

Learning design ecosystems thinking: defying the linear imperative and designing for higher education at-scale

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Abstract

Purpose – The purpose of this article is to posit an alternative learning design approach to the technology-led magnification and multiplication of learning and to the linearity of curricular design approaches such as a constructive alignment. Learning design ecosystem thinking creates complex and interactive networks of activity that engage the widest span of the community in addressing critical pedagogical challenges. They identify the pinch-points where negative engagements become structured into the student experience and design pathways for students to navigate their way through the uncertainty and transitions of higher education at-scale.

Design/methodology/approach – It is a conceptual paper drawing on a deep and critical engagement of literature, a reflexive approach to the dominant paradigms and informed by practice.

Findings – Learning design ecosystems create spaces within at-scale education for deep learning to occur. They are not easy to design or maintain. They are epistemically and pedagogically complex, especially when deployed within the structures of an institution. As Gough (2013) argues, complexity reduction should not be the sole purpose of designing an educational experience and the transitional journey into and through complexity that students studying in these ecosystems take can engender them with resonant, deeply human and transdisciplinary graduate capabilities that will shape their career journey.

Research limitations/implications – The paper is theoretical in nature (although underpinned by rigorous evaluation of practice). There are limitations in scope in part defined by the amorphous definitions of scale. It is also limited to the contexts of higher education although it is not bound to them.

Originality/value – This paper challenges the dialectic that argues for a complexity reduction in higher education and posits the benefits of complexity, connection and transition in the design and delivery of education at-scale.

Keywords Learning design, Curriculum design, Student experience, Constructive alignment, Education at-scale, Higher education pedagogy

Paper type Conceptual paper

Introduction

The design and delivery of effective and resonant educational experiences *at-scale* presents significant challenges for both academic practitioners and their higher education institutions (Fulcher and Prendergast, 2023; Kagan and Diamond, 2019; Ryan *et al.*, 2021). These challenges are both economic, where the costs of magnifying and multiplying education offerings in marketised universities needs to be matched and exceeded by the revenue generated by the programs (Dhanani and Baylis, 2023; Holmwood and Marcuello Servos, 2019) and pedagogical, requiring strategies that ensure the quality of the teaching and learning does not fade with repetition, resort to the scalability of didacticism or lose students

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in a sea of faces (Li *et al.*, 2021; Oliver, 2021). It is predicated on the efficacy of instructivist standards such as the replicability of the educational design in multiple forms and contexts and an equalness of experience for all the learners in the cohort (Blodgett and Madaio, 2021; Li *et al.*, 2021; Ryan *et al.*, 2021).

Scale is one of these academic terms that have lost much of its meaning through overuse in literature and through the over-application of the term as a differentiator from personalised, boutique or elite education, especially in university marketing materials. There is little objective codification or agreement in the literature or practice of the term “scale” with regards higher education, leaving it an intrinsically vague and abstract concept. It has been deployed across multiple contexts and reasoned arguments to variously represent complexity, diversity, opportunity, growth, neo-liberalism and the malaise of the modern higher education institution (see, e.g. Börjesson and Dalberg, 2021; Hemsley-Brown and Oplatka, 2010; Holmwood and Marcuello Servos, 2019; Laurillard and Kennedy, 2017).

The realities of education at-scale have been greeted by the higher education institutions and practitioners alike with varying degrees of hysteria, fear, zealotism, loyalty and acceptance (Baer, 1998; Daniel, 2012; Davidson, 2014; Harden, 2012; Jackson *et al.*, 2011). The significant increase in staff to student ratios over the last decade (especially prevalent in business schools) and the perception that larger class sizes are cognate with reduced academic staffing and increased expectations of service quality have resulted in teaching staff problematising scale and describing the experience of teaching at-scale in overly negative terms (Alajoutsijärvi *et al.*, 2021; Hubbard *et al.*, 2020; Prosser and Trigwell, 2014). Hornsby and Osman (2014) argue that as the class sizes grow, higher order cognitive skills, such as problem solving, critical thinking and affective learning become harder for learners to develop. Scale becomes a byword for a mode of surface learning, where memorisation and repetition replace deeper engagement and the criticality of skills in creativity, innovation or invention. To some degree, in both the context of the drivers of scale and its educational manifestations, the educational capital of students is deployed away from idealistic assertions of transformation and lifelong learning and towards consumerist, transactional exchanges rooted in the privileging of consumer choice, satisfaction and brand loyalty (Corrall, 2022; Vásquez *et al.*, 2017).

Higher education is rarely agnostic of scale. The realities of education at-scale create institutional fractures around the academic staff recruitment, the over-reliance on casual labour, the efficacy of student satisfaction metrics and rankings and the public relations challenges of overcrowding (often represented by media photographs of students sitting in the aisles of lecture theatres) (Bettinger and Long, 2018; Bound and Turner, 2007; Davis *et al.*, 2018; Reiling, 2016). It contributes both explicitly and implicitly to the perceptions of students as consumers and to the transactional framing of higher education (Banwait, 2021; Bryant, 2023a; Maringe and Sing, 2014). Many of these fractures have been superficially ameliorated by the deployment of technology to enable the affordances that arise from the reproduction of education with little or no decay to large audiences (Ryan *et al.*, 2021), the financial benefits of economies of scale in the delivery and assessment of higher education (Butler *et al.*, 2017) and the effective leveraging of scarce space on campuses (Fisher and Newton, 2014).

At a teaching and learning design level, technology acts as a magnifier and multiplier of content, voice and validation. For example, technology magnifies lecture content to ever-larger audiences both in a lecture theatre and online through lecture recordings (Davis *et al.*, 2018; Huber *et al.*, 2023; Jandrić *et al.*, 2022). Technology supports how education can be multiplied, offering hybrid models of engagement in smaller teacher contexts such as tutorials, decoupling participation from interactivity and enabling large-scale assessment and feedback (Guilding *et al.*, 2018). These technology-led practices are not without their limits as the capabilities and limitations of spaces on campus (architecturally, institutionally and pedagogically) have to some degree-bound ambitions for scale and created diseconomies

of scale that negatively affect the student learning experience at-scale (for example, lecture spill-over rooms and remote AI proctoring of exams) (Carnell, 2017; Cook *et al.*, 2023; Marano *et al.*, 2023).

Designing an at-scale higher education

There are no absolutes in higher education, in part because teaching and learning are complex human processes of sociality, experientiality, psychology and being. Larger class sizes are not always a lesser experience for students or for learning gain. Smaller cohort sizes do not always support a more effective leveraging of networks and connections for learning. There are significant pedagogical benefits created by students being in large cohorts that include harnessing the processing power and collective intelligence that is catalysed by immersing yourself in the noise and chaos of a large group (Allais, 2014) and the epistemic benefits from listening and reflecting in large-group teaching situations such as lectures (Abedin *et al.*, 2009). To define education at-scale as a function of numbers in a room or by student revenue growth diminishes the capabilities of scale to transform the educational experience and the learning outcomes for students in at-scale programs. The opportunity of education at-scale is not inherent in defining it or managing (coping) with its impacts on students and staff, but how institutions and academics design *for* it. The design of an at-scale educational experience must recognise and integrate the capacity and capabilities of the crowd.

When designing education at-scale, the technological interventions, the curricular complexity and the structural institutional limitations privilege the linear effectiveness of design patterns like constructive alignment (Biggs, 1996). The valorisation of constructive alignment in higher education is in part because of its effectiveness in reducing complexity (Berthoud *et al.*, 2021; Gough, 2013). Gough argues that constructive alignment disenables agency and trenches instrumentality to curriculum that:

... will function as a tool for perpetuating established norms and rules, a plan or path that leads, pushes or coaxes learners in one particular direction – with no choice. It usually implies that achieving specified intended learning outcomes (often couched in terms of acquiring some ideal representational knowledge) will produce an ideal kind of person who can contribute to an ideal kind of society – and will usually produce ideological clashes over whose ideas of a ‘good’ society are best. (p.1123), (p. 1223)

The capacities of the crowd get lost when deployed in this mode of systematic structuralism. Constructive alignment maps a journey, from point A to B. The processes of magnification and multiplication discussed earlier simply replicate that journey across spaces, platforms and programs. Their pedagogical effectiveness relies on the rigor and integrity of the structure inherent in the alignment of the process and practice. Approaches like constructive alignment focus more closely on the structure and not on the human process of learning and the development of capability that start, journey and finish at different states of identifying, certainty and canniness. Scale is a complex ecosystem of multipliers and influences that define how it is experienced and the impact it has on the design of teaching and learning. Education at-scale can change the social experience and materiality of learning, relocating it to learning spaces inside and outside the campus, where self-directed learning and the intersections of life, work, play and learning reside (Bryant, 2019, 2023b).

The ways in which we structure curriculum design ontologies to be nested around teaching and learning practice, assessment frameworks and learning outcomes imbues scale with a sense of simplistic forward momentum and the effort required to deliver is emboldened by the alignments and linkages between the ontologies and practices used. It also de-agencies students and staff from transitioning through the learning experience emboldened and

challenged by their own unique combination of networks, experiences, emotions and knowledges. As [Alaimo \(2010\)](#) asserts (in the context of nature study);

... the evacuation of agency from nature underwrites the transformation of the world into a passive repository of resources for human use. Alternative conceptions which accentuate the lively, active, emergent, agential aspects of nature foster ethical/ epistemological stances that generate concern, care, wonder, respect, caution (or precaution), epistemological humility, kinship, difference, and deviance. (p.143)

The challenge for learning designers is to discover and design for the paths *of* resistance, the capabilities of agency and the networks of complexity within education at-scale. Scale is not homogenous and cannot be leveraged for learning benefit by relying on curricular and educational uniformity and linearity. We can understand what constitutes education at-scale, we can interrogate how it affects staff and students and we can design ecosystems to manage the burdens it can create. We can also embrace scale when faced with its challenges. The scale genie is out of the bottle, the massification of cohorts, curriculum complexity and program/ and mode proliferation are not going away ([Czerniewicz et al., 2023](#)). The increasing budgetary pressures on higher education institutions as they pivot away from government funding and towards more commercial, market driven revenue models will continue to put pressure on some programs to grow and be revenue positive, necessitating the need to “scale-up” (see [Dhanani and Baylis, 2023](#); [Goodman et al., 2023](#)). Education at-scale is the reality for many students as they enter and transition through their higher education experience. It is the responsibility of learning designers to ensure that those experiences deliver the transformative or even transactional outcomes that learners and their institutions expect.

An ecosystem thinking approach for at-scale educational learning design

Design matters in the context of education at-scale because design makes changes and adapts practices in purposeful and critical ways. Design is built on the application of knowing and doing to the development of multiple solutions for difficult and complex challenges. The acts of knowledge acquisition and creation are more than linear journeys through constructively aligned teaching, learning and assessment activities existing only to gain the next step on the credentialing ladder. Even before the pandemic, learning had broken out from the four walls of the academy and into the spaces, technologies and sociality of the students and their wider networks. The experiences and networks of students in their life, play and work create opportunities for authentic learning and organic connection making that both support their objectives within their degree but create resonant and complex forms of learning that extend beyond it.

It is in these intersecting epistemological Venn spaces that different understandings of authority, expertise and authenticity emerge, challenging the orthodoxies of the academy. Learning at-scale intersects personal, professional and educational lived experiences in complex, messy, inter-connected and personally defined and managed ways ([Osborne et al., 2021](#)). Learning inhabits conversations, reflections, casual and fleeting connections, ambitions and expectations that are not always located in the classroom or even on campus ([Cox and Orehovec, 2007](#); [Nye, 2015](#)). The affordances, designs and locations of education at-scale are challenged by the liminality within the Venn spaces of work, life, play and learning. [Lefebvre \(1991\)](#) notes that users often experience the spaces they inhabit passively, with their affordances imposed on them, as opposed to a designer of space who exerts agency over how a space should be used and represented. The efficacy of connection and the embodied experiences are defined by the density and complexity within the curricular space created for learners, the situated context and the ways the individual and groups are expected to behave by the designer ([Blasco, 2016](#); [Boddington and Boys, 2011](#)).

Connections are not made *for* students by the teacher or by the needs of the curriculum framework or assessment instruments. Connections are at their best when the environment and the people allow for connections to evolve, to find their own value, equilibrium and purpose. Connections are learning experiences, acting as the connective tissue and sinew of adult education, weaving in-between gaps in knowledge and skills, integrating the problems, scenarios, applications and schemas in the learner's brain through the thematic links within and between disciplines (Knowles, 1970). Learners and academics teaching at-scale need multiple spaces to enter into the complex ecosystems of connection and context and then once there, find multiple (un) safe spaces to land, reflect and collaborate. Ecosystem thinking has evolved from the ecological definitions of an ecosystem to emerge as a '... new way of conceptualising human relations, economic development, different forms of collaboration and changing notions of civil society (Hodgson and Spours, 2016, p. 20). Adner (2006) argues that ecosystem thinking expands learners (the actor) beyond their limits and supports innovation and collaboration with others. The extension of learners beyond their limits runs counter to the assurance of learning and structuralism within approaches like constructive alignment. Markkuola *et al.* (2013) assert that:

... an effective (ecosystem thinking) learning environment incorporates operative methods that elicit new insights and stimulate individuals to exceed their own limits. Typically, coincidental encounters and interactive processes fostering surprising innovative angles elicit curiosity and inspiration. A successful learning environment is characterized by myriad events that could be described as creative tension. (p.6)

The ecosystem thinking approach to the designing of education at-scale embraces the complexity of the experiences and traits that influence how people engage in learning. Learning design ecosystems are complex and interactive networks of activity designed to engage the widest span of the community in addressing critical pedagogical challenges. The learning design and the connections it creates and supports moves learning away from singular, linear journeys (where the fear of failure or the expectation of reward can drive momentum) towards more complex representations of the intersections impacting and shaping the lives of students and staff. Learning design ecosystems recognise that students can use and apply knowledge and skills they have gained from across their education, from their work and life experiences and from their networks and communities to describe and share the liminality of their lives, to both navigate and lead others through rites of passage, to understand and solve critical challenges and to make a difference to their societies, cultures and communities.

Learning design ecosystems embrace the complexity of learning by supporting multiple pathways and paces through the learning experience. They recognise that all the inputs (experience, skills and knowledge) and outputs (destinations, satisfaction and transformations) are not equal, and that each unique combination, mixed with a unique experience of learning, teaching and assessment, results in something individual, not standardised and metricised. Learning design ecosystems are essentially transdisciplinary, in which they look at the understanding of the "present world" and privilege the unity of knowledge to address critical educational and life-wide challenges. To that degree, they need to be connected, ensuring that the actors who engage with the design ecosystem leverage and benefit from the connections made through learning to do more than memorise and recite, but affect and interrogate how they engage in change, crisis and innovation.

Conclusion

The pedagogical and transformational capabilities of higher education have been deeply disrupted, frayed at the edges and pulled in counter-productive directions by government policy, the industry demands for skills and the competitiveness of the global market.

Education at-scale is a manifestation of that disruption, challenging the efficacy of everything from systems to teaching practices to space. The design of education at-scale is undermined, challenged and sometimes crashes under the weight of the fractures and pressures exerted upon it. Learning design ecosystems support learning designers in developing and delivering teaching and learning that can be *experienced* by students and help to ensure that education is lasting, transformative, flexible and inspiring. The challenge for learning designers is to develop learning and teaching experiences that “accentuate the lively, active, emergent, agential aspects” of education (Alaimo, 2010). An effective learning design ecosystem identifies the pinch-points, where negative engagements become structured into the student experience and design pathways for students to navigate their way through the uncertainty and transitions of higher education. They enable creativity, authenticity and inspiration through the necessary systems of assessment, accreditation and certification by giving students an agency of where and how they engage, reside and transition through the ecosystem. This agency is neither absolute and nor is it exclusively personalised. It is connected with their cohorts, their communities, their discipline areas, their academic staff and their own lived and living experiences. Brown (2001) observed that:

... it's through participation in communities that deep learning occurs. People don't learn to become physicists by memorizing formulas; rather it's the implicit practices that matter most. Indeed, knowing only the explicit, mouthing the formulas, is exactly what gives an outsider away. Insiders know more. By coming to inhabit the relevant community, they get to know not just the “standard” answers, but the real questions, sensibilities, and aesthetics, and why they matter. (p.68)

Deep learning builds on the ecosystems of experiences, relationships, linkages, emotions, knowledges and practices we engage in every day. Connections are not bi-directional or even networked; they are constantly intersecting, and the skills acquired in navigating and leveraging those intersections are critical. Learning design ecosystems create spaces within at-scale education for deep learning to occur. They are not easy to design or maintain. They are epistemically and pedagogically complex, especially when deployed within the structures of an institution. As Gough (2013) argues, complexity reduction should not be the sole purpose of designing an educational experience, and the transitional journey into and through complexity that students studying in these ecosystems take can engender them with resonant, deeply human and transdisciplinary graduate capabilities that will shape their career journey.

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