Balancing on the “edge of chaos”: Teaching complexity during a global pandemic

Dr. Pam Joseph, University of Sydney, Australia

Abstract

The global Covid-19 pandemic’s emergence over the first months of 2020 led to a rapid, unexpected transition from on-campus to remote online learning for many Higher Education educators and students. In this article, I reflect on my experience of teaching throughout this time, framed through the lens of complexity theory. The article focuses on three theoretical concepts (uncertainty, interconnectedness, and co-evolution), illustrating their relevance to the context, content and process of teaching and learning throughout this semester. It recommends that the experiences of 2020 be used to shape a more flexible and just approach to future social work education in both online and on-campus formats, proposing that complexity theory offers an alternative to both order and chaos, in which a level of continuous change is not only acknowledged, but can be welcomed.

Key words

Complexity, uncertainty, interconnectedness, co-evolution, education, pandemic

Introduction

In February 2020, as I completed my final preparations for the new academic year, Sydney was surrounded by fire and its inhabitants were feeling the impact of weeks of sustained poor air quality. Murmurs were beginning about a novel coronavirus emerging in China, a particular concern for educators with international students in our classes. Factored into our routine preparations was outreach to international students and others who might be overseas, checking on their wellbeing and hoping to identify and respond to possible risks to their smooth transition into the new semester.

By the middle of March, we found ourselves facing a rapid, unexpected transition to online teaching, in response to the escalating global pandemic, which came hard on the heels of a summer that had left many staff and students exhausted and, sometimes, deeply traumatised. In the space of two weeks, faculty and students pivoted (a word we were to hear often) from initial on-campus classes to a teaching and learning environment that was completely online, learning new skills, new technologies, and new ways of relating to each other as we embarked on a journey that none of us had prepared for.

In this article, I frame my experiences of teaching and learning during this time through complexity theory's concepts of uncertainty, interconnectedness, and co-evolution (Byrne, 1998; Bartollas, 2014; Cilliers, 1998; McDaniel, Jordan & Fleeman, 2003; Pycroft, 2014). Complexity theory provides an organised conceptual framework for reflection on social work experiences (Payne, 2014), accommodating the multidimensional nature of lived experience over time.

My use of the term *teaching complexity* in the article's title is intentionally ambiguous; it refers to the experience of teaching the topic of complexity theory in the midst of extraordinary change, and also considers the complexity of that teaching (and learning) itself. This experience felt very much like a maintaining a delicate balance between order and chaos, described as the point at which "the components of a system never quite lock into place, and yet never quite dissolve into turbulence, either" (Waldrop, 1992, p. 12).

The article commences with an overview of complexity theory, followed by a description of the role of three of its key concepts in the context, content and process of teaching and learning through the first semester of the global Covid-19 pandemic, illustrated through a second-year

Bachelor of Social Work (BSW) unit of study that focuses on theories of human development. It suggests that in contrast to seeking either a return to business as usual or finding a new normal, complexity theory presents the possibility of a third option. In this option, the learnings of 2020 might be used to develop an increasingly flexible, inclusive and just approach to social work education - one that embraces a level of sustainable change as a potential source of energy and innovation.

The interpretations offered in this paper are grounded in my own direct experience and represent only one of many different perspectives on this teachable moment in history. This position is itself consistent with one of complexity theory's principles: that no part of a complex adaptive system is considered to be fully cognisant of the whole, its parts, and their interactions (Cilliers, 1998).

An overview of complexity theory

Complexity theory's contribution to social work and human services is still developing, although its place as a "third wave" system theory builds on a well-established foundation of two earlier iterations of systems theory: general and ecological systems theory (Healy, 2014; Payne, 2014). While these earlier approaches had their roots largely in the biological sciences, exemplified in the work of Bronfenbrenner (1979), complexity theory is also influenced by mathematics and the exploration of chaos (Pycroft, 2014).

Complexity theory has been applied across diverse disciplines. Kauffman (1995) drew on mathematics, biology, computer science and business management to posit that, in the face of challenge, highly ordered organisations become "frozen" and highly chaotic organisations are too volatile to maintain peak performance, but those at the "edge of chaos" experience high but achievable peaks, with optimal "fitness" (Kauffman,1995, p.81).

While Kauffman and the Sante Fe Institute in New Mexico maintained close links with these origins, Byrne (1998) developed complexity theory's applications to the social sciences, bringing together both quantitative and qualitative exploration and emphasising the importance not only of contemplation but of action, and particularly of action for purposes of social change. His stated intention was to apply complexity theory as a "socially located and contextual" approach, "connected with the real, with the way the world works" (1998, pp. 94-95).

Complex systems, by definition, consist of very large numbers of components. The interactions of components and subsystems within the whole are characteristically rich, dynamic, non-linear, influenced by historical factors, and usually occur between components in close proximity to each other. System boundaries are open, or permeable, and feedback loops exist within the system and subsystems. Importantly, disequilibrium is viewed as a vital source of energy and creativity, rather than a challenge to be addressed (Cilliers, 1998; Pycroft, 2014).

Complexity theory is, arguably, a natural fit for social work practice, which inevitably involves ambiguity and uncertainty (Stalker, 2003). It is crucial that social work students learn to navigate such challenges if they are to be both ethical and effective in their future practice. Reflexivity is central to this; exploring the complexity of systems allows for attention to be paid to interactions within systems, the ways in which practice problems are constructed, and collaboration across disciplinary difference (McDermott, 2014; Pycroft & Wolf-Branigin, 2016). By taking into consideration a system's history, a range of possible futures can be imagined, leading to action in order to address social inequality (Byrne, 1998).

Moreover, it is a theory that sits comfortably with social work education, particularly as the profession transforms from its historical roots into an uncertain future. In contrast to traditional modernist pedagogies, "a complexity-oriented learning approach extends beyond hierarchical, reductionist and behaviourist notions of learning" (Jess, Atencio & Thorburn, 2011, p.179). While that statement was made in the context of physical education in Scotland, it could arguably be applied also to social work and human services education, which has historically been closely aligned with social administration (Byrne, 1998). It is also particularly relevant to teaching theories of human development, which have a strong tradition of Western scientific scholarship in fields such as psychology, biology and medicine (Parrish, 2014).

The unprecedented worldwide crisis in 2020, which closed down almost all international travel, limited people's freedom of movement and brought far-reaching economic impacts, presents an opportunity to explore complexity theory's relevance to social work education during this year, and how that knowledge might assist in shaping the future.

Human development in context: Teaching and learning

The experience of teaching a second-year Bachelor of Social Work (BSW) unit of study exemplifies aspects of my wider experiences throughout a tumultuous semester. The unit was a core requirement for the BSW and combined Bachelor Social Work/Bachelor of Arts, although it was also available as an elective for students in other courses. It comprised one two-hour lecture and one one-hour tutorial per week, over 12 weeks from late February to early May. The first three weeks of semester were taught on campus, before turning to off-campus learning in March.

The unit aimed to introduce students to traditional and alternative theories of development, and key debates relating to the use of these theories in practice, in both social work and other disciplines. Students were asked to consider, "How can we make space for understanding diverse life trajectories, rather than holding on to a 'one size fits all' explanation? Whose voices are missing, who holds power and in what way, and how can we use our own understanding of development to work towards a socially just world?" (University of Sydney, 2020).

Complexity theory is not taught as a discrete theory for social work until the third year of the BSW, however aspects appear explicitly and implicitly throughout the second-year unit. For example, a lecture on eco-social work locates individuals' development within their intersecting local, global and historical contexts. Similarly, complexity principles are incorporated when guiding students in their critiques of the uses and limitations of traditional linear models.

This article focuses on three central concepts from complexity theory: uncertainty, interconnectedness and co-evolution. These concepts illustrate resonance between complexity theory and my experience of teaching (and learning) through this first semester of the global pandemic.

Uncertainty

The concept of uncertainty in complexity theory, as it applies to social systems, can be traced back to the early 20th Century and the work of physicist Werner Eisenberg (Bartollas, 2014). Eisenberg argued that it was impossible to have full and precise knowledge of the position and momentum of all properties of a system at a single point in time, affecting the ability to predict future behaviour and determine causality. A parallel can be readily recognised in social

systems, where the histories, characteristics and subjectivities of sub-systems and their component parts (individuals within student cohorts, faculty, and program areas, for example) interact with multiple others (Byrne, 1998; Pycroft, 2014).

As the global pandemic unfolded, the challenges of rapid change to teaching and learning modes were exacerbated by the combination of a lack of previous preparation, and an absence of knowledge about how long the situation would continue (and what would come next). As a result, preparation for the future was similarly uncertain. International travel bans meant that students were geographically dispersed. This was not a unique or unprecedented situation; many institutions are familiar with, and skilled in, remote learning methods. However, neither my students nor I had intended to work this way. In fact, my discussions with students indicated that the provision of on-campus rather than remote learning had been an important factor for some in their choice of institution.

The level of unpredictability that complexity theory would expect of such a situation (Pycroft, 2014) was heightened by the novel nature of the coronavirus. As a result, the transition to off-campus learning took place without knowing whether the new approaches would be in place for the short or long term, and whether things would then go back to business as usual or settle into an undefined "new normal".

In addition to this temporal uncertainty the move represented uncertainty of place, as private living spaces became quasi-public workspaces (we learned a lot about each other's homes, pets, and sometimes households), and plans for a return to campus remained far from clear.

The uncertainty that we were experiencing occurred within a greater sense of crisis. Not only was there a permeating sense of anxiety about the immediate impacts on learning, health, and wellbeing, but the longer-term economic consequences for the higher education sector were also unknown (Green, Anderson, Tait, & Tran, 2020). This had a direct influence on how faculty approached our work: maintaining effective learning and engagement for students was important in its own right, but also linked to the economic health of the university and, beyond that, of the sector (Green et al., 2020).

In responding to the changing context, the content of many individual units of study was similarly uncertain, requiring navigation through dilemmas around synchronous and asynchronous delivery, and redesigning class activities and assessment tasks. Some material was reduced or removed, in acknowledgement of students' circumstances, but there were also

new opportunities to bring our course content to life. In a class about social work responses to diverse family systems, for example, I commonly use the familiar example of butterfly wings and hurricanes, illustrating the notion of scale of effect. Instead, our 2020 reinterpretation considered the proposition that a new virus within a single wild animal in regional China might have dramatically altered the toilet-paper purchasing habits of large numbers of people in our local communities.

Changes to the *context* and *content* of units necessitated new approaches to the *process* of teaching and learning. Untried technologies suddenly became integral aspects of our program. We tried out new software, listened to feedback, observed levels of student engagement, and refined our methods. With each new attempt, we worried about the consequences for students, and also for ourselves, of suggesting additional changes to processes that had not yet become established themselves.

In the face of the crisis confronting many students, staff, and the wider university, the importance of processes that fostered connection and relationship came to the fore. Boundaries around work hours blurred, or melted away entirely, in order to support fearful and distressed students, often isolated socially and geographically, who could not wait until business hours for responses to their concerns.

Interconnectedness

The interconnection and interactivity between components of a complex system is another central tenet of complexity theory (Cilliers, 1998; Pycroft, 2014). The concept of feedback within systems had become well established in earlier iterations of systems theory: system outputs were understood to influence their environments which, in turn, shaped further inputs (Payne, 2014). Complexity theory offered a rich understanding of the multiplicity of these connections (Healy, 2014).

In pedagogies based on notions of complexity, collaboration occurs both within and across the many levels of education systems, so that "learning emerges through the relationships that develop between these constituent 'elements', which are themselves considered shifting, dynamic and diverse" (Jess et al., p.180). Moving into the off-campus mode with a mutual lack of preparation required us to embody established adult learning approaches (Knowles, Holton, & Swanson, 2016) in new and changing ways, re-shaping our practices and expectations of

each other in response to emerging awareness of the ways that individual circumstances could influence shared learning.

Interconnectedness was also illustrated in the unit's content. The pandemic, coming on top of the summer of sustained bushfires, presented an opportunity to consider complexity theory as a framework with which to begin to make meaning from these cumulative crises, and their impact on both individual development and social inequality. Students contributed from their personal experiences. For example, some of the students had become their family's primary wage earner due to pandemic-related parental unemployment, challenging the notions of linear staged development that underpinned some of the traditional theories in the curriculum. As we considered what these experiences meant for disrupted family structures and roles, the relevance of complexity theory to understanding human development became starkly apparent.

Co-evolution

Co-evolution refers to the way system elements, and the system itself, change over a period of time (McDaniel et al., 2003). Co-evolution is intertwined with uncertainty and interconnectedness: as elements and systems try to adapt to unexpected changes, one or more components elsewhere in the system experience consequences that can be disproportionate and difficult to predict. Conceptually, it can be argued that co-evolution goes beyond adaptation as, rather than being a limited response to a given stimulus, it implies learning (Health Foundation, 2010). This is an important distinction when considering complex systems, as it suggests that co-evolution can provide a foundation for collaborative creativity.

Co-evolution is neither linear nor binary (McDaniel et al., 2003); in contrast to simple cause-and-effect logics, consequences "are determined not by single causes but by multiple causes, and these causes may, and usually do, interact in a non-additive fashion…the combined effect is not necessarily the sum of the separate effects" (Byrne, 1998, p.16). A brief exploration of the ways my teaching evolved over the course of the semester, together with changes in the teaching environment, gives an indication of the co-evolution within the larger system.

The first week of the teaching semester involved a face-to-face lecture in a typical lecture theatre, allowing me to pick up visual cues that might indicate students' academic and interpersonal engagement, and adapting my material accordingly. There was space for some ad hoc individual contact before students headed off to their tutorial groups.

Within a month, we no longer met on campus, and my teaching methods had to evolve rapidly in response. I learned to pre-record my lectures, and gradually developed a workable timeframe for uploading these. In response to feedback from students and university leadership, as well as in discussion with colleagues, my colleagues and I made concerted efforts to find new and flexible ways to engage and support both students and each other. These changes were not only externally-driven; the level of unpredictability broke down some constraints and opened up opportunities to be creative in ways that I was keen to explore.

Meanwhile, the nested subsystems (Byrne, 1998; Jess et al., 2011) of school, faculty and institution were also evolving in response to feedback from a diverse range of sources within and beyond their borders. Online drop-in information-sharing sessions became a fixture of the weekly calendar. Approaches to student attendance and assessment had to be reconsidered and reconfigured, and as restrictions on international travel solidified, it became apparent that rapid innovations would be required in order to enable off-shore students to access learning materials. This in turn required international negotiations at a high level, as we commonly used platforms that were inaccessible in parts of the world. At stake, arguably, was the both the education of this cohort of students, and the sustainability of the higher education sector (Blackmore, 2020; Green et al., 2020).

Discussion

My experiences support the analysis of Jess et al. (2011) about the use of complexity principles to underpin pedagogy in a Scottish school system, in the reminder that "learning is a collaborative endeavour, reflecting the complex interactions *within* the different groups…and also *across* the different 'nested' levels of this system", in a wider context of "dynamic, unpredictable and multi-faceted complex systems" (p.180, italics in original).

As I reflected on the experience of teaching undergraduate students about human development, four key learnings emerged that carry implications for future social work education. These relate to the role of power in complex systems, particularly in times of uncertainty; the importance of relationship at every level within, between and beyond parts of the system; the importance of non-linearity; and the possibility of a third path into the future that involves neither returning to a familiar "normal" nor arriving at a new one.

Power and complexity

The move to off-campus learning, in response to the pandemic, added impetus to existing practices that sought to equalise power dynamics with the classroom, such as the use of "flipped" classrooms (Ahmed & Indurkhya, 2020). Power imbalances between faculty and students were, to some extent, further disrupted by the equalising move to conference platforms. Each person had an equal space on the screen, and approximately equal proximity to others in the virtual classroom. Accessibility was also enhanced, through such tools as closed captions and the avoidance of physical features of the on-campus classroom, or movement between sites, that presented hurdles to inclusion.

However, the online environment allowed other inequalities to emerge. It was clear that access to reliable internet, lack of distractions, privacy from family and housemates, and even physical safety, constrained some students' classroom participation. More subtly, socio-economic inequality became apparent in a way that was less evident in the classroom, through the visibility and background sounds of home environments. These inequalities drew together physical, emotional and social aspects of students (and teachers') lives in an illustration of complex interactions between systems and subsystems. Attention to such inequalities emerged as a central feature in designing future socially just learning communities.

Atwell and Savit (2016) propose that the co-evolution of complex systems may actively introduce and support inequality. They describe the emergence of an "in-group" and an "out-group" as a system and its components adapt over time. As the in-group develops greater influence on the system and can exert its preferences, the onus falls on the out-group to continue to adapt. Atwell and Savit acknowledge that their modelling does not account for the full range of external factors that contribute to the system's context, but their ideas present an interesting aspect for consideration in the development of future teaching and learning strategies from the current context of the global pandemic.

Systems theories have been criticised for their silence on the impact of power within systems, presenting an explanatory rather than critical perspective (Walby, 2007). Atwell and Savit's (2016) finding, if applied to social systems, suggests the importance of adding a critical component to complexity theory, to address the perceived gap in established approaches. Such a theoretical perspective would arguably provide some predictive insight into the future

directions of teaching and learning modes, offering a framework for analysis of evolving power relationships and an increasingly equitable pedagogy in the face of ongoing uncertainty.

The importance of relationship

The shift from physical to virtual classrooms led to a process of discovery about each other's strengths and limitations. Some people, both students and staff, relished the flexibility afforded by asynchronous learning, which allowed control over schedules to accommodate work and family commitments. For some, the shift to the online mode increased accessibility. Others reported difficulty in finding motivation and structuring their time. The shift to off-campus learning also represented a loss of ad hoc social connections with peers, technical challenges such as limited internet capacity, and sometimes the lack of a convenient or even safe place in which to participate in class activities.

One of complexity theory's most promising contributions to an equitable and just pedagogy is that "in an unknowable future, the essence of complexity is to raise questions rather than to provide answers" (Morrison, 2008, p.23). This position does not preclude the use of other perspectives in order to respond to those questions, but it does open up a space in which learning can be creative, collaborative, reciprocal, and relationship-based. While formally positioned as "teacher" in the unit of study, I was also explicitly enacting andragogical principles (Knowles et al., 2016), learning from students about their own experiences, perspectives, and ideas of what might or might not help them to learn.

The response to the pandemic led to the introduction of new ways of interacting as we renegotiated the complexities from a shared position of not-knowing, and established boundaries became more fluid as students disclosed issues around their physical, mental and social wellbeing.

Teaching through the pandemic has clarified my perspective on the place of nurture in many of my professional relationships, and specifically with students. In the past, this has been an area of ambiguity for me, and I suspect also for other social work educators and students themselves, as we navigated the boundaries between the roles of educator and counsellor. Reflection on uncertainty, interconnectedness and co-evolution has brought me to a position that values educational praxis that is based more firmly on empathy (Demetriou, 2018; Grove O'Grady, 2020). Given the principles of adult learning (Knowles et al., 2016), it also justifies

a degree of reciprocal acknowledgement of the pressures and constraints facing social work educators as we share the journey's challenges.

Non-linearity

A primary goal of the unit is to develop students' critical understanding of a range of traditional theoretical frameworks. These theories are generally based on modernist assumptions of staged development, with linear and individualist models founded in Western academic disciplines including biology and psychology (Parrish, 2014). The intention is not to discount the usefulness of such approaches, but to encourage students to extend their understanding beyond decontextualised and individualised approaches, and to consider alternative discourses, including First Nations knowledges and practices (Kruske, Belton, Wardaguga, & Narjic, 2012). In particular, the unit draws on life-course approaches to diversity (Hutchison, 2019), contesting conceptualisations that understand difference largely in terms of abnormality, deviance, failure to achieve, or location "outside the mainstream".

The combination of a preceding summer of extreme heat and bushfire disaster, a student climate strike, the unfolding global nature of the pandemic, and the direct impacts of the resulting changes, created a "teachable moment", an unplanned but extremely valuable opportunity to link the planned academic content with current events as they transpired.

There are many points of conceptual resonance between complexity and life-course theory (Hutchison, 2019), an approach taught in this unit as an alternative to traditional positivist models: uncertainty, ambiguity and unpredictability; historical and chronological connections; a holistic approach to individuals and their environments; location of diversity within rather than outside the realm of expected human experience; and the crucial importance of context. Bringing together the lenses of life-course and complexity theories in this unit provided an opportunity to illustrate they ways that students might integrate theoretical perspectives in both their current understanding and future practice.

My experience of teaching and learning over the course of the semester progressed in a similarly non-linear fashion as challenges, opportunities and solutions came from multiple directions. While it was no doubt extremely tiring to respond to such a high level of ongoing change, it taught us that there was an energy in our creative approaches and in the sense of

collaboration not only between teachers and students, but also in innovative responses to information-sharing between senior leadership and faculty.

Progress is likely to continue in a non-linear path, influenced by factors that may have a greater or lesser effect on local experience than a linear, progressive logic would predict. Faced with this ongoing level of change, an approach grounded in an understanding of complexity equips social workers to draw on well-established strategies to deal with uncertainty and ambiguity, not as a short-term response to a temporary departure from a perceived normal, but as a usual way of "doing business".

Navigating a new path

The semester was marked by a pervasive sense of disequilibrium; in the absence of any certainty about how long each adaptation would remain in place, the metaphor of balancing on a cliff's edge, over which we might topple into chaos at any moment, felt very appropriate. However, rather than overly problematising this sense, the lens of complexity theory offers a more hopeful interpretation. As Morrison noted, "Systems *need* disequilibrium on order to survive" (2008, p.20, italics in original text). This represents a subtle but important departure from earlier iterations of systems theories, in which dynamic equilibrium was viewed as a goal.

The distinction enables the uncertainty to be framed as energising rather than energy-depleting, however it should not be conflated with "toxic positivity", a term that, while not new (Wright, 2015) gained considerable traction in social media in 2020. It is crucial to acknowledge the influence of factors outside local control, and to anticipate that the scale of their effect may be disproportionate.

Complexity theory has a particular resonance for social work education on the basis of social work's diverse fields of practice. It is an approach that can contribute to practice with children and families (Hassett & Stevens, 2014; Smith, 2019), criminal justice (Wolf-Branigin, 2014), and domestic abuse (Lewis, 2014), among others. It is also transferrable across disciplinary boundaries in social work and human services (McDermott, 2014), as it "stresses the importance of transdisciplinary enquiry and complexity thinking, and an awareness of the interconnectivity of all phenomena, both physical and social. Using this perspective allows us to examine the big picture as it affects the third sector" (Onyx, McLeod, Suhood & Ramzan, 2017, p.40).

Despite the opportunities that this theoretical lens brings to a deepened understanding of the multiple interrelated factors in the first semester of teaching and learning in a global pandemic, it also has some practical limitations for future social work education.

First, the very holism and abstraction of complexity theory has been criticised for the challenges this brings when translated to practice (Fish & Hardy, 2015). My reflection on the semester has, to some extent, supported this position. Although I found the three concepts that I used in this article helpful as a starting point for sense-making, they represent only a portion of the whole. This raises the question of how valid any conclusions might be, given the importance (but also impossibility) of adequately comprehending the parts of a system in the context of their wider whole. On the other hand, I wonder whether this limitation might be weighed against the value of understanding that such knowledge is, in fact, limited. Such a question poses a crucial challenge to practice decisions that are based on simplified but "manageable" tools, such as assessment formats, with potentially significant consequences for people whose complex circumstances are not fully accounted for.

Second, complexity theory, like previous iterations of systems theories, has been criticised for its failure to go beyond the descriptive, and to address the role of power and inequality within social systems (Walby, 2007). In the process of co-evolution, this is an important aspect to consider. If Byrne's assertion that "knowledge has to be of some use" (1998, p. 92) is accepted, then it is inadequate to simply recognise the role that individual students, faculty, the University, and broader policy mechanisms played in re-shaping the provision of higher education across this six-month period.

This awareness needs to be analysed from a more critical position in order to create equitable future change. Complementary use of complexity theory with critical theories and anti-oppressive practices may offer the possibility of both a more effective critique and a clearer way forward, by considering the intersection of multiple systems of inequity (McPherson & McGibbon, 2014). Furthermore, by combining complexity theory with other critical perspectives, there is flexibility to draw on theoretical understandings relevant to different contexts, and to retain the distinctiveness of each approach rather than seeking to develop a single critical complexity theory (Davis & Sumara, 2008).

Conclusion

To frame this article as a reflection implies retrospectivity, but in many ways, it was written from within the experience rather than beyond it, a looking-around rather than looking-back. At the time of writing, our teaching modes continue to evolve in response to student feedback, institutional budget measures, as well as local and international politics. Student engagement with course material, with academic and administrative staff and with their own approaches to learning are also in flux, sometimes developing new skills and attitudes, sometimes choosing to withdraw and follow alternative paths.

It is likely that new insights will emerge with the benefit of distance. In a sense, this article represents a pause, a moment to disembark at a station, look around at the local landscape and remark on the journey this far, before getting back on the train and continuing the adventure.

Morrison asks, "Who are the learners?" (2008, p.23). This semester's experiences have demonstrated that we are all learners. I certainly learned a great deal from my students about the pandemic's impacts on them, and about the effectiveness (or otherwise) of particular teaching and support strategies. I saw bonds between students and educators strengthen as we combined our energies to find a way through shared uncertainty. Whether this is sustained into the longer term is uncertain, however complexity theory, in combination with other theoretical perspectives, offers a framework for an engagement with the constantly shifting social world that can be adjusted to focus on specific parts of the social system, while acknowledging the impact of its complex backdrop.

Rather than seeking either a past or new "normal" (the familiarity of order) or embracing change uncritically (the paralysis of chaos) a third path of dynamic balance offers the possibility of energy, creativity and collaboration. Returning to Waldrop (1992), we are reminded that "(t)he edge of chaos is the constantly shifting battle zone between stagnation and anarchy, the one place where a complex system can be spontaneous, adaptive, and alive" (p.12). Teaching and learning through the first half of 2020 brought challenges, but the things we learned during this time will be incorporated into our ever-evolving approaches to social work education.

References

Ahmed, M.M.H. & Indurkhya, B. (2020). Investing cognitive holding power and equity in the flipped classroom. *Heliyon, 6*(2020), e04672 https://doi.org/10.1016/j.heliyon.2020.e04672

Atwell, J. & Savit, R. (2016). The emergence of groups and inequality through co-adaptation. *PLOS One, 11*(10), e0165352 https://doi.org/10.1371/journal.pone.0165352

Bartollas, C. (2014). Constituting the system: Radical developments in post-Newtonian society. In A. Pycroft and C. Bartollas (Eds.), *Applying Complexity Theory: Whole Systems Approaches to Criminal Justice and Social Work.* (pp.269-285). Bristol: Policy Press.

Blackmore, J. (2020). The carelessness of entrepreneurial universities in a world risk society: A feminist reflection on the impact of Covid-19 in Australia. Higher Education Research and Development, 39(7), 1332-1336, https://doi.org/10.1080/07294360.2020.1825348

Bronfenbrenner, U. (1979), *The Ecology of Human Development: Experiments by Nature and Design*. Cambridge: Harvard University Press.

Byrne, D. (1998). *Complexity Theory and the Social Sciences: An Introduction.* London: Routledge.

Cilliers, P. (1998). *Complexity and post-modernism: Understanding complex systems.* New York: Routledge.

Davis, B. & Sumara, D. (2008). The death and life of great educational ideas: Why we might want to avoid a critical complexity theory. *Journal of the Canadian Association for Curriculum Studies*, *6*(1), 163-176.

Demetriou, H. (2018). *Empathy, Emotion and Education*. Palgrave Macmillan UK.

Fish, S., & Hardy, M. (2015). Complex issues, complex solutions: Applying complexity theory in social work practice. *Nordic Social Work Research, 5*(sup.1), 98-114. https://doi.ord/10.1080/2156857X.2015.1065902

Green, W., Anderson, V., Tait, K., & Tran. L.T. (2020). Precarity, fear and hope: Reflecting and imagining in Higher Education during a global pandemic. *Higher Education Research and Development, 39*(7), 1309–1312. https://doi.org/10.1080/07294360.2020.1826029

Grove O'Grady, A. (2020). *Pedagogy, Empathy and Praxis: Using Theatrical Traditions to Teach.* Palgrave Macmillan https://doi.org/10.1007/978-3-030-39526-1

Hassett, P. & Stevens, I. (2014). Child protection practice and complexity. In A. Pycroft and C. Bartollas (Eds.), *Applying Complexity Theory: Whole Systems Approaches to Criminal Justice and Social Work.* (pp.97-112). Bristol: Policy Press

Health Foundation. (2010). *Evidence Scan: Complex Adaptive Systems*. London: Author. https://www.health.org.uk/sites/default/files/ComplexAdaptiveSystems.pdf

Healy, K. (2014). *Social Work Theories in Context (2nd Ed)*. New York: Palgrave Macmillan.

Hutchison, E. (2019). An update on the relevance of the Life Course Perspective for social work. *Families in Society, 100*(4), 351–366. https://doi.org/10.1177/1044389419873240

Jess, M., Atencio, M., & Thorburn, M. (2011). Complexity theory: Supporting curriculum and pedagogy developments in Scottish physical education. *Sport, Education and Society, 16*(2), 179-199. https://doi.org/10.1080/13573322.2011.540424

Kauffman, S.A. (1995). Escaping the red queen effect. *The McKinsey Quarterly, 1*(Winter 1995).

Knowles, M.S., Holton. E., & Swanson, R. (2016). *The Adult Learner: The Definitive Classic in Adult Education and Human Resource Development. (Eighth edition).* Oxfordshire, England: Routledge.

Kruske, S., Belton, S., Wardaguga, M., & Narjic, C. (2012). Growing up our way: The first year of life in remote Aboriginal Australia. *Qualitative Health Research, 22*(6), 777-787. https://doi.org.10.1177/1049732311432717

Lewis, S. (2014). Responding to domestic abuse: Multi-agented systems, probation programmes and emergent outcomes. In A. Pycroft and C. Bartollas (Eds.), *Applying Complexity Theory: Whole Systems Approaches to Criminal Justice and Social Work.* (pp.181-198). Bristol: Policy Press.

McDaniel, R.R.Jr., Jordan, M.E., & Fleeman, B.F. (2003). Surprise, surprise, surprise! A complexity science view of the unexpected. *Health Care Management Review, 28*(3), 266-278.

McDermott, F. (2014). Complexity theory, trans-disciplinary working and reflective practice. In A. Pycroft and C. Bartollas (Eds.), *Applying Complexity Theory: Whole Systems Approaches to Criminal Justice and Social Work.* (pp.181-198). Bristol: Policy Press.

McPherson, C. & McGibbon, E. (2014). Intersecting contexts of oppression within complex public systems. In A. Pycroft and C. Bartollas (Eds.), *Applying Complexity Theory: Whole Systems Approaches to Criminal Justice and Social Work.* (pp. 159-180). Bristol: Policy Press.

Morrison, K. (2008). Educational philosophy and the challenge of complexity theory. *Educational Philosophy and Theory*, 40(1), 19-34. https://doi.org/10.1111/j.1469-5812.2007.00394.x

Onyx, J., McLeod, K., Suhood, T., & Ramzan, A. (2017). Neoliberalism, complexity theory and the third sector: A discussion paper. (Essay). *Third Sector Review, 23*(2 SI), 39-56.

Parrish, M. (2014). *Social work perspectives on human behaviour* (Second edition). Open University Press.

Payne, M. (2014). *Modern Social Work Theory (4th Ed.)*. Basingstoke: Palgrave Macmillan.

Pycroft, A. (2014). Complexity theory: An overview. In A. Pycroft and C. Bartollas (Eds.), *Applying Complexity Theory: Whole Systems Approaches to Criminal Justice and Social Work.* (pp.15-38). Bristol: Policy Press

Pycroft, A. & Wolf-Branigin, M. (2016). Integrating complexity theory and social work practice: A commentary on Fish and Hardy (2015). *Nordic Social Work Research, 6*(1), 69-72. https://doi.org/10.1080/2156857X.2015.1123459

Smith, H. (2019). Omniscience at the edge of chaos: complexity, defences and change in a Children and Families Social Work Department. *Journal of Social Work Practice, 33*(4), 471-480 https://doi.org/10.1080/02650533.2019.1682332

Stalker, K. (2003). Managing risk and uncertainty in social work, *Journal of Social Work, 3*(2), 211-233. https://doi.org/10.1177/14680173030032006

University of Sydney (2020). *Life-course Perspectives on Development.* canvas.sydney.edu/courses

Walby, S. (2007). Complexity theory, systems theory, and multiple intersecting social inequalities. *Philosophy of the Social Sciences, 37*(4), 449-470. https://doi.org/10.1177/0048393107307663

Waldrop, M. M. (1992). *Complexity: The Emerging Science at the Edge of Order and Chaos.* New York: Touchstone.

Wolf-Branigin, M. (2014). Complexity and the emergence of social work and criminal justice programmes. In A. Pycroft and C. Bartollas (Eds.), *Applying Complexity Theory: Whole Systems Approaches to Criminal Justice and Social Work.* (pp.79-96). Bristol: Policy Press

Wright, N. (2105, August 6). Samara Scott, artist: "There is a Disneyland quality, a relentless toxic positivity to my work." *Independent,* Retrieved from https://www.independent.co.uk