- Non-school-owned physical collaboration hubs in convenient locations worldwide
- A variety of school-owned multi-person VR learning environments (LIVE)

### TO GAIN WHAT

- Freed-up capital to invest in the development of hyper-responsive virtual spaces
- Satisfying in-person human contact in informal settings

### PARTNER WITH

- Private Sector (Banks, Coffee Shops, Commercial Realty)
- Tech Industry (Digital Content Developers, Virtual Environment, Wearable Hardware Developers)

### TO CHANGE WHAT

- Schools have acres of campus space that impede learning due to distance, centralized location, disrepair
- Sterile classroom environment is uncreative, isolated. VR is limited to student recruitment, not design learning

### INTO WHAT

- Physical learning spaces inside cost, relaxed, well-maintained coffee shops everywhere
- Digital content developers create experiential learning environments not tied to any one physical location

### SO WHAT

- Seek suitable buyer of campus real estate
- Anticipate potentially complex rezoning laws
- Pitch coffee shop chain to host learners
- Determine optimal portfolio of virtual environments to propose and fund

---

### MAKING IT HAPPEN

<table>
<thead>
<tr>
<th>MILESTONE 1</th>
<th>MILESTONE 2</th>
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<th>MILESTONE 5</th>
<th>MILESTONE 6</th>
<th>MILESTONE 7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seek potential buyers/uses of campus locations</td>
<td>Negotiate dedicated collaboration spaces in retail locations</td>
<td>Develop virtual learning environments with digital content developers</td>
<td>Pilot project at select coffee shop locations</td>
<td>Phase out legacy programs tied to campus buildings</td>
<td>Sell, lease campus buildings</td>
<td>Regional/national, global launch</td>
</tr>
</tbody>
</table>

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### POTENTIAL PITFALLS

- Customer complaints
  - Regular cafe customers are irritated by commotion, walk away
  - Fail-safe: Learner code of conduct
- Unattractive real estate
  - Location, type of buildings are difficult to sell
  - Fail-safe: Urban planning proposal
- Peer availability
  - Scheduling flexibility results in unpredictable attendance, no one to collaborate with
  - Fail-safe: Collaboration scheduling request app

---

### COMMUNICATING FOR BUY-IN

- **Private Sector (Coffee Shops)**
  - Steady stream of paying customers, tax breaks for supporting education initiative, corporate social responsibility, mature and self-motivated learners
- **Tech Industry**
  - Multi-year service agreement, prestige of developing unique platform, corporate social responsibility

---

### VALUE CONTEXT

Schools augment their physical presence in choice locations worldwide without the overhead. Coffee shops even out revenue peaks and troughs, while learners gain convenient, convivial spaces (both virtual and real) that are more conducive to learning.

---

### PHASE 5: ACTIVATE THE FUTURE
The Rise of PROF-BOT
Delegating content delivery, discussion topics, and time-consuming tasks to non-human learning assistants

WHAT'S NEEDED TO GAIN WHAT PARTNER WITH TO CHANGE WHAT INTO WHAT SO WHAT

Artificial Intelligence that effectively assesses, adjusts to individual student comprehension

Real-time feedback that satisfies student quandaries without costly instructor hours

Tech Industry (AI hardware, software) Educators (art and science of pedagogy)

Not all students learn at the same pace, some are left behind while others are bonded

Students are engaged in their own time without consequences

Tightens standards of student privacy

Change interim performance evaluation criteria from standardized to individual

Virtual educator that curates content, facilitates discussions with emotional nuance

Human-like substitute that is more effective at holding student interest than traditional multimedia aids

Tech Industry (AI hardware, software) Educators (art and science of pedagogy)

Current instructional media is static, dry, lacks personality. Chatsbots are easily sufficed

Students feel that they are interacting with a fellow human at all times

Organize consultation, fine-tune with PROF-BOT to minimize backlash from traditionalists and build confidence in the technology

Making it Happen

<table>
<thead>
<tr>
<th>Milestone 1</th>
<th>Milestone 2</th>
<th>Milestone 3</th>
<th>Milestone 4</th>
<th>Milestone 5</th>
<th>Milestone 6</th>
<th>Milestone 7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consult instructional tech, educators, admin, global partners on learning, criteria</td>
<td>Develop AI engine, sensors for learner comprehension</td>
<td>Create PROF-BOT personality matrix, content, evaluation rubric</td>
<td>Build initial prototypes, user testing</td>
<td>Beta PROF-BOT per user feedback</td>
<td>Launch regional pilot, trial</td>
<td>Launch international print, trial</td>
</tr>
</tbody>
</table>

Potential Pitfalls

Public Readiness

People have idealized expectations of virtual educator or question learning from “something” with no track record

Fail-safe: Awareness campaign, optimal mix of fast and slow tech

Rushing to Market

Hasty launches to meet predetermined deadlines lead to awkward, error-prone PROF-BOT

Fail-safe: Quality assurance testing

Diversity / Localization

For a global rollout, not enough content from international experts to enrich the platform with design perspectives ex-North America

Fail-safe: International recruitment of content experts, participants

Communicating for Buy-In

Educators

No preparing and delivering tedious lectures, universal access to marking assistant, lower volume of learner inquiries, more flexible work schedules, more time for interesting, higher-value work, future-proofing their role

Tech Industry

Multi-year service agreement, prestige of developing unique platform, corporate social responsibility

Value Context

Virtual learning assistant (PROF-BOT) allows Educators to have more fulfilling careers as Content Advisors while learners maximize the personalized attention they need. Schools gain labour efficiency and rely less on unions for business continuity.
While PROF-BOT may not wander the virtual halls of Sheridan College anytime soon, it is incumbent upon design schools and educators to accept (if not welcome) this eventuality.

The promise of technology is well-documented: lecture automation, convenient access, content customization, entertainment, and scalability, to name a few. How, then, can today’s educator thrive in this uncomfortable future world? The ironic answer is to dive even more deeply into our comfort zone.

While the AI educator delivers hyper-customized lessons and technical skills training, the Content Advisor Formerly Known As Educator doubles down on their intrinsic value proposition and offers wisdom, guidance, empathy, and sober second thought to the design learner of tomorrow. Indeed, if we accept the dictionary definition of the word “luxury” as “something that gives you pleasure or an advantage which you do not usually have,” might human contact be the new luxury in our technologically driven culture?

One of the unspoken goals of this MRP has always been to provoke thought, open discussions, and, better still, ignite stakeholder action well before the likes of PROF-BOT are amongst us. Schools can rethink physical campuses by partnering with the private sector for more conducive environments. Online learning approaches can be pushed beyond glorified web portals by collaborating with the tech industry on AI-assisted learning. Educators, in concert with their labour associations, can proactively evolve from lecturer to advisor in preparation for a “teacherless” society. As A Bot of Coffee shows, maximizing value creation in the web of post-secondary design learning allows us to face the future without fear.

As a program coordinator at Sheridan College, what can I commit to today? I intend to prototype the enhanced advisory role inspired by A Bot of Coffee. This starts with maximizing in-person studio time by shifting supplemental learning to online delivery methods. To enrich the learning culture, I will look to the human-centred motivations identified herein to foster a responsive environment that recognizes individual learning styles and encourages experimentation. To instill an addiction to learning, I will infuse a meaningful, scaffolded approach to curriculum design where methods and achievements are clear and content in one course purposefully informs another.

Finally, I will recalibrate the “Web Design” program to showcase employable Sheridan talent who can design compelling, human-centred digital products for any platform.

It is important to recognize that A Bot of Coffee is but one depiction of the future at a fixed point in time. As such, my work cannot end here. I will continue to seek and workshop other viable futures so that tomorrow’s design learning environment not only stays relevant but also one day predicts the needs of industry and learners alike. It takes a community to shape the future(s) of design learning. I invite others to advance this research approach of thoughtfully framing and evaluating the state of design education, creatively ideating and refining future “worlds” of learning, and most importantly, resourcefully finding ways of activating them. For those who need further convincing, I leave you with this: While large-scale technological disruption may still be unprecedented in an academic context, it is most certainly foreseeable.
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APPENDICES

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APPENDIX A: SORTING UTTERANCES—LEGEND

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<th>Legend</th>
<th>Description</th>
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<td>Ad</td>
<td>Ae</td>
<td>Expert Interview 1: Personal communication, August 3, 2017.</td>
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<td>Sawarre, K. Revamping Education for the Future of Work at MaRS Discovery District (keynote lecture, May 10, 2015)</td>
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Legend for Sorting Utterances Appendix A to G
APPENDIX A: SORTING UTTERANCES–SOCIAL

The source of learning is transacting written (many self-written)

Online learning requires written input (metacognition)

Collaborative venues

1. Striking a balance: A constructive conversation about participatory technol-
ologies in education.
2. Participatory technologies allow users to open their work up for 

3. Siemens argues that technologies and network-building are 

4. But collaboration in person has been the core. Since we 

5. J Flynn: Gone are the impromptu after class discussions. Gone 

6. Technology is available to develop either independence and 

7. It is in current blogs, for example that connectivist principles 

8. Students can challenge or support each other’s ideas through 

9. A computer instructor, students can learn from their peers and even from 

10. Students did not use the class wiki collaboratively at first, but 

11. It freed up the human to answer questions that were deeper and 

12. Technologies like Electrical resale (though new)

13. Technology is an activity of the times, not a replacement

14. Technology has its dependency & leads people to think 

15. Technology fosters dependency & leads people to think immediately over depth

16. What is new is old again

17. Tech enables students to learn on their own terms [now what, when, where]

18. Little is known about students’ intended use of technology, or 

19. Technology modes it easier to express opinions indirectly properly confidential

20. Tech superbically: terrestrial vehicle cause people to understand its potential for other meaningful change

21. What's superlative, terrestrial vehicle cause people to understand its potential for other meaningful change

22. Students can challenge or support each other’s ideas through

23. The source of learning is transacting written (many self-written)

24. Online learning requires written input (metacognition)

25. Collaborative venues

26. Social interactions generate accountability and ownership of studies

27. Social interactions are relatively satisfying

28. Social interactions involve traditional environments promote learning

29. Interpersonal relationships are authentically satisfying

30. Collaborative without planning/instructions yields sub-optimal results

31. Social interactions generate accountability and ownership of studies

32. Social interactions involve traditional environments promote learning

33. Interpersonal relationships are authentically satisfying

34. Collaborative without planning/instructions yields sub-optimal results

35. Social interactions generate accountability and ownership of studies

36. Social interactions involve traditional environments promote learning

37. Interpersonal relationships are authentically satisfying

38. Collaborative without planning/instructions yields sub-optimal results

39. Social interactions generate accountability and ownership of studies

40. Social interactions involve traditional environments promote learning

41. Interpersonal relationships are authentically satisfying

42. Collaborative without planning/instructions yields sub-optimal results

43. Social interactions generate accountability and ownership of studies

44. Social interactions involve traditional environments promote learning

45. Interpersonal relationships are authentically satisfying

46. Collaborative without planning/instructions yields sub-optimal results

47. Social interactions generate accountability and ownership of studies

48. Social interactions involve traditional environments promote learning

49. Interpersonal relationships are authentically satisfying

50. Collaborative without planning/instructions yields sub-optimal results

APPENDIX A: SORTING UTTERANCES–TECHNOLOGICAL

Little is known about students’ intended use of technology, or 

Technology modes it easier to express opinions indirectly properly confidential

Tech superbically: terrestrial vehicle cause people to understand its potential for other meaningful change

What's superlative, terrestrial vehicle cause people to understand its potential for other meaningful change

Technology fosters dependency & leads people to think immediately over depth

Technology has its dependency & leads people to think [now what, when, where]

Little is known about students’ intended use of technology, or 

Technology modes it easier to express opinions indirectly properly confidential

Tech superbically: terrestrial vehicle cause people to understand its potential for other meaningful change

What's superlative, terrestrial vehicle cause people to understand its potential for other meaningful change

Technology fosters dependency & leads people to think immediately over depth

Technology has its dependency & leads people to think [now what, when, where]
Should parents have the right to earn skill credit for their children?

Skills are scarce. It is not expensive, a lot of it is free. Programs into schools. It is not expensive, a lot of it is free. Advantage of that. And there are third party actors – project lead, with good teaching, a further stratifying of society due to the benefits favour the rich.

Tech availability and their access, inability of lower socio-economic areas in acquiring the means to learn the tools and connect to information, a further stratifying of society due to the benefits favoring the rich.

So long as the older professions monopolize superior income and are unlikely to abandon MOOC-related principles and his colleagues on the new Global Learning Council welcome many people whom the schools exclude. …an independent educational profession of this kind would be less restrictive.

Funding derives from the parents who would have a claim on the time of more accomplished people to learn skills and to generate a currency of its own.

Because of the rapid development of new knowledge and increasing work for one or both of future generations, more people will want further education for one or both of their children.

Because of a snow day… we all agreed to meet on the campus of the institution. Columbus would quake with terror in a nuclear attack. That lecture delivery system and idea of tenure is sacred. … The attendance rule makes it possible for the child to proceed beyond traditional face-to-face education in that it offers a broader environment. The global reach of MOOCs will provide an opportunity to evaluate and use information are different from what they were.

Neither learning nor justice is promoted by schooling. There are only 75 institutions in the Western world that still teach adolescence the way they were taught when the child was born. … The attendance rule makes it possible for the child to proceed beyond traditional face-to-face education in that it offers a broader environment.

Serious … The attendance rule makes it possible for the child to proceed beyond traditional face-to-face education in that it offers a broader environment. The global reach of MOOCs will provide an opportunity to evaluate and use information are different from what they were.

The globally distributed MOOC courses are losing students. Despite tech’s potential to deliver learning, MOOCs are losing students.

People engage in self-directed learning if they have—or are motivated to learn. Self-directed learning produces learning that is meaningful to them.

In the 2.0 classroom, students have a large measure of control over their learning. In a good program, students are motivated.

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In the 2.0 classroom, students have a large measure of control over their learning. In a good program, students are motivated.
implied understanding that teaching and research in our fundamental contradictions between myth and wasn't easy.

Against the cross currents of radical academic specialization. It present discrimination against infants, adults, and the educational revolution be guided by certain goals: student to choose one of a limited number of courses. In any At their worst, schools gather classmates into the same room feedback we received was quite positive so we are going to do those type of things; how important the materiality is; …we

flawed policy, + leadership current beliefs + power

Institutionalization of change

Education is feudalistic

...we were innovating on top of infrastructure that was...capable of learning.

Flawed policy + leadership current beliefs + power

Technology dehumanizes

Students” should be able to choose their own course of learning

The history of innovation in education should teach us to be

3. liberate the critical and creative resources of people by

It was the nature of the school with 1500 students for the

Democratic dialogue in

Building on design thinking, we believe that design

Failure

Fluidity

Define learning by means act majors

Learner autonomy

Learner autonomy = self-regulated achievement

Learning is continuous and lifelong emission of skill

Learning is continuous and lifelong emission of skill, discovery

True learning happens outside the classroom

A “super-teacher” understands and manages modern society’s changing needs of the class. In many ways, they are more like

...we were innovating on top of infrastructure that was...capable of learning.

Educating for change demands helping our young people

...we were innovating on top of infrastructure that was...capable of learning.

Greater autonomy and control over the resources they select

The role of IT, as a tool to deliver the curriculum and as a subject

So schools still have to grapple with two rationales—one

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APPENDIX C: DISCUSSION GUIDES FOR EXPERT INTERVIEWS

INTERVIEW DISCUSSION GUIDES: EDUCATORS

June 5, 2017 - Professor (Code: Ch)

Technology plays a big role in teaching. What do you consider technology? Follow up depending on the answer (day-to-day life or in education)

How has College bureaucracy been a barrier to something that you tried to implement in the program or curriculum? What are the tensions?

Is there an example where they supported you?

Do you consider the College a big business? Acting too much like one or not enough?

Can you recall an inspiring figure or teacher that made a lasting impact? Describe an example

What if one of the Web Design non-studio courses was taught online? Which one would you pick — and why?

If you could turn back time, what is the one thing you would change in your role as an educator (or program coordinator)?

August 4, 2017 - Professor (Code: Ma)

Technology plays a big role in teaching. What do you consider technology? Follow up depending on the answer (day-to-day life or in education)

Students come in with varying levels of technical proficiency, especially in first year. How do you manage this?

What do you think are the biggest challenges that students face based on your experiences with them?

Can you speak to an example of successful collaboration in the classroom? Any examples where collaboration led to sub-optimal results and why?

What if one of your studio courses was taught online, any comments?

If you could create the ideal teaching environment, what would that be like for you? Please describe an example

June 27, 2018 - Professor, University of British Columbia (Code: Cu)

How do you anticipate the role of design educators evolving in the decade?

How does technology facilitate collaboration among students and educators?

With post-secondary students having self-directed and autonomous learning options, where do you see the educator role fitting in?

What are your thoughts on online course delivery? Probe: Human nuance, blended approaches

Describe what lifelong learning means to you, outside of a structured, post-secondary environment?

June 29, 2018 - Professor, Illinois Institute of Technology (Code: Ba)

How do you see the student experience changing in the future?

How do you anticipate the role of design educators evolving in the decade?

What are your thoughts on online course delivery? Probe: Human nuance, blended approaches

What are your thoughts on design schools partnering with industry and having them more involved in curriculum?

Describe what lifelong learning means to you, outside of a structured, post-secondary environment?

July 3, 2018 - Digital Pedagogy Specialist, McMaster University (Code: Mo)

How do you see the student experience changing in the future? Follow up: Ways students can customize their learning?

How do you anticipate the role of educators evolving in the next decade? Follow up: Any thoughts on adaptive technologies?

What are your thoughts on online course delivery?

What are your thoughts on higher education partnering with industry?

As a specialist in digital pedagogy, what does lifelong learning mean to you? Follow up: How might that be nurtured while students are still in school?
APPENDIX C: DISCUSSION GUIDES FOR EXPERT INTERVIEWS

INTERVIEW DISCUSSION GUIDES: STUDENTS

August 3, 2017 - Graduate, Sheridan College Web Design Graduate Certificate Program (Code: Ad)

What counts as technology to you?
Follow up depending on the answer (day-to-day life or in education)

Why did you choose the program(s) that you did? What were you trying to accomplish?

What do you think of the idea that one of your old studio courses would be taught online?
Probe: What would work? What wouldn’t work for you? Why / not?

Thinking of your experiences at Sheridan, which aspects do you think prepared you the most for your current job?
What were you not ready for? Probe: Technology, life skills, team

What do you think were the biggest challenges your instructors faced during your time?

What do you think the future holds for the technology in the classroom?
If you could change one and only one thing about your higher-ed experience, what would that be and why?

August 5, 2017 - Graduate Student OCAD University (Code: Lv)

What counts as technology to you?
Follow up depending on the answer (day-to-day life or in education)

What are schools still doing that is way past the best-before date?

Would you describe your undergrad experience as collaborative? Why? Why not?
Probe: What role did technology play in that collaboration?

Do you feel your experience with educators has been a one-way relationship?

Do you feel your education has prepared you for the future?
Probe: Role technology could have played in preparing you (helped you / hindered you)?

If you could change one and only one thing about your higher-ed experience, what would that be and why?

APPENDIX C: DISCUSSION GUIDES FOR EXPERT INTERVIEWS

INTERVIEW DISCUSSION GUIDES: STUDENTS

July 3, 2018 - Adjunct Professor, Graduate Student OCAD University (Code: Kp)

How do you see the student experience changing in the future?
Follow up: Ways students can customize their learning?

How do you anticipate the role of educators evolving in the next decade?
Follow up: Any thoughts on adaptive technologies?

What are your thoughts on online course delivery?

What are your thoughts on higher education partnering with industry?

What does lifelong learning mean to you?
Follow up: How might that be nurtured while students are still in school?
APPENDIX D: EVENTS

2017 Learning Technologies Symposium
October 11–12, 2017
Mills Library L504, McMaster University, 1280 Main Street West, Hamilton, ON

The Learning Technologies Symposium (LTS) is an annual event that brings together faculty, staff, and students from the region to share innovations, connect on project ideas, and exchange best practices.

Reshaping Education for the Future of Work
May 30, 2017
MaRS Centre (Auditorium), 101 College Street, Toronto, ON

A presentation by Randy Swearer, VP of education at Autodesk, about the importance of developing new ways of learning—both inside and outside of traditional educational institutions—that help graduates adapt to changing professions and new skills requirements.

SXD: Kickstart
March 13, 2017
MaRS Discovery District, 101 College Street, Toronto, ON

eCampusOntario showcases projects from Student-Experience Design Studio, where 25 students from across the province came together to look at the present and future of online and technology-enabled learning in Ontario.

RSD5 2016: Relating Systems Thinking and Design (RSD5) 2016 Symposium
October 13-15, 2016
MaRS Discovery District, 101 College Street, Toronto, ON

The symposium series has the intention to promote and foster the emerging dialogue of rethinking systems approaches in design.

APPENDIX E: CAUSAL LAYERED ANALYSIS WORKSHOPS

ARTIFACTS
These handouts were distributed to participants so they can reference notes on the workshop’s topic and the four layers of the Causal Layered Analysis method that structured the session.
APPENDIX E: CAUSAL LAYERED ANALYSIS WORKSHOPS

CAUSAL LAYERED ANALYSIS WORKSHOP DETAILS

- Workshop A (Recent Graduates): June 26, 2018 at OCAD University, 205 Richmond St. West, Toronto ON
- Workshop B (Design Educators): July 11, 2018 at OCAD University, 205 Richmond St. West, Toronto ON

PARTICIPANT CRITERIA

- Workshop A: Currently working as a designer and, in the last three years, has graduated from a post-secondary, technology-enabled design program
- Workshop B: Professor of a post-secondary, technology-enabled interaction design program
- Able to attend a two-hour in-person session in the Toronto area

PARTICIPANT PROFILES

Recent Graduates

- AD: Digital Designer, graduate of Web Design Graduate Certificate Program, Sheridan College
- DS: Senior Service Designer, graduate of York / Sheridan Program in Design
- EK: UX Designer, graduate of York / Sheridan Program in Design
- MA: Senior Service Designer, graduate of Strategic Foresight & Innovation, OCAD University
- MK: Graphic Designer, graduate of York / Sheridan Program in Design
- NH: Design Professional, graduate of Strategic Foresight & Innovation, OCAD University

Design Educators

- DW: Professor, Interaction Design, Sheridan College
- EZ: Professor, Visual Creative Arts, Sheridan College
- MG: Adjunct Professor, York / Sheridan Program in Design
- RA: Professor, York / Sheridan Program in Design

APPENDIX F: MORPHOLOGICAL SYNTHESIS WORKSHOPS

DISCUSSION GUIDE

Moderator’s guide offered the participant context and prompts to help generate a future scenario.

CONSIDERATIONS

- reimagine ‘traditional’ post-secondary design education 10-15 years in the future
- the learning experience is tech-enabled and learner-centric (not reliant on educators)
- consider where tech will be a decade from now and how that may change how we learn
- one card can “lead” the scenario, but please consider aspects from each card

WORKSHEET

What would be most different about this design learning future?

How and where does learning take place?

What does collaboration look like in this design learning scenario?

How is technology utilized to optimize the learning experience?
APPENDIX F: MORPHOLOGICAL SYNTHESIS WORKSHOPS

DISCUSSION GUIDE (CONT.)

What would you call this program?

Briefly describe the administration of this design learning future:

What would be the biggest obstacle?

APPENDIX F: MORPHOLOGICAL SYNTHESIS WORKSHOPS

MORPHOLOGICAL SYNTHESIS WORKSHOPS (ONE-ON-ONE)

- Workshop A (Recent Graduates): September 28, 2018 at OCAD University, 205 Richmond St. West, Toronto ON
- Workshop B (Design Educators): December 6, 2018 at OCAD University, 205 Richmond St. West, Toronto ON

PARTICPANT CRITERIA

- Workshop A: Currently working as a designer and, in the last three years, has graduated from a post-secondary, technology-enabled design program
- Workshop B: Professor of a post-secondary, technology-enabled interaction design program

PARTICPANT PROFILES

Recent Graduates

- CV: Designer, graduate of Strategic Foresight & Innovation, OCAD University
- JT: Senior Project Designer, graduate of Strategic Foresight & Innovation, OCAD University

Design Educators

- JA: Adjunct Professor, Interaction Design, Sheridan College
- RA: Professor, York / Sheridan Program in Design
HUMAN-CENTRED STEEPV CARDS

Participants were given 20 cards face down and asked to randomly pick one card for each of six back side colours (i.e. the lead motivation for a specific factor) to end up with six cards in total.

SO-1  ACTIVE LEARNING
The pursuit of highly personal learning outcomes through individual drive and co-creation of knowledge.

SO-2  EMPLOYABILITY
A program that is highly respected and valued by employers, students, and the public.

SO-3  COMMUNITY BUILDING
An inclusive, well-organized circle that creates emotionally satisfying relationships.

TE-1  CUSTOMIZED LEARNING
Efficient tools that let students create and pursue learning pathways as unique as they are.

TE-2  OPTIMAL USE
A culture of learning that embraces iteration and experimentation in the use of technology.

TE-3  PEOPLE FIRST
A program that puts technology in the service of students and teachers, not the other way around.

TE-4  CODE OF CONDUCT
Clear policies on the acceptable use of technology in interactions with people and intellectual property.

EC-1  VIABILITY
A financially efficient business model that does not sacrifice student and faculty engagement.

EC-2  CURRENCY
Skills and experiences that are in tune with personal goals and ahead of industry demands.

EC-3  ACCESSIBILITY
Equal opportunity to have and to use technology to fuel one’s personal learning mission.

EN-1  ADAPTIVE SPACES
Fluid environments that mold physically, procedurally, and technologically to student feedback and the outside world.

EN-2  NO BOUNDS
An eye-opening learning landscape that is not walled in by time, space, or orthodoxy.

EN-3  CONDUCIVE SPACES
Student-defined learning environments supported by expert guidance and venues to implement ideas.

PO-1  CLEAR LEADERSHIP & POLICY
Holistic and widely understood direction built on institutional diversity and student success.

PO-2  TWO-WAY STREET
A democratic mindset that encourages dialogue and feedback for positive change.

PO-3  GRASSROOTS
A willingness to take a bottom-up approach to designing the future of the program.
The confidence to put students in the driver’s seat of their education

A celebration of each student as a unique, whole being who wants to achieve

A readiness to embrace the unknown and quickly change course in the name of progress

A tireless quest of self-discovery that doesn’t stop at graduation

CHOICE

HUMANISTIC

FLUIDITY

LIFELONG MISSION

Back side of morphological synthesis cards (one per category shown). Participants select from all twenty cards with the back side up.
APPENDIX G: STAKEHOLDER INFLUENCE MAPS - TECH INDUSTRY