This is the authors' accepted version of the chapter. To cite, please refer to the published version: Walton, E., Osman, R. (2022). Pedagogical Responsiveness in Complex Contexts. In: Walton, E., Osman, R. (Eds) *Pedagogical Responsiveness in Complex Contexts*. (pp. 1 – 20). Springer. Accessible from https://link.springer.com/chapter/10.1007/978-3-031-12718-2_1

Chapter 1 : Pedagogical Responsiveness in Complex Contexts

Elizabeth Walton and Ruksana Osman

Abstract Responsiveness and complexity are familiar terms in pandemic times. When applied to education, they take on particular meanings separately and in combination. This chapter shows education complexified by a number of factors, including governance and policy, system actors, knowledge claims, and information and communications technologies and artificial intelligence. These factors are agentic and interrelate in networked but non-linear ways that can be understood as general complexity. The challenge is to be pedagogically responsive within complex contexts. Pedagogical responsiveness is characterised by inclusivity and a focus on students, knowledge work, dialogue and relationality, a community orientation, and social justice and equity. It is enabled by collaboration and relational agency, epistemic engagement, contextual sensitivity, technology, institutional capacity and *Ubuntu*. We show that being pedagogically responsive within a restricted view of complexity leads to an efficacy, or "what works" approach, being pedagogically irresponsive with a restricted view of complexity leads to conservativism and preservation of the status quo. A general view of complexity with pedagogical irresponsiveness leads to inertia, but transformation is possible with optimal pedagogical responsiveness within a general view of complexity. The contributions of the various chapters to this volume gesture towards the possibility of transformed and inclusive global educational futures.

Keywords Equity, Inclusion, General complexity, Pedagogical responsiveness, Restricted complexity, Transformation

Elizabeth Walton
School of Education, University of Nottingham, United Kingdom
Elizabeth.walton@nottingham.ac.uk
Ruksana Osman
University of the Witwatersrand, Johannesburg, South Africa
Ruksana.Osman@wits.ac.za

Responsiveness and Complexity: Ideas for These Times

Response, *responding*, and *responsiveness* have become high frequency terms in the global reaction to the coronavirus pandemic. As we write this chapter, countries are battling successive waves of infection, challenged by hospitalisation and deaths, and the economic and educational consequences of lockdowns. Contributors to this volume have harrowing stories to tell of the impact of the pandemic on their own and others' lives. Throughout this time (*unprecedented* seems now to be a cliché), politicians, scientists and the general public have been urged to respond to the unfolding crisis. Governments have been lauded or castigated for their policy responses to the pandemic (Dyer, 2020), the scientific community has responded with "extraordinary global mobilisation" (Gronvall, 2020, p. 77), and human bodies respond in predictable and unpredictable ways to the virus and vaccination. Responsiveness, though, goes beyond the act of responding to something, or a specific response to a stimulus. It signals a state of being or a disposition that comprises sensitivity, openness, empathy and rapport, and demands flexibility and resilience. We explore what this means in a pedagogical relationship later in this chapter as we engage with the work of the contributing authors in this book.

The complexity of our social, political and economic lives has been brought into sharp focus through the pandemic. The interrelationships between systems have meant that decisions made or behaviours enacted by actors in one domain (such as health or education) affect others (such as economics or home). Simple and linear cause-and-effect is difficult to establish because of variability and unpredictability, and we have become accustomed to instability and change. We have also seen emergences, those new phenomena, or structures, or behaviours that have only become possible because of the interactions of elements associated with the pandemic. Scholars such as Nahiduzzaman and Lai (2020) and Wernli et al. (2021) have found complexity theory to be a useful way of understanding the pandemic, based on Thurner et al.'s (2018) idea that "[c]omplex systems are co-evolving multilayer networks" (p. 22).

Complex systems are made up of a number of elements and these elements interact with each other as a network of nodes (Thurner et al., 2018; Tikly, 2020). The interactions change over time and complex systems co-evolve as a result of mutual and reciprocal influence. This co-evolution is non-linear and dynamic. The memories of complex systems become path dependencies that produce a momentum that can be difficult to shift (Tikly, 2020). Emergences occur as new norms, patterns and behaviours result from the combined activity of the system (Lichtenstein, 2021). While complexity theory originated in the natural sciences, it has been usefully applied and developed in the social sciences. Thurner et al. (2018) noted that "[s]ocial systems can be thought of as time-varying multilayer (multiplex) networks" where nodes can be seen as "individuals or institutions" and the links between them as "interactions of different types" (p. 20). Education researchers in different fields have found complexity theory to be particularly generative.

Education as and in Complex Contexts

The challenge of complexity thinking is to know where to start. One of the (not unfounded) critiques of complexity thinking is that analysis is impossible, because no element can ever be separated from the systems within which it is nested. This is particularly so if we, like Tikly (2020), adopt a general rather than restricted approach to complexity. A restricted approach views complexity as complication, with the assumption that linear and causal relationships can be identified and tracked between elements (Byrne & Callaghan, 2014). This approach reflects Scott's (1998) idea of "legibility", the desire to reduce complexity to "manageable dimensions" (p. 22), which can then be delineated into processes. By contrast, a general approach acknowledges the "dynamic and emergent nature of systems such as schools" (Tikly, 2020, p. 43). It emphasises individual, collective and structural agency, and sees complexity constituted by changing and shifting relationships (Byrne & Callaghan, 2014). The difference between general and restricted complexity is ontological (Biesta, 2015; Byrne & Callaghan, 2014), reflecting contrasting understandings of the nature of relationships between elements in a complex system.

Education systems, schools and classrooms are systems in their own right (Ghaffarzadegan et al., 2017; Jacobson et al., 2019), with actors who themselves can be understood as complex systems (Byrne & Callaghan, 2014). These systems are both influenced by, and influence other systems, including family, community and policy. Harris et al. (2018) expressed this well in describing education institutions as "a web of social relations, interactions and micropolitics" (p. 84). The complexity of education systems seems to be growing (Fazekas & Burns, 2012; Tikly, 2020). This is attributed to a number of factors, many of which are highlighted in this book. Fazekas and Burns (2012) catalogued the demands of the "growing diversity of stakeholders' preferences and expectations" (p. 7), governance issues, and the spread and change in information and communication technologies (ICTs). Tikly (2020) has written of the multiplication of governance regimes that impinge on education, including aid, trade and security, and regimes represented by the sustainable development goals. We would add pandemic regimes that operate at international, national and institutional level.

Embracing complexity means not retreating in the face of the messiness and unmanageability of the interpenetrating layers *and* connections *and* actors *and* networks *and* systems *and* influences. It means that it is difficult to single out one unit of analysis, because there is always another in play. But this very interconnectedness offers the possibility for transformation: interventions in one system have the potential to bring about change in other systems. In this section, and with reference to chapters in this book, we draw attention to some of the elements that co-constitute and thereby complexify educational contexts. We separate them for ease of description but acknowledge that this separation is artificial as they are mutually imbricated.

Governance and Policy

Governance is a term that can be used broadly to indicate structures, decision-making processes, priority setting and policymaking aligned with values and norms, monitoring and accountability, and resource allocation. Governance contributes to the complexity of education as it becomes more flexible and decentralised, and through the impact of additional layers of governance at various levels of the system (Fazekas & Burns, 2012; Tikly, 2020). Historical governance decisions and practices or regimes (Tikly, 2020) continue to exert influence and shape education systems, as shown by Krull, Andrews and others in this book. The pernicious legacy of legislated racial discrimination during apartheid in South Africa, for example, has resulted in generational poverty. Krull shows that because of this, many university students do not have the devices, data and infrastructure to benefit from remote online teaching and learning during the pandemic. Both Andrews, and Nkambule and Mbhiza explain how, because of the apartheid legacy, many schools in the compulsory sector remain under-resourced, particularly in rural areas. International and national governance of the pandemic has complexified education and demanded pedagogical responsiveness from teachers, teacher educators and researchers. Rusznyak and Krull make this explicit in their chapters. Other governance regimes that complexify education include the management of migration (see Chiramba and Maringe's chapter) and the de/legitimation of certain forms of education (Abdulrahman's chapter). Though not made fully explicit by the authors in this volume, we see governance regimes operating in these contexts through the commodification and marketisation of education, including various ranking systems. These regimes are at work to determine who participates in education and on what basis, and what constitutes legitimate education. Governance is usually exercised through policy, which is a factor in complex educational contexts.

Educational policy processes are complex and are situated within a policy ecology that includes not only texts and discourses, but also the contextual factors and actors who influence and are influenced by policies (Weaver-Hightower, 2008). Policies are not devised and implemented in a linear and unidirectional fashion, but are shaped, contested and reshaped at the sites of their creation and in the context of practice. As such, policies dynamically interact with other elements in the education system. Policy requirements complexify some of the educational contexts described in this book. Rusznyak's chapter shows policy imperatives as a catalyst in the emergence of a pandemic response – pre-service teachers in a context who could not qualify without practice-focused classroom learning. Policy is less explicit in Andrews's chapter, but it is at work shaping how schools can be constituted and who teachers are expected to teach. The experience of refugee students in Chiramba and Maringe's chapter is determined by the implementation of international and national refugee policies, and these authors believe that a policy response is needed to secure a pedagogically responsive higher education environment for these students.

System Actors

Individuals are both elements within complex systems and they are complex systems themselves who exercise agency, both individually and collectively (Byrne & Callaghan, 2014). Their diversity complexifies educational contexts. The monocultural, monolinguistic, and monastic classrooms and lecture halls of a century ago are, to a large extent, extinct. But access to educational spaces by previously excluded groups has not always meant inclusion, and those with devalued identities still face marginalisation. The diversity of the student population in the compulsory schooling sector is foregrounded as a complexifying factor in both Andrews's, and Nkambule and Mbhiza's chapters. Andrews refers to the range of learning needs represented by diverse students in an inclusive classroom, while Nkambule and Mbhiza focus on rural students, who are often neglected in teacher preparation programmes. In their chapter, Chiramba and Maringe offer an account of refugee students in South African higher education who are challenged by the demands of the language of instruction, academic writing, computer literacy and a lack of funding. These students have specific needs, which may be unfulfilled when universities focus on income-generating international students. Refugee students are not, however, pitiful victims of their circumstances, but are resilient and agentic, well able to articulate their dreams for their futures. Student activists are credited with the impetus towards decolonised curricula, as described in Omar and Ramgotra's chapter. University students have challenged the legitimacy of the Anglo-Western canon and compelled academics to revisit curricula and pedagogic assessment choices. Abdulrahman describes how Muslim parents in northern Nigeria exercise their agency in sending their sons to *Almajiri* schools. There are complex reasons for this, and Abdulrahman challenges simplistic or reductionist accounts of this practice. This list of system actors is not exhaustive, and the presence, actions and expectations of individuals and groups are shown throughout this book to be factors in complex educational systems.

Knowledge

Knowledge, broadly defined, is a complexifying factor in educational contexts. Without the space to engage with various conceptualisations of knowledge and how it relates to knowers (see Maton, 2013), we note here that many chapters in this volume engage with aspects of knowledge. Competing claims to legitimate or valued knowledge emerge as a key concern across chapters. Omar and Ramgotra consider the field of political science and the call for a decolonised curriculum. They challenge the hegemony of Western knowledge and assumptions of its universal value, and argue for an epistemic pluralism. These authors show the imbrications of institutional and knowledge hierarchies, and point to the potential

for new knowledges to shape more equitable social relations. Refugee students in Chiramba and Maringe's chapter also challenge the knowledge goods (Morrow, 2007) of the university. These authors identify three types of knowledge valued by refugee students and which should feature in the curriculum of a pedagogically responsive university: world-systems knowledge, digital and technical knowledge and resilience knowledge. Competing knowledge claims also complexify the context described in Abdulrahman's chapter, where parents and communities reject the knowledge offered in state schools in favour of the knowledge offered in the *Almajiranci* system. Rusznyak centres knowledge in her chapter, showing the importance of providing students with access to both abstract and context-based knowledge. She emphasises how the different knowledge structures of subjects make demands on how teaching and learning is enacted in appropriate and generative ways. Across this volume, knowledge is evident as an element in complex education systems, shaping and being shaped by its interactions with other elements.

Information and Communication Technologies, and Artificial Intelligence

The possibilities and demands of technology, including artificial intelligence (AI) and machine learning, contribute to the complexity of contemporary educational spaces and practices (Fazekas & Burns, 2012). The Concept Note for the 2023 General Education Monitoring Report confirms this as it described the "ubiquity, complexity, utility and heterogeneity" (United Nations Educational, Scientific and Cultural Organization [UNESCO], 2021, p. 4) of educational technology. The authors in this book view the interaction and interpenetration of technology in educational contexts in various ways. Huang sees AI as an active agent in learning, increasing its complexity. AI functions as a virtual teammate in individual and collaborative learning, with the potential to create new knowledge. This potential can only be realised with the development of teacher–AI partnerships, and due consideration of issues of data, ethics and governance, all of which complexify the educational endeavour. Emergency remote teaching and learning during the pandemic demands home-based ICT access and skills, and Krull shows how the unequal and uneven distribution of these among students and staff significantly complexified the higher education institutions' (HEI) response to lockdowns. Rusznyak alludes to this too, finding both limitations and affordances in available ICTs for pre-service teacher learning during school closures. Chiramba and Maringe highlight the technological, computer and digital skills needed by refugee students, noting that financial constraints mean that this need is often not met by HEIs. These chapters confirm that technology cannot be regarded as a mere tool for administration, research and teaching, or an input in linear models of education. Instead, it shapes and is shaped in its complex and dynamic interactions with other components of complex education systems.

Pedagogical Responsiveness

Responsiveness is not an unknown idea in education. Its prominence is mostly found in the literature on cultural responsiveness, usually with reference to Ladson-Billings' (1995) seminal work on culturally relevant pedagogy that was developed to ensure the success of African American children and those "who have not been well served" (p. 159) by the schooling system. Cultural responsiveness has been variously defined and operationalised in research and has been recruited in the quest for equity and inclusion for marginalised groups, particularly ethnic minorities. Concerns have been raised about simplistic understandings of culturally responsive pedagogy that reduce it to "cultural celebration" (Sleeter, 2011, p. 12) and which decouple it from its origins in critical race theory (Pirbhai-Illich et al., 2017). Responsiveness is also a key idea in the literature on Universal Design for Learning (UDL), which emphasises the need for varied educational responses to neurological differences among students (Galkienė & Monkevičienė, 2021). Similar themes can be found in literature about differentiation and differentiated instruction. A leading authority on the topic, Tomlinson (2015) said:

> The nature of 21st century student populations suggests that schools will have to become more *responsive* to the broadening array of cultures, languages, experiences, economics, and interests represented in most contemporary classrooms—and to do so in ways that provide equity of access to robust learning experiences for that broad spectrum of learners. (p. 203; emphasis ours)

For Tomlinson (2015), differentiation is responsive instruction that meets the learning needs of a heterogeneous student population by centring students, knowledge, assessment, instruction and community. Responsive or differentiated instruction is regarded as a means to access and equity, and has come to be associated with the literature on disability-inclusive education (Broderick et al., 2005; Strogilos et al., 2017). Common concerns about access and success in both culturally responsive pedagogy and differentiation have led some authors (Santamaria, 2009; Valiandes et al., 2018) to combine these two concepts.

Pedagogical responsiveness is conceived here more broadly than culturally responsive teaching and differentiation. It suggests a disposition or orientation to pedagogy that is sensitive, open and empathetic, not only to individual students or groups of students, but to wider factors in that community and context. Responsiveness is active. It is more than awareness of students' needs, or demands of the content, or influence of the environment, but demands professional judgement leading to action (Walton et al., 2019). The word *pedagogy* should imply responsiveness, if it reflects Alexander's (2009) "barest essentials" of teaching in any context as "the act of using method *x* to enable students to learn *y*" (p. 927). Pedagogy is thus not the random application of general strategies that are assigned on arbitrary grounds, rather there are logics that inform why certain approaches may be more or less appropriate in response to a given set of contextual factors and knowledge demands. But, in practice, not all

pedagogy is characterised by responsiveness. Many students find themselves in classrooms where an unresponsive pedagogy is the order of the day. These students find that they have what Morrow (2007) called formal access to education, but not epistemological access, that is, access to the knowledge goods of education. Nkambule and Mbhiza, in their chapter in this book, call this an irresponsive pedagogy, which we like, not least because it suggests that this is irresponsible.

Characteristics of Pedagogical Responsiveness

Pedagogical responsiveness is a concept which Rusznyak, in her chapter, says has relatively strong "semantic density" because it condenses a network of meanings. It is used by different authors in relationship with various other concepts, giving it a complex internal meaning. In this section, we show that pedagogical responsiveness is characterised by inclusivity and a focus on students, knowledge work, dialogue and relationality, a community orientation, and principles of social justice and equity. Each of these characteristics supports and enhances the other and contributes to the complex meaning and expression of pedagogical responsiveness.

Inclusivity and Student-Focused

To be pedagogically responsive is to be inclusive, in the full meaning of the word. In his chapter, Andrews finds common ground between inclusive teaching and pedagogical responsiveness, and argues that this means that diverse students have individual learning needs met and that whole-class teaching is effective. A diverse student population is assumed, and Andrews sees that it is the teacher's responsibility to be pedagogically responsive to this diversity. With echoes of the tenets of differentiation, this conceptualisation of pedagogical responsiveness emphasises that individual students have different learning profiles, including their readiness to learn and their interests (Tomlinson, 2015), and can expect instruction, curriculum and assessment to account for these differences. Huang is also concerned with individual difference in his chapter and sees that pedagogical responsiveness must mean personalising learning for each student to give them an optimal educational experience.

Pedagogical responsiveness involves appreciating and addressing the specific needs and experiences of groups of students. Refugee students experience fear (fear of the known, the unknown and the future), they have dreams and they are resilient, according to Chiramba and Maringe. These authors argue that too often universities are not sufficiently responsive to these experiences. Nkambule and Mbhiza are also interested in a group of students – those in rural areas. Teacher education is shown to be urban focused, and unresponsive to the needs of

farm and rural school contexts. These authors show how a critical reflection on course content and subsequent amendments to teaching and learning materials was necessary to promote pedagogical responsiveness in and for a rural context. Krull focuses on the group of students who lack the technology needed for effective online learning. To be pedagogically responsive to these students during emergency remote teaching and learning associated with the pandemic, academics must appreciate students' experiences at the confluence of historical and systemic oppression, current poverty, and digital inequality, including uncertain network coverage in remote areas.

We would add that this inclusivity and focus on students must involve a critical diversity literacy (Reygan et al., 2018) and the acknowledgement that there are power differentials which mean that students are not equally different (Walton & Dixon, 2020).

Knowledge Work

Pedagogical responsiveness looks not only at the student, but at the content – the "*y*" in Alexander's (2009) definition of teaching, or the knowledge goods in Morrow's (2007) account of epistemological access. This is a central concern of Rusznyak's chapter, which acknowledges the importance of responsiveness to student diversity and context, but which claims that equal account should be taken of knowledge structures. Rusznyak critiques the idea that generic teaching strategies can be used irrespective of the target knowledge and shows that cumulative knowledge-building requires a pedagogy that is responsive to the demands of the knowledge to be learned. Abdulrahman also sees knowledge as central to pedagogical responsiveness, in this case, it is the knowledge of the Qur'an, which is embodied by the *malam*, the teacher. Who the teacher is, what he knows, and thus what he teaches, are inseparable. In these chapters, and others, including Nkambule and Mbhize, Omar and Ramgotra, and Chiramba and Maringe, knowledge work is shown to be integral to pedagogical responsiveness.

Dialogue and Relationality

Pedagogical responsiveness is characterised by a deep and meaningful relationship through dialogue and mutual respect. The chapters in this book draw on various conceptual resources to deepen an understanding of pedagogical responsiveness as inherently relational. Krull frames pedagogical responsiveness within Noddings's (2012) ethic of care to emphasise the listening, dialogue and connection that is necessary for a connected and relational pedagogy. Care is also foregrounded by Waghid et al. who talk about rhythmic caring in interactions as students and teachers speak, listen, critically reflect, and talk back, so furthering understanding. These authors expand on the dialogic and relational essence of pedagogical responsiveness through the notion of the intra-relatedness of all humans. This relates to the internal connection between humans – teachers and students – that

enables them to see the world through one another, even if they are materially or temporally apart. In their chapter, Nkambule and Mbhiza situate pedagogical responsiveness within Freire's ideas of dialogue and praxis. They emphasise critical and participatory dialogue between student and teacher, among students and between teachers to enable reflection and promote the critical consciousness that pre-service teachers need.

Community Orientation

Pedagogical responsiveness is characterised by a community orientation, where the community is immediate, local and global. While education institutions are complex contexts in themselves, they also interact and are mutually interpenetrative with other systems. Pedagogical responsiveness demands deliberate and deliberative engagement with these other systems. Various authors in this book emphasise this orientation towards the community. Waghid et al. frame this as an engagement with social transformation and democratic citizenship. These authors reflect on the importance of students responding to the socio-economic and political concerns of their communities with solutions to problems and societal dilemmas and predicaments. Nkambule and Mbhiza are similarly concerned that pre-service teachers should make links between themselves, classrooms and schools, and the wider community, thus advancing social empowerment and equity. Qur'anic schooling has a community orientation, maintains Abdulrahman in her chapter. The pedagogies of recitation and memorisation are not only for individual spiritual formation but enable participation in a community and the enactment of moral values in society.

Social Justice and Equity

Finally, and perhaps most importantly for the authors of this book, pedagogical responsiveness is characterised by, and orientated towards the dismantling of exclusion, discrimination and oppression, and the advancement of social justice and equity. For Andrews, this means teaching so that every student, regardless of their difficulties or disabilities, is included in education and can participate and experience success. Huang is concerned with the educational outcomes of each individual student and sees AI as a means to personalise and optimise learning for all. Nkambule and Mbhiza are concerned about ensuring that pre-service teachers reflect critically on their pedagogy so that they do not perpetuate inequities. Krull's low-tech considerations are designed to disrupt patterns of disadvantage that would exclude university students from remote teaching and learning. Discriminatory and inequitable policies and practices towards refugee students in universities are challenged in Chiramba and Maringe's chapter, with Waghid et al. proclaiming that "pedagogical responsiveness is an exercise of dissent against any form of human injustice, discrimination and exclusion wherever it may occur". Waghid et al. maintain that this form of dissent in a complex way arouses sudden

upheavals of thought within pedagogical encounters that can provoke humans to think differently. Addressing epistemic injustice is a theme of Omar and Ramgotra's chapter, as they explore the decolonisation of the political theory curriculum, to challenge unjust and exploitative colonial epistemologies. Abdulrahman is concerned with exposing the epistemic violence meted out to the practitioners of *Almajiranci*, as mainstream discourses delegitimise its knowledge and practices. The module described in Rusznyak's chapter has bold equity goals as it is designed to disrupt legacies of unequal workplace experiential learning for teachers, and to empower pre-service teachers with the epistemological tools needed to analyse the complexities in teachers' classroom practices. On the strength of these contributions, we must conclude that pedagogical responsiveness is impossible without social justice and equity, and that advancing educational justice and equity demands pedagogical responsiveness.

Enablers of Pedagogical Responsiveness

Various factors in this volume are shown to enable pedagogical responsiveness. The different chapter authors place varying emphasis on these enabling factors, with each factor creating conditions necessary for pedagogical responsiveness, but each insufficient on its own. These enabling factors are collaboration and relational agency, epistemic engagement, contextual sensitivity, technology, institutional capacity, and *Ubuntu*. In effect, these factors are all mutually interdependent and dynamically imbricated, but discussed here individually for ease of analysis.

Collaboration and relational agency are foregrounded by Andrews in his chapter. Using conceptual resources from cultural historical activity theory, including Engeström's idea of "knotworking", Andrews shows that collaboration among teachers enables them to be pedagogically responsive to the learning needs of diverse students in South African classrooms. This is more than creating pleasant school cultures but is the means by which teachers exercise agency in and through their relationships with each other. By crossing boundaries, but not relinquishing autonomy, teachers find ways to disrupt the status quo and transform constraints to equity. Pedagogical responsiveness is thus enabled in and through community, is directed towards community, and enacted with community as Nkambule and Mbhize, Waghid et al., and Abdulrahman's chapters illustrate.

Epistemic engagement relates to the thoughtful selection, sequencing, legitimation and valuing of knowledge(s). In her chapter, Rusznyak shows how epistemic engagement enables pedagogical responsiveness as teachers make choices that support learning. Drawing on concepts from Legitimation Code Theory, Rusznyak shows the "semantic waves" that a teacher creates to move between contextual specificity and conceptual complexity in a short online lesson.

The teacher is able to be pedagogically responsive to both the student and the knowledge because she has a nuanced understanding of the structure of the knowledge to be taught, and of how to sequence a lesson to enable cumulative knowledge-building. The epistemic engagement in Omar and Ramgotra's chapter is both critical and attuned to epistemic injustice. It enables pedagogical responsiveness as academics revisit Anglo-European and colonial canons to identify and disrupt the epistemic violence and epistemicide that these canons inscribe. Epistemic engagement as a means to pedagogical responsiveness features in other chapters in this book, including Chiramba and Maringe's work on the knowledge valued by refugee students in higher education; Nkambule and Mbhize's autoethnographic account of curriculum change; and Huang's account of AI for education in Singapore.

Contextual sensitivity enables pedagogical responsiveness as it resists universalising discourses that seek to standardise and homogenise. It recognises the exigencies of context and the interstices of history, geography and culture that shape places and discursive spaces. Complex contexts are necessarily idiosyncratic, and while they may share features with other contexts, there will always be unique features to consider. This is well illustrated in Nkambule and Mbhize's chapter, where consideration of rural educational contexts demonstrates pedagogical responsiveness in an initial teacher education programme. Krull's chapter explains how emergency remote learning during the pandemic had to be sensitive to the context of poverty and digital inequality in South Africa, and being pedagogically responsive meant taking this into account in curriculum design and delivery. Abdulrahman is concerned with the deficit discourses about the *Almajiri* system that are insensitive to the context in northern Nigeria. She shows this system as being pedagogically responsive to the religious values that have shaped the culture.

Technology, including hardware, software, internet access, and AI, is shown by authors of this book to enable the pedagogical responsiveness required in the twenty-first century. The thesis of Huang's chapter is that AI enables teachers to be pedagogically responsive to the individual learning needs of each student. Huang argues that student-centred teaching is a complex endeavour, and that personalised learning is difficult to achieve. Artificial intelligence for education (AIED), enabled by data-driven, real-time decision-making is suggested as a means to address teachers' challenges and optimise both individual and collaborative learning. While Huang engages with the possibilities of intelligent tutoring systems and classroom orchestration systems, Krull is concerned with "low-tech" teaching in his chapter. Access to technology and digital resources has been necessary for emergency remote teaching and learning, but lecturers have had to adapt to the realities of digital inequalities among their students. He shows how pedagogical responsiveness can be enacted even with low-tech options, by considering content creation, learning activities, the learning community and communications, and assessment. Rusznyak's chapter also refers to the use of

WhatsApp that ensures the continuation of teaching and learning under conditions where other forms of interactions are impossible.

Institutional capacity is the broad term we use to capture the education institution as a collective, including its leadership, governance, values, and resources. In keeping with a general view of complexity, we see institutional structures as agentic (Byrne & Callaghan, 2014) in education systems, and thus enable or constrain pedagogical responsiveness. The case presented by Chiramba and Maringe in their chapter is of an HEI that is irresponsive to the specific needs of refugee students. These authors identify three key dimensions the institution needs to consider to enable pedagogical responsiveness: the epistemological dimension (physical and cognitive access, and access to worthwhile knowledge), the curriculum dimension (purpose and goals, content, methods and assessment), and the experiential dimension (the dreams fears and resilience of refugees). Krull, by contrast, shows HEIs as being agile and flexible, enabling pedagogical responsiveness through the provision of material and digital resources. Institutional leadership is shown in this chapter as being a crucial enabler of pedagogical responsiveness and is mentioned by Andrews as a determinant of whether schools are orientated towards inclusivity.

Ubuntu, which Waghid et al. translate as human interconnectedness and dignity, is shown by these authors to be a necessary condition for pedagogical responsiveness when expressed in three aspects of human action. First, it spans local and indigenous concerns and embraces intra-human relations. Second, it depends on the exercise of deliberative and autonomous human action and the advancement of articulation – listening and talking back. Third, is a global orientation that affirms respect and compassion beyond the local community to embrace all humanity, and challenges oppression and exclusion wherever it manifests. We pick up this theme of the global in the conclusion of this book, as we affirm the inter- and intraconnectedness of humanity, all other life forms, and the earth itself. Pedagogical responsiveness is enabled by this expansive and inclusive life-view that centres on relationality and moral responsibility.

Thinking About Pedagogical Responsiveness in Relation to Complexity

Our exposition of complexity in educational contexts and what pedagogical responsiveness may mean in theory and practice leads us to consider these ideas in relationship to each other. As a heuristic and for ease of discussion, we constitute them on horizontal and vertical axes on a Cartesian plane to show how the continuum of greater to lesser pedagogical responsiveness interacts with general or restricted views of complexity. We have named each quadrant for the focus in

education that results with each combination, as illustrated in Figure 1.1 and explain the labels in the section that follows. While the graphic helps to illustrate the ideas in relation to each other, we do acknowledge that it problematically suggests that each quadrant is equal and discrete. In fact, the messiness of complex education systems, and the human actors who shape and are shaped by these systems, make the reality much more fluid, porous and uncertain.

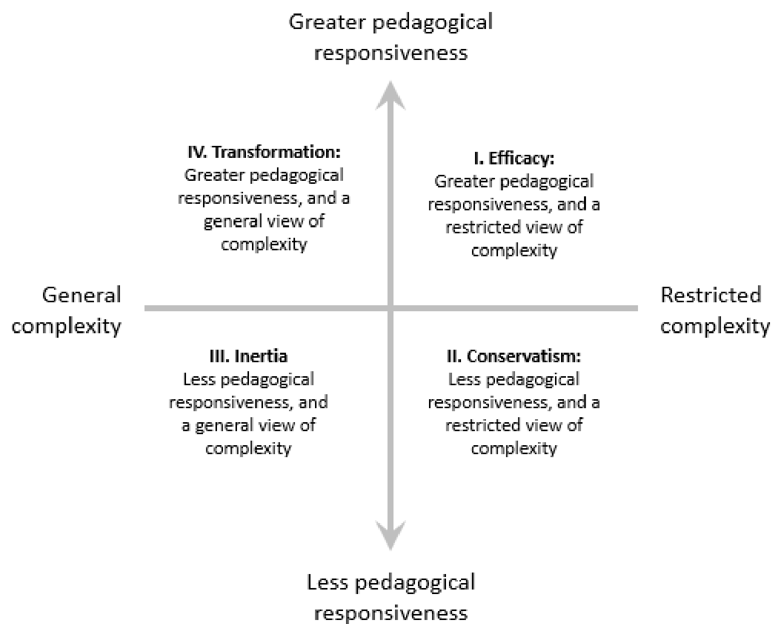

Fig. 1.1. Pedagogical responsiveness and complexity

Efficacy

When greater levels of pedagogical responsiveness are combined with a restricted understanding of complexity, the focus of the educational endeavour is efficacy, namely “what works”. We see this reflected in the “effectiveness” literature in teaching, and the emphasis on only using evidence-based practices in the classroom. This has gained traction, particularly with efforts to ensure that diverse student abilities are considered in teaching and learning. The premise of evidence-based practice is that interventions proven to be effective by large-scale experimental research should be used when teaching disabled students (Cook et al., 2009). The search for evidence-based practices is indicative of a desire for optimum pedagogical responsiveness, including a commitment to inclusion and social justice in education (Foreman & Arthur-Kelly, 2008; Spina, 2020).

However, this responsiveness is premised on a restricted, rather than general view of complexity, and does not take into account multiple circumstances, diversity, uncertainty and plurality (Hammersley, 2005). Biesta (2015) problematised the "what works" approach for its assumptions of "closed deterministic systems" (p. 204), whereas education is open, non-deterministic and made up of human agents who can think and alter their behaviour.

Conservativism

Less pedagogical responsiveness within a restricted notion of complexity buttresses conservativism in education. It is invested in preservation, saying: "This has worked in the past, so no need to do anything different now." The restricted approach to complexity assures the teacher or lecturer that causal and linear relationships can be identified, and that scientific measures, such as randomised controlled trials, have provided sufficient understanding of education (Tikly, 2020). Combined with a pedagogical irresponsiveness, this approach gives rise to the educator caricatured in film and television (and sometimes present in our staffrooms and classrooms). As we write this chapter, *The Chair* is showing on Netflix, with the character Professor Elliot Rentz played by actor Bob Balaban. This character refuses feedback and makes no changes to what Craig (2021) calls "his tediously traditional teaching methods". He is not pedagogically responsive to his students or to the changing university context and relies on teaching methods that have worked in the past.

Inertia

We have used the term *inertia* to characterise an acknowledgement of general complexity but a relative lack of pedagogical responsiveness. Characterised elsewhere as a "pedagogical paralysis" (Walton & Rusznyak, 2017, p. 241), we see the potential for teachers, lecturers and other education actors to retreat in the face of complexity, overwhelmed by its demands. This is a space where general complexity is acknowledged, but pedagogical action is constrained. The uncertainty of general complexity in the educational context leads to the feeling that "Nothing I do can make a difference", and inertia is the result. Hammersley (2005) confirmed that recognising complexity "[m]ay demotivate practitioners or dissuade them from taking any action at all on an issue" (p. 324). Educational problems are seen as so complex that they are beyond resolution, and "preserving the status quo seems a more expedient and efficient option" (Walton & McKenzie, 2020, p. 149).

Transformation

Transformation becomes possible when optimal pedagogical responsiveness is exercised in a context that is acknowledged as complex in the general sense, that is, acknowledging the causal powers of structures, and individual and collective human agency (Byrne & Callaghan, 2014). Transformation has been variously defined and defended in the educational literature, referring to an individual's experience of "a profound epistemic and personal shift" (Paul & Quiggin, 2020, p. 561), to substantial changes in curriculum, pedagogy and research at institutions (Higgs, 2016; Waghid, 2002), and to changes that fundamentally alter the priorities, resourcing and governance of wider educational systems (Maringe & Prew, 2015). Osman and Hornby (2017) usefully defined transformational pedagogy as: "Being critical, thinking critically, enabling democratic educational relations and empowering people to be critical agents in order to transform unequal capitalist orders" (p. 6).

We use transformation in a utopian sense, to signal the individual, societal and environmental emancipation that is possible when pedagogical responsiveness – expressed through inclusivity and focus on students, knowledge work, dialogue and relationality, a community orientation, and social justice and equity – acknowledges and mutually engages with others (human and non-human) as autonomous and agentic actors in their ecosystems. This necessarily eradicates dominance and discrimination and refuses the violence of epistemic subordination and erasure. Unlike the efficacy quadrant, which channels aspects of pedagogical responsiveness towards pre-determined outcomes and outputs, transformation has the potential "to create holistic, life-generating and possibility-enabling educational projects which re-establish critical relationships with the future" (Amsler & Facer, 2017, p. 13). In different ways, the chapters in this book and the projects they describe offer a glimpse of this potential.

Chapter Sequence

The chapters in this book can be read in any order and the sequence does not signify any hierarchy.

- First is the chapter by Yusef Waghid, Zayd Waghid and Faiq Waghid, in which the authors explore the interrelationship between pedagogical responsiveness and the cultivation of democratic citizenship education in African higher education. They advance a philosophical argument that when teachers and students are encouraged to act autonomously, deliberatively and diffractively, the possibility exists that human relations can respond to some of the societal dilemmas that confront them on the African continent and perhaps elsewhere.

- Continuing the focus on higher education, Otilia Chiramba and Felix Maringe's chapter follows. These authors report on the experience of refugee students in a prestigious university in South Africa and on extant literature to develop a tentative model for promoting pedagogical responsiveness. They use a theory of resilience to underpin the development of adaptive, adoptive, predictive and transformative capacities needed for a more rounded, relevant and rewarding educational experience for refugee students.
- The chapter by Greig Krull is also concerned with the higher education context. His chapter considers a South African university's pedagogical responsiveness to the global COVID-19 pandemic, with a particular focus on contextual and digital access challenges. It reviews the adoption of teaching with low bandwidth (or low-tech) strategies to overcome digital access challenges in this complex educational context and argues for contextually-relevant low-tech teaching and learning strategies for future disruptions.
- Jun Song Huang's chapter follows, continuing the technology theme. This chapter unpacks the complexity of teaching and learning and illuminates how it imposes high demands on the workload, judgement and knowledge of teachers as they adapt and respond to students' needs in the classroom. The chapter introduces intelligent tutoring systems and classroom orchestration systems as the AIED tools that can assist teachers in coping with the complexity in teaching an individual student or a group of students.
- Douglas Andrews is also concerned with the capacity of teachers to meet the learning needs of all students. He uses Engeström's heuristic of "knotworking" to examine the collaborative interactions between teachers in their unique and complex school systems. Despite teachers' concern that they are unprepared to be pedagogically responsive to diverse learners, Andrews shows that they are empowered by "knotworking" moments that enable boundary crossing and relational engagement.
- Teacher preparation is Lee Rusznyak's focus. Her chapter argues that pedagogical responsiveness is both a principle to be enacted and a construct to be understood. She considers how both are addressed by a module that enables pre-service teachers to complete their work-based learning during the COVID-19 pandemic. Using conceptual tools from Legitimation Code Theory, Rusznyak discusses how semantic waves offer a principled yet flexible way of analysing how teachers work with conceptual knowledge in pedagogically and contextually responsive ways.
- Thabisile Nkambule and Hlamulo Mbhiza continue the focus on teacher preparation, arguing for the importance of exposing pre-service teachers to pedagogical knowledge and contexts that are different from what they know. These authors use autoethnography to discuss experiences and decisions made to reconceptualise a module that conscientises students to different debates and taken-for-granted pedagogies that resulted from their dominant exposure to urban-centred schools.
- The theme of marginalised school communities is continued in the chapter by Hadiza Kere Abdulrahman, with its focus on the *Almajiri* schools in northern Nigeria. This chapter explores the pedagogical practices of these schools,

which are considered at odds with the modern education system regarded as better suited to meeting the development demands of the country. This account of the *Almajiranci* system shows different views and understandings of what constitutes knowledge in other forms and settings and argues that marginalised knowledges remain desirable, valued and valid to many.

- Ayesha Omar and Manjeet Ramgotra also advance consideration of valued and valuable knowledge as they engage with the issue of decolonising the discipline of political theory at two universities. These authors undertake a comparative analysis to explore how ideas, content and specific forms of curriculum design and teaching can be utilised in political theory teaching to confront past injustices and render greater transformation, justice and inclusiveness. They argue that teaching political theory through Mbembe's notion of "epistemic pluralism" of ideas greatly enhances pedagogic responsiveness in these complex contexts.
- Our concluding chapter considers the complexity of our shared global futures and how pedagogical responsiveness might anticipate these futures. Through a metalogue, the authors and editors converse about what it might mean for pedagogical responsiveness to create conditions for the possibility of creative and not-yet-imagined, relational and democratic, critical and decolonial, transformed futures.

References

Alexander, R. (2009). Towards a comparative pedagogy. In R. Cowen & A. M. Kazamias (Eds.), *International handbook of comparative education* (pp. 923–942). Springer Netherlands. https://doi.org/10.1007/978-1-4020-6403-6_59

Amsler, S., & Facer, K. (2017). Contesting anticipatory regimes in education: Exploring alternative educational orientations to the future. *Futures*, *94*, 6–14. https://doi.org/10.1016/j.futures.2017.01.001

Biesta, G. (2015). Improving education through research? From effectiveness, causality and technology to purpose, complexity and culture. *Policy Futures in Education*, *14*(2), 194–210. https://doi.org/10.1177/1478210315613900

Broderick, A., Mehta-Parekh, H., & Reid, D. K. (2005). Differentiating instruction for disabled students in inclusive classrooms. *Theory Into Practice*, *44*(3), 194–202. https://doi.org/10.1207/s15430421tip4403_3

Byrne, D., & Callaghan, G. (2014). *Complexity theory and the social sciences: The state of the art*. Routledge.

Cook, B. G., Tankersley, M., & Landrum, T. J. (2009). Determining evidence-based practices in special education. *Exceptional Children*, *75*(3), 365–383. https://doi.org/10.1177/001440290907500306

Craig, D. (2021). Meet the cast of The Chair on Netflix. *Radio Times*, 17 August. https://www.radiotimes.com/tv/drama/the-chair-cast-netflix/

Dyer, C. (2020). Covid-19: UK government response was overcentralised and poorly communicated, say peers. *BMJ*, *371*, m4445. https://doi.org/10.1136/bmj.m4445

Fazekas, M., & Burns, T. (2012). Exploring the complex interaction between governance and knowledge in education. *OECD Education Working Papers*, *67*, 1–42. https://doi.org/10.1787/5k9flcx2l340-en

Foreman, P., & Arthur-Kelly, M. (2008). Social justice principles, the law and research, as bases for inclusion. *Australasian Journal of Special Education*, *32*(1), 109–124. https://doi.org/10.1017/S1030011200025793

Galkienė, A., & Monkevičienė, O. (2021). Preconditions of transforming the educational process by applying inclusive education strategies: Theoretical background. In A. Galkiene & O. Monkeviciene (Eds.), *Improving inclusive education through universal design for learning* (pp. 1–21). Springer International. https://doi.org/10.1007/978-3-030-80658-3_1

Ghaffarzadegan, N., Larson, R., & Hawley, J. (2017). Education as a complex system. *Systems Research and Behavioral Science*, *34*(3), 211–215. https://doi.org/10.1002/sres.2405

Gronvall, G. K. (2020). The scientific response to COVID-19 and lessons for security. *Survival*, *62*(3), 77–92. https://doi.org/10.1080/00396338.2020.1763613

Hammersley, M. (2005). The myth of research-based practice: The critical case of educational inquiry. *International Journal of Social Research Methodology*, *8*(4), 317–330. https://doi.org/10.1080/1364557042000232844

Harris, J., Carrington, S., & Ainscow, M. (2018). *Promoting equity in schools: Collaboration, inquiry and ethical leadership*. Routledge.

Higgs, P. (2016). The African renaissance and the transformation of the higher education curriculum in South Africa. *Africa Education Review*, *13*(1), 87–101. https://doi.org/10.1080/18146627.2016.1186370

Jacobson, M. J., Levin, J. A., & Kapur, M. (2019). Education as a complex system: Conceptual and methodological implications. *Educational Researcher*, *48*(2), 112–119. https://doi.org/10.3102/0013189X19826958

Ladson-Billings, G. (1995). But that's just good teaching! The case for culturally relevant pedagogy. *Theory into Practice*, *34*(3), 159–165. https://doi.org/10.1080/00405849509543675

Lichtenstein, B. (2021). Complex systems and emergence in action research. In H. Bradbury (Ed.), *The SAGE handbook of action research* (pp. 446–452; 3rd ed.). Sage. https://dx.doi.org/10.4135/9781473921290.n44

Maringe, F., & Prew, M. (2015). *Twenty years of education transformation in Gauteng 1994 to 2014*. African Minds. http://muse.jhu.edu/book/40713

Maton, K. (2013). *Knowledge and knowers: Towards a realist sociology of education*. Routledge.

Morrow, W. (2007). *Learning to teach in South Africa*. HSRC Press. http://hdl.handle.net/20.500.11910/6104

Nahiduzzaman, K. M., & Lai, S.-K. (2020). What does the global pandemic COVID-19 teach us? Some reflections. *Journal of Urban Management*, *9*(3), 261–262. https://doi.org/10.1016/j.jum.2020.08.004

Noddings, N. (2012). The caring relation in teaching. *Oxford Review of Education*, *38*(6), 771–781. https://doi.org/10.1080/03054985.2012.745047

Osman, R., & Hornsby, D. J. (2017). Transforming higher education: Towards a socially just pedagogy. In R. Osman and D. J. Hornsby (Eds.), *Transforming higher education in a global context: Towards a socially just pedagogy* (pp. 1–14). Critical University Studies Series. Palgrave MacMillan.

Paul, L. A., & Quiggin, J. (2020). Transformative education. *Educational Theory*, *70*(5), 561–579. https://doi.org/10.1111/edth.12444

Pirbhai-Illich, F., Pete, S., & Martin, F. (2017). Culturally responsive pedagogies: Decolonization, indigeneity and interculturalism. In F. Pirbhai-Illich, S. Pete & F. Martin (Eds.), *Culturally responsive pedagogy: Working towards decolonization, indigeneity and interculturalism* (pp. 3−28). Palgrave Macmillan.

Reygan, F., Walton, E., & Osman, R. (2018). Assimilation and celebration? Discourses of difference and the application of critical diversity literacy in education. In E. Walton & R. Osman (Eds.), *Teacher education for diversity: Conversations from the global South* (pp. 1−14). Routledge.

Santamaria, L. J. (2009). Culturally responsive differentiated instruction: Narrowing gaps between best pedagogical practices benefiting all learners. *Teachers College Record*, *111*(1), 214–217. http://www.tcrecord.org/Content.asp?ContentId=15210

Scott, J. C. (1998). *Seeing like a state: How certain schemes to improve the human condition have failed*. Yale University Press. https://yalebooks.yale.edu/book/9780300078152/seeing-state

Sleeter, C. E. (2011). An agenda to strengthen culturally responsive pedagogy. *English teaching: Practice and critique*, *10*(2), 7–23. http://files.eric.ed.gov/fulltext/EJ944889.pdf

Spina, N. (2020). Using assessment data to support student learning. In L. J. Graham (Ed.), *Inclusive education for the 21st Century: Theory, policy and practice* (pp. 159–178). Allen & Unwin. https://ugc.futurelearn.com/uploads/files/d4/3b/d43b4b8a-ef3c-412f-ade7-4f33b2243d67/Graham_BookExtract_Chapter1.pdf

Strogilos, V., Tragoulia, E., Avramidis, E., Voulagka, A., & Papanikolaou, V. (2017). Understanding the development of differentiated instruction for students with and without disabilities in co-taught classrooms. *Disability & Society*, *32*(8), 1216–1238. https://doi.org/10.1080/09687599.2017.1352488

Thurner, S., Hanel, R., & Klimek, P. (2018). *Introduction to the theory of complex systems*. Oxford University Press.

Tikly, L. (2020). *Education for sustainable development in the postcolonial world: Towards a transformative agenda for Africa*. Routledge.
Tomlinson, C. A. (2015). Teaching for excellence in academically diverse classrooms. *Society*, *52*(3), 203–209. http://dx.doi.org/10.1007/s12115-015-9888-0
United Nations Educational, Scientific and Cultural Organization. (2021). *Concept note for the 2023 global education monitoring report on technology and education*. https://unesdoc.unesco.org/ark:/48223/pf0000378950/PDF/378950eng.pdf.multi
Valiandes, S., Neophytou, L., & Hajisoteriou, C. (2018). Establishing a framework for blending intercultural education with differentiated instruction. *Intercultural Education*, *29*(3), 379–398. https://doi.org/10.1080/14675986.2018.1441706
Waghid, Y. (2002). Knowledge production and higher education transformation in South Africa: Towards reflexivity in university teaching, research and community service. *Higher Education*, *43*(4), 457−488. https://link.springer.com/article/10.1023/A:1015211718131
Walton, E., & Dixon, K. (2020). Googling inclusive education: A critical visual analysis. *Discourse: Studies in the Cultural Politics of Education*, 1–14. https://doi.org/10.1080/01596306.2020.1819203
Walton, E., & McKenzie, J. (2020). The education of children with disabilities in South African online news reports. In J. Johanssen & D. Garrisi (Eds.), *Disability, media, and representations* (pp. 135–155). Routledge. https://doi.org/10.4324/9780429469244
Walton, E., & Rusznyak, L. (2017). Choices in the design of inclusive education courses for pre-service teachers: The case of a South African university. *International Journal of Disability, Development and Education*, *64*(3), 231–248. https://doi.org/10.1080/1034912X.2016.1195489
Walton, E., Andrews, D., & Osman, R. (2019). Professional judgment in and for complex social and educational contexts. *Southern African Review of Education with Education with Production*, *25*(1), 5–15. https://hdl.handle.net/10520/EJC-1877c03ed6
Weaver-Hightower, M. B. (2008). An ecology metaphor for educational policy analysis: A call to complexity. *Educational Researcher*, *37*(3), 153–167. https://doi.org/10.3102/0013189X08318050
Wernli, D., Tediosi, F., Blanchet, K., Lee, K., Morel, C., Pittet, D., Levrat, N., & Young, O. (2021). A complexity lens on the COVID-19 pandemic. *International Journal of Health Policy and Management*, x(x), 1–4. https://doi.org/10.34172/ijhpm.2021.55 [In Press]

Elizabeth Walton; D.Ed. She is a professor of education at the University of Nottingham, UK, and a visiting associate professor at the Wits School of Education, University of the Witwatersrand in Johannesburg. She co-convenes the UNESCO Chair in Teacher Education for Diversity and Development and her research interests include teacher education for inclusive education, the field of

inclusive education (its knowledge and knowers) and identifying and addressing educational exclusion.

Ruksana Osman; PhD. She is a full professor and is currently appointed as the Senior Deputy Vice Chancellor at the University of the Witwatersrand in Johannesburg, South Africa. She is the convenor of the UNESCO Chair in Teacher Education for Diversity and Development at the same university.