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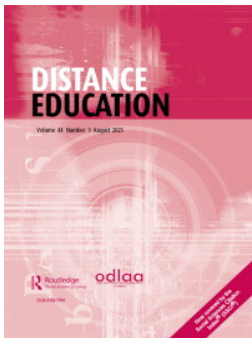
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Open education in closed-loop systems: Enabling closures and open loops

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ABSTRACT

University systems maintain prohibitive closures that constitute a closed-loop system: opaque academic practices, control of what counts as knowledge, financial and social exclusion, and the perpetuation of privilege. Yet this closed-loop system is also governed by adherence to values around education as a public good, openness, and authenticity, and education as a vehicle for social mobility. The closures and openings created with such systems are in tension. Open education in universities is entwined in these tensions. In this paper, we differentiate between prohibitive closures and enabling closures. We define enabling closures as closed loops of activity that allow for openings both at the boundaries of the university and within. It is through these enabling closures that universities can adhere to open education as accepted policy and practice. As such, in this paper we explore how open education sits in tension with closed technological and increasingly commercialized educational infrastructures in higher education.

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Introduction

There is a tension with universities committing to open education while exhibiting many of the attributes of a self-regulating closed-loop system, where feedback gleaned from institutional activity ultimately maintains an existing set of operating conditions. In this paper, we argue that open education, like all openness in education, depends on closures (Bayne et al., 2020) to function and to thrive. These closures can be found throughout higher education in accreditation schemes, academic discourses and practices, publication processes, technological infrastructures, and administrative procedures. Open education therefore becomes an act of identifying those closures, noting which are enabling and which are prohibiting its growth and developing strategies to foreground existing enabling closures and imagine further ones. Throughout this process, it is necessary to surface open education practices that sit within and adjacent to this system of closures. We take higher education in the United Kingdom as the setting for this discussion on open education, noting how

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universities often act as closed-loop systems, systems where feedback gleaned from institutional activity ultimately maintains an existing set of operating conditions.

As with all dynamic organisms, such a closed-loop system perpetuates a myriad of closures that universities have traditionally been associated with: stark delineations of who is inside and outside the boundaries of the university (Öztok, 2019); opaque institutional and disciplinary practices which allow for or stunt navigation within these boundaries (Aparna et al., 2020); power asymmetries in access to leadership and governance controls; a burgeoning administrative function; and an epistemic hegemonic, albeit loosening, grip on the means of knowledge production (Noda, 2020). The closures in these closed-loop systems are systemic. They regulate the operating conditions of institutions that have survived in many cases for decades and centuries. Yet, as we argue in this paper, at least some of these closures are necessary for open education to exist and thrive. We look to surface what these enabling closures are in universities.

Yet this closed-loop system is also governed by adherence to particular, and largely sector-held, values around education as a public good, openness and transparency as a means of establishing trust and authenticity, and education as a vehicle for inclusion and, potentially, social mobility. These values introduce an *open loop* within and adjacent to a larger closed-loop system, where there is no self-regulating mechanism and human interaction is required. The human interaction required is in the performance of these values as they are often designed to challenge and transform the existing set of operating conditions that the closed-loop system perpetuates. The closures and openings created with such systems are productively yet problematically in tension. In such a system, open education becomes an act of navigating granular open loops and larger closed-loop systems.

Open education as such is both normative in the sense that it maintains existing operating conditions, and non-normative in its emphasis on (potentially diverse) human interaction in relation to its shared values. These values and the range of interaction around them generate new operating conditions. Such a position of open education is inherently a political one in that these moves toward and away from normativity are not available to all those associated with the university (Kezar & Bernstein-Sierra, 2019). As such, we argue for an evolving definition of open education to include recognition of the power asymmetries that exist amongst actors in these university spaces and their attendant openings and closures. We believe there is a need to surface these power relationships, to map their relations to one another, to reimagine how they might more coherently align with sector-held values, and to interrogate the role that an increased reliance on closed commercial technologies have on the enactment of these values.

It is important to note that we are making distinctions here between universities that have been constituted as open universities and those that are not. Open universities are by their very constitution dedicated to part-time and online learning and to the students that would benefit from such a focus. Other universities are less constituted to this focus and as such, the sort of openness that open universities promote will likely not become more than a marginal preoccupation (Weller, 2017) elsewhere in the sector. As we argue, that is to a degree the point: universities,

open or otherwise, function to maintain their own closed loops and overall operating dynamics.

Situating this discussion in the research

Much has been written about how open education is structured and practiced in higher education. However, the discussion found in this paper focuses on the interplay between open education and closedness, noting the political implications of this interplay. These political implications have often stemmed from the framing of open education in the broadest terms, which in turn has allowed it to be attached to instrumental discourses around self-directed learning, flexibility (critiqued in Oliver, 2015), the flattening of educational hierarchies (Bayne et al., 2015), and the essentialist role of technology (Storme et al., 2016) in this process.

Further research has explored how open education can abet the reinforcement of traditional power asymmetries (Bordignon, 2022; Olakulehin & Singh, 2013); and how it can reinforce knowledge hegemonies and colonial divides (Adam, 2019). There is also discussion of how noneducational actors can engage with specific aspects of openness for communicative purposes but maintain proprietary, closed, practices (what Watters, 2014, referred to as openwashing). However, much of this critique of open education, at least that portion directed toward higher education, can be seen to be a proxy for the closedness of academic practice and structure itself. It is a sector that has traditionally depended on a particular set of closures to exist. These closures are writ both large and small: the opaque practices associated with university (Gourlay, 2009); the social capital needed to navigate this tacitness (Mishra, 2020); the adherence to particular citation frameworks, methodologies, and theoretical frameworks and academic writing practices (French, 2020); the exactitude of particular assessment regimes; the formal mechanisms for admissions; the navigation of research impact practices (V.-W. Mitchell et al., 2022), and the sizeable, self-referential, and ultimately self-reinforcing accreditation systems governing the university. All are, or have been seen to be, closures on which universities depend.

These closures further complicate open education as they have been seen to be in direct opposition to openness itself (itself presented as a universal good), a false binary that has been repeatedly critiqued in the literature (Bayne et al., 2015; Collier, 2021; Edwards, 2015a; Knox, 2013). In these false binaries, there is danger of “foreclosing conversations about the deeper, and more political, goals of openness” (Collier, 2021, p. 102); and of ignoring systemic barriers to openness in higher education by using open education as a proxy for the “politics of participatory democracy” (Watters, 2014). These binaries, and indeed the practices of open education itself, have been intensified as they are problematically bound within economic discourses of commodification that emphasize education as market creation (Riep, 2017) and the instrumental position of delivery of educational content (Ferreira & Lemgruber, 2019). As Ferreira and Lemgruber astutely noted, these discourses are detrimental to or delegitimize the evolving relationships between the interrelated actors on which a more fully realized open education will likely depend.

As this paper will argue, there is a muting of possible closures on which open education in higher education might depend, or what we refer to as *enabling closures*. These enabling closures are composed of and compromised by the interplay of academic practice, the composition of the university itself, sector values, and, as is increasingly but not uniformly the case, closed commercial technologies. We make a distinction here between enabling closures and *prohibitive closures*, which are closures that impede in the most granular sense the practice of open education in the sector, but more broadly impede the enactment of values that the sector has traditionally ascribed to.

As such, this paper attempts to move into the systemic spaces of open education in universities and notes the terrain of these contested spaces as they jostle between openness and closure. This paper frames this through the concepts of closed-loop systems and open feedback loops to note how academic practice and overall systematic constitution is often a self-referential system reflexively reinforcing its own existing operating conditions. The position of open education advanced in this paper is one of systems transformation, where open feedback loops are deliberately designed to reprogramme the university structure with enabling closures that work with and against closed-loop systems. Open education in higher education, at least in this paper, is framed around the interplay between the open and closed-loop systems and the boundaries that this interplay generates.

Universities as closed-loop systems

The concept of a closed-loop system as presented in this paper is informed by general systems theory (Von Bertalanffy, 1972) and its attendant emphasis on how interrelated actors exist within defined boundaries are governed by context and a relationality with other actors. Closed-loop systems are presented in this paper as a means of systematically exploring how open education sits within and adjacent to university structures, and specifically how the interrelatedness of university structures and actors foster a relationality that subsequently structures how open education is performed. Studies of closed-loop systems have largely focused on studies of circular economies (Alcayaga et al., 2019), supply chains (Shekarian, 2020), medical processes and assistive technologies (Boughton & Hovorka, 2021), and large interconnected information systems (Yoo et al., 2016).

Closed-loop systems require little to no human interaction to maintain their current state. These systems rely on instruments that create closed circuits of activity, ones responsive to the feedback received from various points of the circuit, while still maintaining the equilibrium of the overall system. These instruments, referred to as control systems, are notable largely for the lack of human interaction needed to maintain them. As presented in this paper, closed-loop systems offer a conceptual frame to explore what structures universities use to maintain their own operating conditions, and what closures are created as a result.

The control systems that universities use to create closed-loop systems are embedded throughout institutions and the overall sector. These can be seen to include opaque academic practice, accreditation frameworks, assessment regimes,

admissions processes, administrative procedures, proprietary and gatekeeping practices associated with publication, and financial closures associated with rising fees. While we caution against using the closed-loop concept too literally here, as many if not all the control systems require significant human interaction to circulate within closed circuits of activity, we do note that this interaction has much the same effect as a closed-loop system as the overall focus is on maintaining existing operating conditions. The university, like any institution or organism, is predisposed to its own maintenance.

All of these, to greater or lesser degrees, create and compound closed loops of feedback that serve to maintain existing internal operating conditions on one hand; and reinforce boundaries on the other for those who receive the “specifically pedagogic message” (Bourdieu, 1977, p. 87) that universities put forth that higher education is “not for them” (Edwards, 2015b, p. 268). Although this pedagogic message has been often framed as a *hidden curriculum*, that implicit message within higher education that involves the reproduction of “social relations like race and gender hierarchy, social class reproduction, the inculcation of ideological belief structures” (Margolis, 2001, p. 22), in this paper we argue that this is at least partly by design. It is the systemic output of a closed-loop system. As such, we see two interrelated types of closedness emerging here: one for the multitude of closed circuits of activity within university and another for the closures at the boundaries of university itself, and the political implications of who and what is inside and outside that boundary. A critical understanding of both these forms of closedness is necessary for open education to further open the sector.

As such and in summation, we return to our position of universities as closed-loop systems to note the following. First, they are self-referential. As with many large organizations, the activity of the university will make reference to itself and the norms of the sector. Second, the activity of the university associated with its closed circuits is normalizing. It is made predictable through an adherence to control systems such as accreditation frameworks, marking schemes, and research frameworks. Beyond the significant political dimensions involved here, this normalization represents an act of closure. Third, universities, like all dynamic organisms, reinforce their own existing operating conditions and processes above all else. Equilibrium is sought and maintained. This position of universities as self-referential, normalizing, and reinforcing is important as it directly impacts how open education is presented and practiced.

The open loops within and adjacent to university systems

Closed-loop systems co-exist and contrast with open-loop circuits, which are characterised by circuits of activity that involve human activity and where there are no self-regulating control systems. These open loop systems often involve effort directed at systems or circuit transformation, where the automated functioning of a closed-loop system has proven insufficient in response to existing operating conditions and the new variables that have been introduced into those systems. This insufficiency might be a result of a crisis, an external pressure, or merely institutional or sector activity designed to alleviate a past inefficiency or injustice.

One way that these open-loop circuits are introduced into closed-loop systems is through the values that the higher education sector purports to hold and the role of the university—as a site of communities of scholarship, of civic and social purpose (Bayne & Gallagher, 2021)—in enacting those values. These values might include education as a public good, openness and transparency as a means of establishing trust and authenticity, and education as a vehicle for inclusion and, potentially, social mobility. The human interaction required is in the enactment of these values as they are often designed to challenge and transform the existing set of operating conditions that the closed-loop system reinforces.

These open-loop circuits echo much of the scholarship around the types of open education, in terms of what they aim to address:

The first seeks to transform or empower individuals and groups within existing structures, e.g. by removing specific prior qualifications requirements, eliminating distance and time constraints, eliminating or reducing costs, and/or improving access overall. A second form of open education seeks to transform the structures themselves, and the relationships between the main actors (e.g. learners, teachers, educational institutions), in order to achieve greater equity. (Cronin, 2020, p. 9)

Both forms are of relevance to the discussion found here. The first form aimed at transformation within existing structures suggests a closed-loop system with a multitude of open circuits within it. Adding to Cronin's (2020) examples above, these might include activity aimed at making academic practice less opaque, administrative processes less resource consuming, providing support structures more indicative of the diversity of the overall student body, and providing advancement and development opportunities for staff. It is important to note that these open-loop circuits often, but not always, become closed loops if embedded into the overall control systems of the university.

To offer but one example in higher education in the United Kingdom, open access mandates from research funding bodies are in the process of moving from open circuits of deliberate transformative activity aimed at individual practice and institutional process transformation, into closed circuits of established practice reinforcing the new set of operating conditions. The goal is to create closed loops of activity where open access publishing is the norm of the sector and institutional activity becomes self-referential, normalizing, and reinforcing toward open access. This is what we refer to in this paper as *enabling closures*. They are closed circuits in and of themselves, but they reinforce a degree of openness (defined as open access to publicly funded work) for the institution.

The second form is in the transformation of the structures themselves and the actors involved. This second form inevitably involves a boundary crossing as these structures and actors are not always strictly educational, but rather educationally adjacent. Nor are they accessible to all. Examples of this, harkening to the open access discussion above, is Plan S, which mandates that results from research funded by public grants, provided by the national and European research councils and funding bodies that comprise COALition Sopen access journals or on compliant open platforms. Many research funding bodies have signed on to Plan S and as such universities are now, to greater or lesser degrees, being governed by its mandates. This is notable insofar as

where academics can publish (Frank et al., 2022; Moore, 2021), when seen through this systemic lens of closed-loop systems, it stands as an enabling closure that emerged from systemic work on overall process transformation. Open loops were deliberately introduced to transform the operating conditions of academic publishing practice, and then these open loops were consolidated as closed loops of institutional and sector practice. While open access to research is but one small strand of the overall open education body of work, it stands as an illustrative one for noting how open and closed loops can speak to one another.

What is more problematic in this second form of open education is in the stability of the variables involved in these heterogeneous, networked spaces. The institutions and individuals involved move routinely, and as such the relationships between them are redrawn. Open loops are introduced to account for this redrawing and quickly become closed circuits of activity designed to reinforce any newly found equilibrium. This may be in response to crises, as was the case with the 2008 economic downturn (Civera et al., 2021) or the COVID-19 pandemic (E. Ossiannilsson, 2020). It might be in response to more gradual, seemingly inexorable changes such as the rise of tuition fees that emerged in response to government deregulation throughout the sector, which quickly became standard, if not contentious, operating procedure (Pitman, 2015). In this instance, we see an open circuit of activity in response to a crisis quickly becoming a closed loop reinforcing the new operating conditions. This is predictably a prohibitive closure with significant political implications as it reintroduces barriers to higher education overall.

The open-loop activity emerging from the initial instabilities of the COVID-19 pandemic is prevalent in the literature, offering a broader understanding of how this disequilibrium was experienced across the sector. Largely framed as emergency remote education, this research is often characterized by the constraints on which these open loops of activity were predicated: such as meaningful access to technology, to connectivity, to electricity, to existing technological competences of students and teachers, and to navigating social norms. With some meaningful exceptions often framed around social justice (E. S. Ossiannilsson, 2021), reworking inequality and inequity (Belluigi et al., 2020; Veletsianos, 2021), or evolving pedagogies of care (Bozkurt & Sharma, 2021), the larger presentation of how the initial open loops of the pandemic around open education circulated through the closed-loop systems of higher education, and in some cases became closed loops themselves, is still emerging. However, both forms of openness are found in the technological spaces that open education is increasingly bound within. There is a great amount of activity both within and in collaboration with university adjacent actors in broader networks. This next section discusses how the open and closed loops of higher education interact with broader technological actors and networks.

Closed and open in technological spaces

When seen through the lens of open online education, where technology explicitly intersects with these existing closed-loop systems and any open loops within and adjacent to them, this interplay becomes all the more complicated and contested.

Particularly with commercial technologies and the pervasive data-driven hidden architecture that accompanies them (Williamson, 2018), higher education is increasingly bound in the human-algorithmic decision-making practices and surveillance regimes of commercial technologies (Prinsloo, 2017), and the same algorithmic misrepresentations, particularly for already marginalised groups, as critiqued in Ball (2016), Noble (2018), and Benjamin (2019). There is a growing body of research that suggests the role of commercial technologies in higher education has accelerated post-pandemic (Williamson & Hogan, 2021) as have the discourses used by these commercial agents to legitimize their increased role throughout the sector (Clark, 2023).

These commercial discourses are important for the purposes of this paper as they introduce temporary open loops of experimentation and deliberate institutional activity toward the common discursive emphasis on transformation, before becoming closed loops of accepted institutional processes that maintain the new equilibrium. These commercial discourses are predicated on the values of growth, scale, efficiency, and progress toward a universal, global knowledge economy (Facer & Sandford, 2010). They often sit in tension with the university, seen, and arguably wanting to be seen, as a community of scholarship and as a site of civic and social purpose (Bayne & Gallagher, 2021). Such discursive tensions have a direct impact on the subsequent openings and closures that become the hallmarks of open education as practiced in higher education. The multitude of open and closed loops created as the result of the increased role of commercial educational technologies shifts the landscape of open education throughout the sector. These loops again are written both large and small, codified in policy, practice, legal frameworks, and administrative processes. The closures contained therein are both prohibitive and enabling. These closures are largely defined through their enactment, or repression, of sector-held values around education as a public good, openness and transparency as a means of establishing trust and authenticity, and education as a vehicle for inclusion and, potentially, social mobility.

Examples of these closed loops that engage with commercial educational technologies in a larger network of educational actors include the data protections afforded by the General Data Protection Regulation (GDPR) in the European Union and the measures taken by online education providers to comply with these regulations (discussed in Zdravkova, 2019, & Amo et al., 2020). The protections afforded by GDPR can be seen as an enabling closure, providing a measure of technological governance and data protection from which further values-based openings can be created in higher education. It is closed in the sense that it is a self-referential circuit of activity: educational technologies and technological practices are by default subject to it within European Union jurisdictions. It is also self-fortifying in that each successive case of using GDPR to provide data protection for higher education further maintains the equilibrium that GDPR gradually brought into the sector. It further normalizes the discourses around data protection, where aberrations to this closed loop are positioned as breaches (Sanford & Yasseri, 2021) and not disruptions or transformations. GDPR as a closed loop speaks to the openness of open education directly in its emphasis on data protection; it is an enactment of a particular value held by the university sector.

Further enabling closures include adherence to policies around the accessibility of higher education, where increasingly educational technologies are being used to

provide some measure of accessibility for both the online and the face-to-face educational experience. These measures include lecture capture, transcriptions of recorded presentations or lectures, and ALT text for images for screen readers. Although not as firmly a closed loop as is the case with GDPR in that accessibility is in constant interplay between policy and individual praxis, it stands nonetheless as a closed loop that presents a measure of openness. Students who might not have otherwise been able to engage in educational activity are provided at least some means to do so. However, this enabling closure is also a prohibitive one in the sense that it further draws the higher education sector into commercial networks where noneducational actors are increasingly structuring the education taking place within institutions (discussed in pedagogical, commercial, and political terms in Lamb & Ross, 2021). This reliance on commercial technologies for enabling this closed loop of activity around accessibility increases the dependence of the sector on these commercial actors and makes them more responsive to the discourses around commercial edtech.

Other examples of potent enabling closures include institutional policies around open educational resources (OER) and their role in enacting, at times uncritically, institutional and/or sectoral values, particularly around access, collaboration, and transformation (Chikuni et al., 2019). How OER policy potentially acts as an enabling closure is mediated, and at times muted, by existing policy structures at an institution, the institution's social culture and academics' own agency in response to these (Cox & Trotter, 2016). What this suggests is that not all enabling closures are equal, as some might simply serve a hygienic role, creating the conditions necessary for university staff to allow them to act on their personal inclination toward OER (Cox & Trotter, 2016). Depending on the existing institutional policy culture, one could imagine institutional policies related to OER serving a hygienic, albeit necessary, role as an enabling closure.

Further examples include the commercial applications that fortify the already closed loops of knowledge production and assessment, such as plagiarism detection and remote proctoring applications, which have become embedded in academic and administrative practice at universities. These are notable insofar as we see a closed loop of activity around assessment both fortifying itself within the university through the policing of academic integrity (Bruton & Childers, 2016) but also shifting the boundary of the university itself by moving further into these networks of commercial actors and their attendant machinations of surveillance capitalism (Arnold, 2022). The ethics of this activity aside, these moves are problematic as they are creating prohibitive closures that effectively stunt the opening of the university: internally through the reinforcement of legacy assessment practices and externally through a greater dependence on commercial actors to define academic integrity algorithmically. Alternatives exist and are largely defined by their jettisoning of both traditional assessment practices and the technologies that support them (Silverman et al., 2021; Taylor, 2022), an open loop of experimentation that attempts to redefine the equilibrium of the closed-loop system.

As discussed, while it is important to note that much of the above activity is taking place within universities, and as such representing closed and open loops in closed-loop systems, this activity is predicated on a negotiation with a larger set of

networked actors outside the university. These negotiations effectively introduce commercial dependencies that redraw the boundary of those inside and outside the university, and engagements with them require a boundary crossing. Examples of negotiations within these heterogeneous actor networks again are written both large and small. Some examples are provided as follows that do not go into any significant level of detail. They are presented merely to illustrate the substance of these closures, whether prohibitive or enabling.

- Negotiated agreements with third-party technological providers (discussed in Hamilton et al., 2022) provide an enabling closure due to the legal framework that binds the commercial provider and protects those within the university. The prohibitive closures that emerge from these agreements are largely around the growing dependency of universities on these commercial networks and actors.
- The nondisclosure agreements often structured into these larger commercial relationships are prohibitive closures as universities cannot draw critical attention to black-boxed technologies. These nondisclosure agreements are often part of a larger program aimed at strategic obfuscation to shield these technologies from public scrutiny until they are fully embedded in organizational practice (Levendowski, 2023).
- The data being generated by the use of these technologies, and the data agreements in place (discussed in critical detail in Hillman, 2022), cede some level of data sovereignty away from universities and reorient the centres of power in higher education to those with the “technical expertise to calculate and visualize the data, plus the predictive analytics capacities to anticipate and pre-empt educational futures” (Williamson, 2016, p. 123).

These in effect created closed loops in these networks that in turn are ported into the university and govern an increasing amount of what constitutes education. Creating openness within universities involves working with enabling closures in these actor networks. The shape of these enabling closures often depends on advocacy, governance, bold withdrawals from closed commercial services, bold transformations around accepted academic practices that predicate the use of these technologies, moves toward technological sovereignty with open technological systems, more explicitly linking social justice to open education, and further expressions of sector-held values.

Not all the institutions and individuals in these networks are of equal power, however, much the same as not all those engaging with and creating open and closed loops within universities have equal power. As such, there are natural political dimensions to open education that are increasingly being addressed in the research around how social justice is, or can be aligned with open education (Lambert & Czerniewicz, 2020); how decolonialization is engaged with in this context of infrastructural inequality (Adam, 2020); how open education has and might respond to economic inequality, cultural inequity, and exclusionary practice (Hodgkinson-Williams & Trotter, 2018). These political dimensions will inevitably redraw how we might understand open education itself. As such, echoing this past research, we argue for an evolving definition

of open education to include recognition of the power asymmetries that exist amongst actors both in and outside these highly relational university spaces, particularly for those universities where a dependence on commercial technologies have favored a closed loop which in effect enacts a digital colonialism (Couldry & Mejias, 2019; Gonsales & Damiati, 2023; Kwet, 2019), where commercial, largely Global North, actors have consolidated power over the educational structuring of higher education.

Building on this definition, we suggest that an emphasis on enabling closures becomes a useful mechanism for embedding openness into the operational dynamics for universities for a broader political spectrum that is currently allowed. This emphasis on enabling closures and their role in open education—and the process of identifying them and, at times, creating them—becomes an issue of institutional, individual, and sectoral praxis.

Open praxis as structural transformation and subversion of prohibitive closures

Many have recognized the structural transformations that need to take place for open education to fully thrive, a need often expressed as social justice (Charitonos et al., 2020; Lambert, 2020, Lambert & Czerniewicz, 2020; Ochieng & Gyasi, 2021) or framed around inclusivity (Croft & Brown, 2020) or equity (Katz & Van Allen, 2022). This paper argues that identifying and at times creating enabling closures is part of this structural transformation. All, we would argue, are acts of open institutional praxis. Freire (1970, p. 126) defined praxis as a “reflection and action directed at the structures to be transformed.” Open praxis as structural transformation engages in the difficult work of identifying and changing the structural, political, and social inequalities encapsulated in higher education.

We would argue that part of this open praxis is a systemic understanding of universities as closed-loop systems. The university, as discussed, is a dynamic organism that is self-referential, self-fortifying, and concerned with, above all else, maintaining its own equilibrium. Closed loops abound in such systems, and must be acknowledged and, if prohibitive, transformed. Sector-held values provide one such mechanism for this transformation, sitting as they do as open-loops requiring significant human feedback to be actualized as institutional or sector practices. Once received as institutional practice, however, they become to some degree a closed loop.

They are fortified and made self-referential by the mechanisms that encircle them: open access mandates, institutional OER policies, legal protections afforded through formal reviews of new technologies, such as found in Data Protection Impact Assessments (DPIAs), accessibility requirements for educational content, and adherence to universal design frameworks (Burgstahler, 2021). All are, to some degree, closed loops supporting openings within institutions. All, to some degree, redraw the boundaries of higher education itself as the sector jostles with a new variable that requires open-loop experimentation before settling into a new equilibrium and the closed loops associated with them. Whether any resulting closure is enabling or prohibitive is an interpretative act fundamental to open praxis.

An increased reliance on commercial technologies complicates this process significantly, as discussed. It moves the boundaries of higher education further into the commercial infrastructures and discursive logic of scale, efficiencies, and quality (Hall, 2013). It stimulates activity that measures the activity designed around this logic, particularly in regard to the overall platformization and datafication of the sector. Closures abound, political autonomy is ceded, and boundaries are redrawn, particularly as the sector becomes more entwined in these commercial technologies. Through a systemic view of open education, commercial technologies can be seen to compromise the opening of universities, the enactment of sector-held values, particularly around social justice, inclusion, equity, and the university as a common good. They inexorably draw the sector into a particular discursive logic that creates its own closed loops. When mediated through the sector-held values of equity, social justice, and inclusion, they introduce a cruel optimism that projects these values onto a socio-technical mediator (Macgilchrist, 2019) such as a commercial technology to enact them. Indeed, this projection onto commercial technologies is its own closed loop: it becomes self-referential and self-fortifying with each successive application. It becomes harder to disentangle, for example, efforts to frame equitable access to higher education without engaging with data-driven approaches suggested by the commercial discursive logic of technological systems. This is a prohibitive closure and is just one example of many.

Open praxis therefore becomes involved in the transformation of these commercial closed loops. This might involve, in its most overt form, a move toward free and open-source software (FOSS); decentralized, federated social network technologies; attempts to ensure data autonomy; open data repositories; open textbook initiatives; and the overall capacity for collaborating on and managing these moves within the sector itself. Indeed, much research has explicitly linked open education in the sector to FOSS and open technological infrastructures (Smith & Seward, 2017), contrasting this with the often prohibitive impact massive open online courses had on open education itself (Wiley, 2015). FOSS initiatives within the sector abound, and no recitation here would do the breadth of these approaches justice. Other examples include the aforementioned open access publishing systems. However, we note the necessity of having autonomy at the regional or national levels to define open education locally and work toward that systemically institutionally (Gallagher & Knox, 2019).

However, what is critical to this discussion in this paper is whether these FOSS initiatives, or open access actors, have become closed loops within opening systems, or to put it another way, whether they have become accepted and reinforced practice and policy within universities. This is an enabling closure on which further openings can be built. FOSS is but one facet of open education, but a critical one as it speaks to how education is being structured within universities, and at the boundaries of higher education where engagements with commercial actors naturally impact the constitution of the overall sector and the education taking place there. Viewed systematically, open praxis might provide some insight into how these moves to open technological systems are contested, at times incremental, and unevenly felt across the sector. This is particularly a hallmark of transformational change in closed loop systems such as those found in universities.

A systematic emphasis on open and closed loops is not all encompassing, however. It merely provides a mechanism to avoid the binaries of open and closed, to note how openness ultimately depends on closures, and, hopefully to have “conversations about the deeper, and more political, goals of openness” (Collier, 2021, p. 102) in higher education. It positions universities and the overall sector as dynamic organisms in their own right, ones that naturally seek closures to maintain equilibrium and their own operating conditions. Such a position countenances the statement that “openness is neither neutral, nor natural” (Bayne et al., 2020, p. xii). Openness must be deliberately structured into universities, often through a robust systems analysis, the critical appraisal of different types of closures, whether enabling or prohibitive, and then through the systematic efforts at making those enabling closures a core aspect of its overall control system.

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