Pedagogical Paradigms in Open and Distance Education

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Contents

Abstract

Building on earlier work that identified historical paradigm shifts in open and distance learning, this chapter is concerned with analyzing the three broad pedagogical paradigms – objectivist, subjectivist, and complexivist – that have characterized learning and teaching in the field over the past half century. It goes on to discuss new paradigms that are starting to emerge, most notably in "theory-free" models enabled by developments in artificial intelligence and analytics,

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hologogic methods that recognize the many cultures to which we belong, and a "bricolagogic," theory-agnostic paradigm that reflects the field's growing maturity and depth.

Keywords

Paradigms · Generations · Pedagogy · Subjectivist · Objectivist · Complexivist · Hologogy · Bricolagogy

Introduction

Successive generations of open and distance learning have often been defined by the most dominant physical technologies of the era (e.g., Garrison, 1985; Moore & Kearsley, 2005; Taylor, 1995). Such technologies provide the most obvious contrasts between distance and in-person learning, and there is no doubt that the inventions on which they have relied have played a dominant enabling – though not determining – role in supporting different ways of teaching and learning. Heydenrych and Prinsloo (2010) question this technology-first perspective, instead calling for a multidimensional view that considers communication, pedagogy, and context on at least equal footing. This chapter represents an answer to that call, building on our previously published work over the past decade (e.g., Anderson & Dron, 2011; Dron & Anderson, 2014) in which we have presented an evolving generational model of our own that considers broad trends in *pedagogical* paradigms that have evolved alongside and, often, in tandem with these changing tools. By examining how pedagogical approaches have developed in a complex dance with tools and systems that enable them, we seek to highlight how distance learning pedagogies owe their origins to in-person learning, how this has impacted their development, and how the pedagogical pathways of open and distance learning have increasingly diverged from their in-person ancestors.

Why Do Physical Technologies Not Seem to Matter for In-Person Learning?

Distance learning relies upon and is enabled by tools – books, postal services, radio, TV, networked computers, etc. – so it is unsurprising that many authors have defined each era of its history through its dominant tools. In-person teaching, though, is at least as dependent on distinctive and ever-evolving technologies as distance learning, from classrooms to electronic whiteboards, yet we do not normally view its history in terms of its dominant tools, even when (such as through the invention of blackboards or textbooks) those tools have been quite transformational. In part this might be because, as Alan Kay quipped, "'technology' is anything invented after you were born" (as cited in Brand, 2008, loc. 189), so we simply fail to see them as technologies. It might be due to a slower rate of change in the dominant motifs of

in-person educational systems. *Some* physical teaching spaces have persisted in largely unaltered form for thousands of years, as have *some* of the teaching methods used within them. However, though some dominant motifs – like classes, lectures, curricula, timetables, and so on – have long persisted, there have been massive upheavals in both process and tools, so that can only be part of the story. In part it might be that the diversity and range of technologies used for in-person teaching mean that few are perceived as being particularly dominant, albeit that classrooms, blackboards, and textbooks, for instance, clearly *have* dominated over lengthy periods.

We suspect that the biggest reason for the relative insignificance of tools in defining generations of in-person learning might be that, beyond language, writing, and drawing, very few of its physical technologies are essential. For learning in a classroom, you could often take away almost anything apart from a teacher and students, including the classroom itself, and it would still be recognizably the same thing. Without the media and tools that enable distance teaching, it would not occur at all.

From a naïve perspective, new technologies of in-person learning are typically introduced into an already well-established system rather than changing the system itself. The tools are usually incrementally better ways of addressing the same problems, and their significance is usually limited because they seldom change structural components of the overall system. This helps to entrench a widespread belief that pedagogy must come first (e.g., Chumley-Jones, Dobbie, & Alford, 2002; Nation & Evans, 2000; Wilkinson, Forbes, Bloomfield, & Fincham Gee, 2004).

Generation 0

While *pedagogy* (in the sense of being the art and science of teaching) underpins all our teaching interventions and is the *purpose* of what we do, *pedagogies* (by which we mean methods of teaching or instructional methods) *never* come first. There are countless other technologies (from curricula to timetables to classroom architecture) that impose limits and create problems that pedagogies must solve. Most of these are prior to pedagogical methods and provide a foundation upon which pedagogies are utterly dependent. Novel technologies can, in solving such problems, create new ones of their own, so the system evolves. As Postman (2011) put it, all technologies are a Faustian bargain, where each problem solved results in new problems caused by the solution. For example, the introduction of blackboards in the nineteenth century changed how teachers could teach. They could draw, provide shared notes, provide structure and emphasis to lectures and discussions, capture student ideas, and so on, in ways that were difficult, expensive, or impossible before. However, blackboards also created many new problems, from diverting the teachers' gaze from the class to issues of teacher competence in drawing and writing, to required changes in pacing, to concerns for students with reading disabilities. Blackboards thus often required teachers to invent counter-technologies (Dubos, 1969) to deal with them. It is possible to see similar patterns in every teaching innovation, including familiar

inventions like lectures, classrooms, courses, faculties, and universities. Pedagogical methods evolve in a specific context in which they solve new problems and take advantage of new opportunities.

The Problems that In-Person Learning Has to Solve

Perhaps the most fundamental problem that an in-person pedagogy has to solve is motivation. In-person teaching (at least in its paradigmatic lecture form) must grapple with the fact that few students will want to be there all of the time, and it is really difficult to sustain everyone's interest when they do attend. Self-determination theory posits that, for intrinsic motivation to occur, support must occur for autonomy (students must feel in control), competence (students must feel capable of overcoming meaningful challenge), and relatedness (students must feel that there is social value and meaning in the activity) (Ryan & Deci, 2017). In-person teaching easily supports relatedness. However, especially in its raw full-frontal lecture form (that originally solved problems of the scarcity of books and reading skills), it is inevitable that some will feel insufficiently challenged (bored) and some will feel over-challenged (confused). Students will not experience autonomy because the nature of classroom activity means that the teacher must be in control of every second. Some of the most common solutions to these problems just make them worse. Notably, the use of extrinsic rewards and punishments such as grades and gold stars, though achieving some kind of motivation (in the sense of encouraging students to comply with teachers' demands), reliably and persistently inhibits intrinsic motivation (Deci, 1972; Gneezy & Rustichini, 2000; Kohn, 1999). Most of what we nowadays recognize as good pedagogy aims to at least partially address the lack of autonomy and inappropriate level of challenge of the in-person context. Problem-based, discussion-based, project-based, and similar individualized/group approaches, for instance, allow greater student control, including more control over the pace and level of challenge. Textbooks allow greater freedom to study at a pace more suited to the learner. Lecturers who enthuse, who ask questions that intrigue students, who seek to know their students so that they can make connections with their interests, and so on are dealing with these issues, as are those who take advantage of the inherent social nature of the situation by encouraging discussion or just by remembering every student's name. Though some of our pedagogies are appropriate to all learners, regardless of their motivation, many of those that characterize classroom teaching are inventions and techniques that solve problems created by classroom teaching.

The Problems that Distance Learning Has to Solve

Evolution in the field of distance learning has occurred, at least in part, due to the affordances and constraints of new technologies. These have, in ways that have seldom been so profound for in-person learning, repeatedly changed the sorts of

problems that distance pedagogies must solve. From a motivation perspective, these are (in principle) largely the inverse of those faced by in-person learners. With few exceptions, distance learners almost always have more autonomy because a teacher is not determining what happens every moment. Students are also far better able to control the level of challenge, because they can reread, rewind, or seek alternative sources for their learning. Relatedness, however, tends to be harder to support because all communication must normally be intentional, focused, and mediated through further technologies, often with limitations on cues such as voice intonation, body language, and touch.

However, the discipline of distance education has grown up in the context of its ancestor, in-person learning, and must often coexist and interoperate with it. Often, teachers who have learned to solve problems in in-person learning bring their expertise – and their assumptions – to the distance context. The same is often true of distance education students, who have nearly all grown up with in-person learning and the problems that it has to solve, which leads to expectations that distance institutions and teachers are expected to meet. Unfortunately, this means that distance learning has inherited many of the problems of its forebear, including assumptions about teacher control and the need to extrinsically motivate students, mainly through examinations, grades, and credentials, with all the damage to intrinsic motivation that this entails. Only recently has this begun to shift. With this in mind, we move on to describe how distance education has evolved over the past 50–60 years.

The Three Generations of Distance Learning Pedagogical Paradigms: Objectivist, Subjectivist, and Complexivist

In our previous work (Anderson & Dron, 2011), we described the evolution of pedagogies in distance education as falling into three fairly distinct generations – the behaviorist/cognitivist, the social constructivist, and the connectivist – each of which was codetermined not just by developments in pedagogical knowledge but by changes in the affordances and constraints of the information and communication technologies that emerged during each period, as well as other systemic factors. No generation replaced any that preceded it, and all survive to this day. We also speculated about what form the next generation might take, predicting that it might be more holistic, incorporating elements of them all. In this section we will return to this model, presenting a revised and refined version that takes into account developments – including in our own understanding – that have occurred since our original work.

The names for the generations that we originally chose were clumsy and overspecific. The behaviorist/cognitivist generation also included instructivist approaches informed by neither behaviorism nor cognitivist models, the social-constructivist generation included much that was either not very social or not particularly constructivist in its underpinnings, while the connectivist generation emerged nearly two decades before the advent of the named theory of Connectivism and included many

models and theories that at least one of Connectivism's creators has explicitly disowned. It is also easy to confuse connectivism, the paradigm, with Connectivism, the theory. On reflection, we now prefer to refer to them as the *objectivist*, the *subjectivist*, and the *complexivist* generations, which more concisely characterize the central differences between them, as explained in more detail below. However, they still denote the same basic concepts.

Objectivism: A Paradigm of Teaching

The objectivist paradigm, as the name implies, involves pedagogies that assume both that there is an objective reality to learn about and that there are clearly defined objectives to be achieved. There are two broad psychological models underpinning this paradigm. The first (behaviorist) focuses on ways to bring about terminal behaviors. The second (cognitivist) focuses on the ways that people are believed to learn, in terms of internal cognitive processes. There are many theories and resultant practices of learning and teaching in both approaches. Both behaviorist and cognitivist models have a clear focus on *teaching*, trying to identify and predict the ways that teachers may most effectively bring about learning of the desired skills or knowledge, and both therefore focus mainly on instruction (and, hence, are often referred to as instructivist approaches), although the principles they entail – such as spaced learning (Fields, 2005), direct instruction (Stockard, Wood, Coughlin, & Rasplica Khoury, 2018), or media mixing theories (e.g., Clark & Mayer, 2011) – may also be of value when learning is self-guided. Before widespread availability of affordable two-way or multi-way communication technologies, an objectivist approach was the main pedagogical paradigm available to distance educators. Telephones, two-way radio, occasional meetings at learning centers, fax machines, and other alternatives have been available for decades, and letters have been an option for many centuries. However, all had limitations in cost, speed, reliability, or range that made their widespread or ubiquitous use problematic. By far the shortest path for the bulk of the learning process itself was, for the teacher, to provide instructions on how to learn and, for the learner, to follow those instructions independently. At least, that was the paradigm. In reality, learners rarely followed such instructions to the letter (Haughey & Muirhead, 2005). Additional pedagogies used by the learners themselves in their homes or offices were seldom observed, because they could not be observed.

The objectivist paradigm evolved over the course of a century or so, starting with newspaper instruction lacking much theoretical basis at all. However, it was only in the 1960s that pedagogical theory and practice began to emerge into the mainstream that was distinct from its in-person cousins. By far the most significant developments in this era were in the systematization of the pedagogical and organizational processes employed, much of it stemming from the work of Charles Wedemeyer (Diehl, 2012), whose analysis of the components of the teaching process enabled it to be reinvented in a form that could be orchestrated with available technologies to produce measurable outcomes that closely resembled those of in-person teaching.

The field advanced through the work of Otto Peters (Peters & Keegan, 1994) who developed and promoted an industrial model of education, in which different teaching roles were assigned to different team members (editors, subject matter experts, media production staff, artists, and so on) to create carefully crafted content, combined with a process model that typically involved interaction with tutors who supported these courses to provide personal support akin to that of a conventional teacher. This industrial model was extremely scalable and provided the foundations needed for the formation of most open universities, such as the Open University in the UK, Athabasca University in Canada, Indira Gandhi National Open University in India, and many others in Turkey, China, and elsewhere. These new distance universities often enrolled vast numbers of students. Currently, IGNOU, Anadolu, and the Open University of China each enroll over a million students a year, but even smaller institutions see the benefit of scale. It is significant that not only were these distance universities but they were also open, meaning that many of their students lacked formal qualifications or experience, unlike the highly selective models of the vast majority of conventional universities. Again, this was heavily influenced by technological factors. On the one hand, in-person universities suffer from problems of finite space and location dependence that inherently limits their enrollment capacity, so selective filtering is as much a necessity as an aspiration. On the other hand, traditional in-person universities that demand attendance are simply not an option for many nonconventional learners with jobs, families, or physical constraints on attendance. Though completion rates were (and often remain) lower than their in-person cousins, the fact that the unfiltered students of open universities achieve similar if not greater measured learning outcomes to those of highly selective in-person institutions suggests that the methods work. At least part of the reason for this might be that the freedoms – especially in autonomy and competence – that they offer make it possible for students with far more diverse abilities and experience to thrive, without the need to remain in lockstep with other students, utilizing their own learning skills, without being hampered by sometimes poor or controlling teachers.

Subjectivism: A Paradigm of Learning

As the name implies, the focus of the subjectivist paradigm is the subject: the learner. Subjectivist theories acknowledge that learning is a subjective process in which knowledge is constructed in the context of existing knowledge. There are two main models in this paradigm, the cognitive constructivist and the social constructivist. The cognitive constructivist model, epitomized in the work of Piaget (1970)*, focuses on how knowledge is constructed by individuals. The more influential social constructivist model, which builds on the work of* Dewey (1938) *and* Vygotsky (1978)*, sees construction of knowledge as both an individual and a shared process, in which not only is individual knowledge constructed with, for, and through others, but knowledge itself is perceived as a social and situated phenomenon. The focus of subjectivist models is on how we know and how we come to know: these are not*

theories of teaching, as such, but of learning. They do not dictate any particular method, though they do imply that some approaches – especially those that involve social interaction, open-ended tasks, and active engagement – will be more promising than the typically instructivist approaches of objectivist models.

Subjectivist approaches to teaching gained support in traditional education throughout the twentieth century, but the limited opportunities for learner-teacher or (especially) learner-learner interaction that could be supported through communications tools of the time made it difficult to implement for distance learners. Some – such as the School of the Air in Australia – managed something like it through the distribution of two-way radio sets to learners. Others – such as many of the open universities – relied on sporadic in-person get-togethers to support such needs. The costs, however, were high, and thus such models also relied heavily on print publication, recorded TV lectures, or similar one-to-many tools to provide much of the content and process, so they began as hybrid pedagogies that concatenated objectivist and subjectivist models at different times.

The advent of the Internet and, especially, the World Wide Web brought subjectivist approaches into the mainstream. Suddenly it became possible to learn at a distance with others, in ways that closely resembled those of in-person institutions, at low cost, with broad and often global reach. Due to network speeds and costs of connection, real-time teaching using audio and/or video tools and that closely replicated in-person classroom teaching remained on the fringes for a long time, allowing a distinctive set of pedagogies to be invented to address the asynchronous context. A wide range of research-backed theories and models emerged from this, such as communities of inquiry (Garrison & Anderson, 2003), transactional distance (Moore, 1993), and curated or shared web explorations (Furuta, 2000). It is notable, however, that this paradigm emerged from and into a traditional teaching context in which distance institutions had to replicate many of the central features of in-person learning that, it will be recalled, emerged in response to the limitations of physics and organization in a physical world. Though subjectivist pedagogies acknowledge that every learner will learn something different, and in different ways, their context of application remains firmly rooted in the institutional paradigms of mediaeval universities. Subjectivism focuses on collaborative processes to support shared but largely teacher-led goals, and though its emblematic view of the teacher is that of a "guide on the side" rather than a "sage on a stage," the role of the teacher is as leader of a named group of students, who retains control, who assesses student learning, and who establishes and enforces group norms and rules.

Complexivism: A Paradigm of Knowledge

The complexivist paradigm goes further than the social constructivist paradigm in seeing knowledge as non-negotiably distributed, situated, complex, and emergent. Learning must, by necessity, inherit the same characteristics, and the knowledge that results does reside not only in the heads of students but also in the networks of both individuals and the physical or conceptual artifacts they create. Complexivist

theories posit that individual knowledge cannot be neatly separated from the knowledge of others and that our minds are not just phenomena emerging in the brains but are extended and instantiated in the world around us; that learning is an inherently complex, unrepeatable phenomenon, always including emergent as well as planned consequences; that learners must be active agents, in control of their own learning; and that connections between what we learn matter as much as or more than what they connect. The term "complexivist" was coined in an educational context by Davis and Sumara (2006) as a means to describe a sensibility towards the world informed by complexity theories and models, through which "the named learner can be considered simultaneously a coherent unity, a complex of interacting unities, or a part of a grander unity" (p. 14), though the educational use of theories and ideas drawn from complexity science went back a decade or two before (e.g., Brown, Collins, & Duguid, 1989; Pea, 1993; Wenger, 1998). However, the archetypal complexivist model is Connectivism, building on the work of Siemens (2005) and Downes (2008), which drew mainly from network theories and models extending from social network theory to connectionism. Complexivist models are concerned with how knowledge emerges in individuals and populations, so seldom dictate ways to teach though, again, some methods, such as open sharing of the process and products of learning, are strongly implied, and many methods are frowned upon as imposing too much structure and order on a complex system. That said, any kind of learning event can be treated as part of the complex whole, including formal lectures and discussions within a course-bound community of inquiry, and most contain within them much that is complex, unpredictable, and emergent. However, while instructivist and subjectivist accounts normally treat these events as the sum total of the instantiation of the pedagogy, complexivists recognize them as only one complex component in a far more complex ecosystem of learning.

Complexivist pedagogies are digitally native, for two main reasons. The first is the enormous scale yet relatively low cost of information and connections to others that is enabled by the Internet, especially in supporting one person sharing with many. The second is that interactions and outputs of learning are reified persistently, allowing learners to participate in the learning of others for years or even decades after the initial interactions occurred. This speaks to the "complex" part of the name because, through such reified interactions, the environment for learning itself is constantly transformed. Unlike the earlier subjectivist and objectivist models, complexivist approaches are not rooted in the classroom, albeit that a complexivist view of classroom learning can have value (Davis & Sumara, 2006). From a complexivist viewpoint, teachers may play important roles in the network, especially as role models and sources of wisdom, but they are not so much guides on the side nor sages on stages as they are co-travellers, part of a complex matrix of interacting agents who learn together, in a broader networked context that extends far beyond that of a defined, goal-focused group.

Among the most notable benefits of complexivist models of learning come from the fact that, far more than subjectivist models, they solve the problems of learning that in-person pedagogies sought to address, *without* the problems caused by a reliance on the physical infrastructure that in-person pedagogies had to solve. Online

learners do not have to follow the same pace as others, keep the same time, or follow the same paths, and they do not have to relocate in order to learn. Meanwhile, they benefit from many of the advantages of social interaction that classrooms support, as well as new affordances enabled by the vast numbers of people with whom they might interact, at any time of day, in any place, with any degree of personal involvement that suits them, at times and places far beyond the classroom. In previous work, building on Paulsen's (1993) theory of cooperative freedoms, the authors (Dron & Anderson, 2014) identified ten distinctive realms of freedom that may be potentially available to online learners that are, without complex and demanding pedagogical processes, rarely available to their in-person counterparts:

- Place – where learning happens
- Content – what you learn and where you learn it from
- Pace – how fast you learn it
- Method – the pedagogies you use and how you are assessed
- Relationship – who with and how you relate to others
- Technology – what tools you use
- Medium – what form media take
- Time – when you learn
- Delegation – who dictates what happens next
- Disclosure – what you reveal to whom

Unlike previous generations, complexivist models natively extend beyond formal learning and intentional training, seamlessly blending into our living and working lives. From Google Search to LinkedIn, from MOOCs to Wikipedia, an increasing amount of our knowledge is enabled by and embedded in the digital environment around us, and we are not just consumers but producers of it, from simple chats in social media to full-blown blogging sites and shared videos. The inevitable increase in complexity of technologies and culture that drives us into an ever-expanding adjacent possible requires us to learn continuously throughout our lives – what Barnett (2011) calls "life-wide learning." Digital tools and systems are both means and co-participants in this. Increasingly we learn just in time because the skills we need would have become redundant by the time we had taken a traditional program of study, and our tools play an ever greater role in our cognition, supporting, enabling, and storing what we know, often reified and expanded in connections and conversations with others.

Blurred Lines and Overlaps

Although we first presented these as distinct generations, the reality of the lived learning experience is and has always been that all generations coexist in any learning journey of any length or complexity. Though only recently recognized, complexivist learning has always occurred in classrooms and families and especially for distance learners who, at least as much as campus-based students, learn in a social

space with others, influenced by many people and many things. Even the most full-frontal behaviorist teaching in a classroom is mitigated by the fact that students live much more of their lives outside it, and complex things can happen within it. Furthermore, none of the generations excludes the possibility of the others. The most free form of complexivist networks still relies on individuals constructing knowledge in a social context and on content that is intended (and sometimes designed) to support ways of learning informed by cognitivist theories. There are even times when behaviorist methods can be useful in otherwise far less structured ways of learning, from actors learning their lines to children learning to ride bicycles. Each provides a perspective and tools. Though there are overlaps, each sees and treats education as a different problem to solve, taking advantage of available phenomena to achieve that. None provide a definitive solution to all learning problems.

Emerging Paradigms

Beyond these three existing paradigms, new models of open and distance pedagogies are emerging. In this section we discuss three of the more significant of these.

Data-Driven Pedagogy: A Theory-Free Paradigm

Cloud-based learning management systems, MOOCs, and similar tools that farm data from massive numbers of students can use such data in an attempt to understand and often to influence the learning process. Educational data mining and learning analytics systems seek patterns in datasets that provide clues about how students are learning, often relating them to intended learning outcomes (in the objectivist tradition) though sometimes to explore other aspects of behavior, such as social engagement or self-directedness. Often, such as in adaptive systems like Knewton (Wilson & Nichols, 2015), the data are used to provide recommendations about how to learn, based on how others have done so, not (like traditional adaptive hypermedia) based on teacher-specified paths, but on the interactions of countless other learners with the resources and one another. The pedagogical underpinnings of these recommendations are often opaque to even their creators as patterns mined from the crowd come to dictate how and what we learn and who we learn from.

These invisible, "theory-free" pedagogies are not neutral but goal driven: machines are trained to seek specific outputs and patterns, even though the paths to reaching them may be unknown. When those outputs are credentials or grades, they are seated firmly within the objectivist paradigm and to a large extent to the behaviorist end of the spectrum, where what matters is not how learning occurs, but what results are achieved. However, similar tools can be trained to seek more than just teacher-determined learning outcomes. For example, Joksimović et al. (2015) have used learning analytics methods to explore patterns of social capital development in MOOCs, while Gašević, Dawson, Rogers, and Gašević (2016) have used

learning analytics to analyze the effects of instructional design on learning behaviors, as well as to mine for student learning strategies (Gašević, Jovanovic, Pardo, & Dawson, 2017).

There are risks that, whether through algorithms or training sets, such systems intentionally or unintentionally embed values and assumptions of their creators and may create filter bubbles (Pariser, 2011) or echo chambers (Dubois & Blank, 2018) that reinforce ineffective pedagogies or falsehoods. The goals of the system are determined by the means of measuring success, and these will, in most cases, fail to recognize what they are not trained to seek: the creative, the tangential, and the expansive outcomes that a human teacher could celebrate. There are therefore risks that systems will lead to "good enough" ways of learning that fail to stretch learners' boundaries. Artificial "intelligence" is often anything but intelligent, because, until artificial generalized intelligence is achieved (which, in the opinion of the authors, may be never), it never can understand what it means to be human, the values, the beliefs, the culture, the motivations, and the meanings that education, in its broad sense, seeks to develop.

Though the field is young and much of it is dominated by the objectivist paradigm, it affords the potential for the development of data-driven pedagogies that have no paradigmatic underpinnings. Much as Google Translate embodies no rules of grammar or syntax, and has no understanding of the meaning of the sentences it translates, yet achieves functional results, so will AI-embodied pedagogical agents teach without understanding or caring how their pedagogies work, measuring success by goals they have been trained to measure, with no knowledge of other effects, the contexts and needs of the learners, nor the value of what they do.

Hologogy: A Cultural Paradigm

The term "hologogy" has been defined to describe ways of learning to be a part of a culture with shared values and practices (Cumbie & Wolverton, 2004), though largely as an extension of the subjectivist paradigm in an in-person setting. At its heart is a networked-individualist (Wellman, 2002) view of humans as individual agents, becoming part of a culture, that Cumbie and Warburton describe as a pedagogical process of identifying, connecting, relating, becoming, and joining as they learn together. To a significant extent, education is concerned with the transmission and development of culture. As education becomes more global and the dominance of Western culture recedes, the networked individualist perspective that underpins subjectivist and complexivist paradigms is being challenged. We belong not just to networks and groups but to *sets* with which we identify (Dron & Anderson, 2014) such as nations, genders, age groups, or adherents to belief systems. We expect to see the development of distance pedagogies that more clearly acknowledge the many tribes and other identity-defining sets to which we belong. Such pedagogies recognize that learning is not just about the person or their immediate network, but the rich, complex, and meaningful ways that we belong to and contribute to multiple interlocking and distributed cultures. Such issues have

historically been addressed by the "hidden curriculum" of in-person teaching – for instance, ways that teachers address problems and invite students into the cultures of disciplines – but play out in different (though no less significant) ways at a distance (Anderson, 2001). This is an emerging paradigm with, as yet, relatively little explicit underpinning pedagogical theory about how it may be supported in an open and distance setting.

Bricolagogy: A Theory-Agnostic Paradigm

The wealth of pedagogical paradigms available to us makes it possible to think of learning as a process of bricolage, selecting the most appropriate pedagogical models for our current needs from the many available options. More and more learning is about charting (Littlejohn, Milligan, & Margaryan, 2012) and wayfinding (Siemens, 2012) in a cornucopia of information, competing values, and incompatible worldviews where we are members of not one society but millions of fragmented sets, networks, and groups. Pedagogically, the challenge is not one of integrating, constructing, or knowing, but of being able to know what is worth knowing, and how best to learn in the whitewater world of conflicting ideals and opinions. We see the increasing need for critical and reflective approaches to *choosing* pedagogies (by both students and teachers), more than how to learn *using* those pedagogies, as a distinct pedagogical challenge in itself. From this perspective, pedagogical methods and paradigms are just tools among many in a tool chest. There is a need for learning how to choose the right tools and how to assemble and orchestrate them most effectively in different contexts. Though lessons can be drawn from the field of critical pedagogy (Giroux, 2020), complexivist accounts, and the discoveries of the emerging theory-free paradigm, this theory-agnostic approach may become a paradigm in itself. We hereby christen this bricolage-based approach "bricolagogy."

Conclusions

Among the positive outcomes of increasing globalization and connection is increasing recognition that we share a common global environment, that there are different ways of learning, different ways of knowing, and different ways of acknowledging competence. The blends and hybrids that result can make all stronger. The risks of truth denial, though, are great when multiple truths are embraced with equal fervor, regardless of internal validity or consistency, or social or ethical foundation. Much of the time, rather than combining or inspiring one another, the egalitarian nature of the Internet separates and polarizes. This is a better alternative, perhaps, than the non-egalitarian approach that is increasingly seen in different nations, where decisions about what can be seen or how we can participate within a digital environment are often made by totalitarian governments. Both alternatives have consequences that demand the invention of counter-technologies, including pedagogies. No longer (if it ever was) can education be seen solely as the passing of wisdom from one

generation to the next, nor as a stabilizing social force that maintains and/or evolves a culture, let alone (as some would have it) as a feeder to business, though powerful forces will conspire to retain these (often competing) roles. Acolytes celebrate the efficiency and effectiveness of large-scale, automated, deeply instructivist learning systems that rely on AI for their effectiveness, and, in fairness, they do bring "education" – in the sense of an opportunity to gain credentials – to many who could only have dreamt of it before. In the process they inculcate the outcomes and values chosen – sometimes unwittingly – by their creators and converge ever closer to an average norm, as data-driven approaches that treat humans as vectors on a graph replace human mentors, guides, and supporters. Chatbots that pretend to be human play an increasing role in the educational process not just as a better form of automated help but as entities that give students a sense of belongingness and being cared for (Eicher, Polepeddi, & Goel, 2018), thus learning values embedded by their creators that represent humanity only in caricature. We learn to be human from the examples and recommendations of machines.

We foresee a fragmented future of increasing diversity, where paradigms rarely blend but instead compete for the ever more valuable attention of those seeking to learn. The powerful *will* succeed: we will see the robot-taught and goal-driven big-data-based variant of the objectivist paradigm become ever more successful, competing more and more with traditional institutions and, often, being embraced by those institutions as essential to a viable future where economic constraints make traditional roles less affordable. Powerful group- and identity-based hologogic learning that stresses affective commitment and belonging, some driven by echo chambers and filter bubbles, will also thrive. Finally, we see the growth of theory-free approaches as inevitable. These pedagogical designs will become the remit of machines that have no intrinsic care for the needs of people and their communities.

Compensating for this arguably dystopian trend, the powerless will become – collectively – more powerful, despite and perhaps in reaction to the dominant players, be they political, commercial, or ideological. We will learn more together, through what we share, and we will learn to share more wisely, more capably, more respectfully, and more openly. It is notable that, despite the very well-reported dominance of a few huge players in social media, independent WordPress sites still constitute more than 40% of all publicly accessible websites (https://w3techs.com/technologies/details/cm-wordpress, accessed June 1, 2021). These sites are all independent but networked, and a fair proportion of those are devoted to learning or teaching, whether formally or not. Just as increasing numbers of people are turning away from algorithmically determined sites and systems of the large corporates, so they will resist the invasion of machines in the educational process. Learners will not be products but producers, valued parts of a human collective that teaches, learning to learn in ever more diverse ways.

We stand at a very diffuse, fuzzily boundaried junction where many pedagogical paths can and will be taken. There is not one dominant pedagogical paradigm emerging in this complex maze, but many.

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