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Peer Assisted Study Sessions (PASS) : through a complexity lens

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Peer Assisted Study Sessions (PASS): through a complexity lens

Clare Power

ABSTRACT

Although the Supplemental Instruction (SI) model is offered in a wide range of contexts across many educational institutions in 29 countries, it maintains an identifiable essence. Each SI program, known in Australia as PASS, tends to operate autonomously within its particular institution while maintaining some of the features that interlink all programs that formally identify with this model. These features include near peers facilitating collaborative learning situations that improve attendees' learning outcomes and increase retention. This paper suggests that complexity theory provides a useful conceptual lens for analysing this multifaceted and multilayered peer learning model. Dimensions of complexity such as self-organisation, fractality, dynamism and emergence seem to offer ways of seeing and sense making that can enhance our understanding of the SI/PASS model, both organisationally and pedagogically. In this initial exploration of complexity and SI/PASS, particularly in its organisational features, I hope to foster conversations that will consider the implications and opportunities of seeing this particular peer learning approach as self-organising, dynamic and emergent.

INTRODUCTION

Supplemental Instruction, a particular model of peer assisted collaborative learning, runs in well over 1000 Higher Educational institutions across 29 countries. Since its inception in 1973, Supplemental Instruction (SI) has maintained an identifiable essence, even though it has adapted and developed to suit a wide range of contexts. Each local program that operates within the SI model has its own internal organisational structure while still following the guidelines that emanate from the central philosophies of SI. Since encountering complexity theory I have been struck by its aptness as a 'sense making' tool for understanding the multifaceted nature of SI programs. Given the increasing prevalence of complexity approaches both in educational research and practice and organisational theory I suggest that complexity theory is a useful conceptual lens for considering the multilayered aspects and multiple intersecting variables that constitute SI programs.

For the purposes of this paper I will be discussing primarily the organisational, rather than the pedagogical processes that are representative of the SI model. From a complexity perspective, organising can be seen as a continuous and emergent activity involving "ongoing processes of relating between people, personalities, preferences, politics and power. It is a self-organising, dynamic and emergent process" (Kuhn 2009, p.24). Similarly, Stacey and Griffin (2005), who have developed a complex responsive processes perspective to organisations, argue that organisations need to be understood as patterns of interactions between people. Organisationally, the SI model is comprised of hundreds of programs in a range of institutions, with each program organising its own internal structure appropriate to its context. These local programs operate as complex systems that are typified by "rich patterns of interconnections between diverse components" (Reason & Goodwin 1999, p.285). The main 'components' that interact within the SI organisation model are the SI supervision/coordination team, the student Leaders, the attendees and the academic and managerial staff at the institution.

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In proposing the usefulness of complexity perspectives to SI, I am responding to Kuhn's (2009) challenge to "imaginatively apply the complexity metaphors in ways that you judge as authentic and productive" (2009, p.47). In taking up this challenge I will be limiting the discussion to some of the dimensions of complexity theory that appear in the organisational literature which seem particularly applicable to the SI model: self-organising, dynamic and emergent processes, fractality and the edge of chaos. This approach to organising is based on the understanding that 'creative and adaptive' organisations encourage interactions between people at multiple scales of focus, and this feeds back to enhance the organisation (Lewin & Regine 2001). In order to provide examples of this, I will draw upon the peer learning program that I coordinate at an Australian university. I suggest, given the core similarities across the model, that these experiences can be extrapolated to other programs. As such, I propose that complexity perspectives offer meaningful ways to analyse and engage with the SI model of peer assisted learning. Since I am writing from within the Australian context, where SI is predominantly called PASS (Peer Assisted Study Sessions), I will henceforth refer to this model as SI/PASS.

SUPPLEMENTAL INSTRUCTION

Although each SI/PASS program tends to operate autonomously within its particular institution, there are a number of features that interlink all programs which formally identify within this model. The main goals of SI/PASS are to facilitate a peer learning situation that improves students' learning outcomes and increases retention (Birch & Li 2009; Jacobs, Hurley & Unite 2008). Supplemental Instruction originated at the University of Missouri-Kansas City in 1973 when Deanna Martin was charged with addressing the attrition rates of students in the medical and dental faculties (Muhr & Martin 2006; Martin & Arendale 1994; Blanc, DeBuhr & Martin 1983). She drew on a range of learning theories to develop a student centred learning model that focussed on high risk courses rather than high risk students (Hurley & Gilbert 2008). Consequently, strong theoretical frameworks based on the work of behaviourists, cognitive developmentalists, constructivists and critical theorists (Zerger 2008) ensure sound pedagogical and innovative approaches to learning in SI/PASS programs. These include principles of active learning, critical thinking and problem solving that are modelled by senior students who have successfully completed the subject and are comprehensively trained.

The student Leaders are critical to the success of each program. They are usually high achieving students with good interpersonal skills who demonstrate an understanding of the value of collaborative learning among peers (Stout & McDaniel 2006). Their sessions are usually offered weekly and are open to all students studying the particular subject. The Leaders plan and run their sessions, usually alone or in pairs, and create a collaborative learning environment which emphasises learning how to learn in the particular field of study. The Leaders, whose roles are to "mirror the curriculum" (Marra & Litzinger 1997, p.112), rather than re-teach specific content, develop activities and processes that enable interactive and substantial learning. Because SI/PASS targets difficult subjects and does not identify as a remedial program, it attracts a diversity of students ranging from those aspiring to top end grades to those who are concerned about passing (Arendale 2001). The student Leaders are expected to provide a safe and non-threatening learning environment and are supported by their SI/PASS peers and program coordinators in attaining this. The program coordinator and/or their team are usually responsible for recruiting, interviewing and training the student Leaders as well as monitoring their work and ensuring their ongoing professional development. They also conduct regular qualitative and quantitative evaluation of the program.

As can be seen, there are many facets of SI/PASS which are distinctive to the model. However, while maintaining the essential characteristics, each SI/PASS program develops its own unique features and roles necessary for effective functioning

according to their local context (Jacobs, Stone & Stout 2006). Some SI/PASS programs are located in specific faculties and others operate from central units. SI/PASS supervisors may be academics or professional staff and their position within the institutional hierarchy and workload allocation, as well as level of autonomy also vary (Zerger, Clark-Unite & Smith 2006). Other differences between programs include the number of SI/PASS Leaders and attendees, their demographics and density within subjects, the work/study/life balance of attendees and the geographic spread of the institution. Additionally SI/PASS Leaders tend to be paid at varying rates, while in some institutions their services are for academic credit or voluntary (Lipsky 2006). Leaders may be expected to attend the subject lecture, as well as regular SI/PASS meetings, whereas in other contexts they may be paid preparation time only and expected to access the subject materials online (Skalicky 2008). The actual day to day running of each program is largely predicated on relationships and interactions between the range different stakeholders and their particular situations. Although there may be a degree of independence within the organisation of the program many of the variations in the model occur due to institutional culture and constraints such as financial, strategic or pedagogical imperatives and they may alter according to managerial prerogative.

COMPLEXITY THEORY

Since its emergence from the sciences complexity theory has been taken up across many disciplines (Morin 2008; Capra 2007; Plowman et al., 2007; Stacey and Griffin 2005; McMillan 2002; Lewin & Regine 2001; Gare 2000) and has become an arena of competing and contested discourses (Ison 2008; Mason 2008). Delgado Diaz (2007) suggests that through complexity thinking, rather than viewing the world as comprised of individual components we can understand it as "a reality of interactions, emergences and becoming" (p.48). As such, complexity theory poses a relational way of seeing that understands the world as self-organising, dynamic and emergent. Morin (2008) argues that we have embraced a paradigm of simplification that is linear, disconnected and reductionist. He proposes instead, the need for a complexity paradigm as "a kind of thinking that reconnects that which is disjointed and compartmentalised…that tries to discern interdependencies...a multidimensional thinking and an organisational or systemic thinking" (Morin 2008, p.vii). Kuhn and Woog (2008) suggest that a complexity framework offers a meaningful way of interrogating the "messiness of human experience" (p.177). It recognises that unpredictability and interconnectedness are integral features of the human experience and therefore any activities arising within it.

Application of complexity approaches

There is some contention about the validity of applying a theory from the sciences to organisations and whether it can only be applied metaphorically. The application of complexity as metaphor to social inquiry and organisations has been variously argued, particularly drawing on the work of Lakoff and Johnson (1980; 2003). Their landmark work on metaphor proposes that "metaphor is pervasive in everyday life...our ordinary conceptual system, in terms of which we think and act, is fundamentally metaphorical in nature" (p.3). Expanding on this notion, Reason and Goodwin (1999) contend that "while necessarily metaphorical, [it] is epistemologically justifiable" (p.281) to explain organisations from a complexity perspective. In justifying a complexity approach to educational leadership, Gilstrap (2005) also draws on Lakoff and Johnson's contention: "if you see reality as defined by the metaphor…then you can answer the question relative to whether the metaphorical entailments fit reality" (Lakoff & Johnson 2003, p. 158). Gilstrap (2005) further supports the metaphorical significance of complexity theory citing a number of researchers who defend this approach (for example Fullan 2001; Morgan 1997; Wheatley 1992). In proposing the validity of a complexity approach, Kuhn (2009) acknowledges the blurring that can occur between metaphors and concepts, but she argues this is largely inevitable as all concepts are ultimately metaphorical by nature.

Complexity approaches are increasingly utilised in a range of arenas beyond the scientific such as social inquiry, education and organizational theory. Horn (2008) recognises the potential of complexity for educational research and practice in understanding change and transformation. An example of this can be seen in the work of Mason (2008), who applies complexity theory to facilitating significant change in schooling systems by generating intervention at multiple levels. In considering curriculum design, Doll (2008) contends that complexity theory's focus on interconnectedness and interrelatedness can help to enrich the learning process. Likewise, Davis (2008) maintains that complexity is a "properly educational discourse" (p.50) that contributes significantly to the field. Complexity theory informs much of Michael Fullan's work on educational reform and leadership (2001; 2003). He utilises it as a way of dealing with complex issues in complex times and as a challenge to linear or prescriptive approaches to change. Jorg (2009) calls for a rethinking of education practices and theory from a complexity perspective. He argues that the interactive and generative nature of learning is not fully recognised in current learning theory and that a complexity approach can rectify this.

Complexity theory is used increasingly in organisation and management theory to enable the understanding of organisations "as highly complex, ongoing processes of people relating to each other" (Stacey, Griffin & Shaw 2000, p.188). Levick (2002) suggests a complexity view of management is the next logical stage in the development of organisations because it is resonant with their increasingly multifaceted interrelated nature. The use of complexity theory to design and structure organisations is regarded as critical to creating more sustainable and contemporary organisations (McMillan, 2002). Carlisle and McMillan (2006) believe complexity informed work can encourage organisations to foster innovation. For instance, Mahmud (2009) uses a complexity framework to explore self-organisation in enterprises encountering adaptive challenges. The originators of the complex responsive processes perspective, Stacey and Griffin (2005) propose that organisations need to be understood, "not as systems but as ongoing patterning of interaction between people" (p.1); a perspective shared by Lewin and Regine (2001) who take a complex adaptive systems approach to organising (2001). Kuhn and colleagues, who also recognise the pre-eminence of human interactions in organisations, have written extensively about organisations and complexity theory (Kuhn 2009; Kuhn & Woog 2008; Levick & Kuhn 2007) and their work largely informs the following sections.

Fractality

One of the compelling features of complexity theory is the concept of fractality, which I suggest could have valuable application to the SI/PASS model. It can provide a framework for discussing the particularities of each local program within the context of the overarching principles of the model. The term fractal, coined by Mandelbrot, describes "an entity with characteristics that are simultaneously apparent at many scales of focus" (Levick & Kuhn 2007, p.266). This can be seen in nature where a tree's particular trunk and branch structure is replicated in its limbs and twigs and then its leaf structure or in the patterns of a fern where the leaflets repeat the patterns of the fronds. In an organisational context this refers to the same qualities or characteristics being present in all scales of the organisation from the individual, to the organisational units to the organisation as a whole. The concept of fractality applies to the SI/PASS model because, to borrow Reason and Goodwin's terminology, each session, and each program "becomes a unique product of human interaction...and evolves a rich originality while conforming in principle to the same pattern" (1999, p.295).

There is sufficient self-similarity across the entire SI/PASS model, that the genetic code (Martin & Blanc, 1995) of the model is maintained, while adaptions occur in local contexts. Consequently, every level of the model from each session within each subject, to sessions within disciplines and programs within institutions can be seen as fractal dimensions of the SI/PASS model. For example, a PASS session run in Chemistry at my institution will be different from, but still identifiable with, an SI session in Chemistry run at a College in the USA. Analysing SI/PASS through a fractal lens

provides a means for understanding how this model remains fluid but recognisable in the many contexts in which it is run. It also provides a way of analysing the evolution of each institution's distinctive program, while at the same time adhering to the underlying principles of the model. By using examples from the SI/PASS program at my university in the following section of this paper, I will be providing a fractal analysis which I anticipate will be resonant with other SI/PASS programs.

A COMPLEXITY VIEW OF ORGANISING

Kuhn (2009) suggests three reasons for engaging a complexity view of organising. The first reason is that a complexity perspective "removes simplistic hopes of an ordered and controllable existence" (p.12). Acknowledging this then allows for ways of understanding the different and unpredictable situations that can arise in organising due to the vagaries of human existence, and it emphasises the need to be perceptive and responsive. It is then incumbent on those involved (stakeholders), to be attentive and prepared to hold transparent and fruitful discussions to address issues that arise. Secondly, she suggests that a complexity view enables a "means of discerning and identifying underlying patterns of order" (p.12) which can provide for greater insight into processes occurring within organisations. A third reason for the usefulness of a complexity perspective is that it "introduces us to potentiality (possible future emergences) by showing how simple recurrent rules result in complex behaviour and emergence" (Kuhn 2009, p.12). This refers to the nature of change deriving from the many interactions that occur in organisations. Where opportunity is not curtailed or prevented, such interactions can be ripe with creative potency. By enabling interactions among the many people in an organisation unexpected and valuable ideas and practice can emerge. A complexity perspective mitigates against a view of an organisation as a static entity with predictable behaviours and control over both internal and external drivers. Instead, individuals and organisations are recognised as self-organising, dynamic and emergent whereby "the behaviour of the whole organisation emerges from local relationships, with these resulting from the almost infinite number of moment by moment decisions made by all of the individual agents" (Kuhn 2009, p.38). According to this perspective all those who are part of an organisation, in this case their SI/PASS program, are co-contributors to its functioning and potential.

Self-organisation

Three of the mutually interrelated features of complex systems are self-organisation, dynamism and emergence. Self-organisation refers to "a spontaneous emergence of collaborative behaviour among elements in a system" (Montuori, 2008 xxxv). It describes the way that complex systems, existing in a state of 'unstable steadiness' (Doll, 2008, p.198) are able to change their structure to adapt to altered circumstances. Kuhn and Woog (2008) suggest that the principle of self-organisation applies to all 'organic unities' which can be individual cells, individual humans, organisations and societies. In contrast with a rigidly delineated and controlled organisation, a self-organising system responds to interactions within the system and spontaneously re-organises into new and possibly more complex forms. This can be seen for example in the way that the physicality of human beings changes and grows over time but each person maintains their unique self (Kuhn 2009, p.26). In viewing people and organisations as inherently self-organising the focus shifts to the "development of structural arrangements, processes and procedures" (p.29) that facilitate possibilities, rather than attempting to predict and control outcomes.

SI/PASS programs can be seen to behave as self-organising systems as they change and adapt to their local contexts according to both internal and external factors. Principles of self-organisation can be observed on a smaller scale in most SI/PASS sessions where, although there is usually a core group of regular attendees at each SI/PASS session, new students often turn up at sessions. This tends to change the group dynamics as well as the plans for the session where, for instance, the new students may want to cover material addressed in previous sessions. The SI/PASS Leader and

the group will self organise in response to the new situation and the way this occurs in one Leader's session may differ considerably from another session due to the unique personalities and interactions within each group. Being responsive to student needs, as well as dealing with group dynamics are integral elements of SI/PASS training. However Leaders cannot be trained for every possible scenario and instead drawing their awareness to the self-organising properties of their role may assist Leaders to be adaptable and primed to deal with any number of different situations. This would mean highlighting the importance of process rather than specific activities so that the Leader's skills lie in being able to utilise collaborative learning strategies around whatever issues arise.

Similarly the feedback that SI/PASS Leaders receive when they are observed by their supervisors or senior Leaders will often influence their future sessions. If, for instance, I encounter a Leader seeming to be re-teaching rather than facilitating collaborative learning, I will encourage them to reflect on whether they are providing opportunities for interaction among their attendees and if not, how they may be more resonant with the SI/PASS model in future sessions. Consequently, the Leader will then adapt their sessions to encourage more participatory and interactive learning which enables a greater range of potential outcomes for the attendees. Where a session fully involves and engages the attendees it is not only adhering to the SI/PASS model but also enabling the 'spontaneous collaboration' among elements that typifies a self-organising dynamic.

Dynamism

Dynamism refers to energy, activity and change. Kuhn suggests that to perceive the world as dynamic is to recognise that change is an inherent aspect of life with "continuous movement of all entities as they adapt, respond to and influence others and the environment (social and physical) within which they exist" (2009, p.29). When reflecting on 4 years that I have been coordinating SI/PASS at my institution I recall a very dynamic and changing environment. Our SI/PASS program was initiated through an internal Learning and Teaching Project grant and piloted in five subjects. The grant funded all aspects of the program including a proportion of my salary, a casually employed administration officer and the wages of the SI/PASS Leaders. The following year, as our funds decreased, the Schools (Faculties) were required to fund 50% of the Leaders' wages and for the past eighteen months Schools have been responsible for 100% of the Leaders' wages. During this time, a Federally commissioned report has recommended increasing the proportion of Australians who attend University thus catalysing a widening participation agenda (Bradley 2008). This has reinvigorated the emphasis on the first year experience and PASS has been identified as a critical component of the University's strategic approach. Consequently, a centrally funded model has been introduced and the program has been mandated to expand annually. The dynamic nature of the strategic and financial environment demands flexible and creative thinking. As each new year approaches, the PASS program exists in a state of uncertainty and, yet at the same time, great potential. This implies the need for constant readiness to be responsive and sensitive to new situations that can arise at any time. Thus, from this perspective, it is critical to be mindful of the current political, educational and institutional landscapes, as an outlook premised on understanding the dynamic nature of organising prevents complacency and inertia.

Emergence

Emergence is a quality recognised as critical to any discussion about complexity. Kuhn (2009) suggests that there are three important aspects of emergence. The first is that it "refers to the capacity of complex entities to exhibit unexpected and novel properties not previously observed as functional characteristics of the complex entity" (p.31). In the SI/PASS context, multiple examples of emergence have occurred as the original template of the program evolves to adapt to different contexts and circumstances. For example, Video-Based Supplemental Instruction (VSI) emerged in the 1990's as a way of enhancing students' capacity to successfully learn from lectures and master course content (Hurley, Patterson, Painter & Carnicom 2008). Also, online PASS is emerging as

another modality of SI in response to the needs of distance and part time students (Huijser, Kimmins & Evanshuysen 2008). Different nomenclature for SI has emerged in different countries: for example in the United Kingdom it is more commonly known as PAL (Peer Assisted Learning) and as mentioned, in Australia it is usually called PASS (Peer Assisted Study Sessions). Applying the concept of emergence has implications for legitimising innovative and unexpected outgrowths of organising behaviour and practices. It provides the impetus for "sensitivity or receptivity to the emergent interface...and encourages awareness and communication" (Kuhn 2009, p.34).

An example of emergence has occurred in the SI/PASS program I coordinate where students are located on five main campuses spread across Greater Western Sydney. As the program coordinator I have been the main source of contact, support and monitoring of SI/PASS Leaders and their sessions and due to geographic constraints I have been unable to hold the regular meetings with Leaders which are a common feature of SI/PASS. As a result, I have had to develop alternative methods of communication that enable Leaders to communicate regularly with me as well as each other. The solution that emerged from this situation was the creation of an online community of practice. We utilise a discussion facility within our university online environment as our meeting space, and each student is expected to post a weekly report about their session and to read and give feedback to other Leaders about any issues they may raise. Although this does not offer the same degree of professional development as weekly face to face meetings we have nevertheless found innovative ways of sustaining regular and meaningful communication.

The second point that Kuhn (2009) emphasises about emergence is the idea that complexity arises from less complex elements. She suggests that the implications of recognising this are that where control is too tight or overbearing, or complexity is avoided as being too complicated, new ideas or processes can tend to be stifled. Where organisations experience a time poor culture, resistance to meetings and a preference for quick and simple solutions there is little fertile ground for emergence. In terms of SI/PASS this again reinforces the importance of facilitating opportunities for interaction among all stakeholders and openness to devising solutions to local situations in a collaborative manner. For example, a recent university wide PASS forum has had a number of unexpected consequences in terms of executive support and School (Faculty) buy-in. The third feature of emergence relates to the role of humans in co-constructing the phenomena of which they are a part. In other words, humans are active participants in any situation, and their decision or capacity to act or not, will necessarily affect any processes or outcomes. This implies that problem solving can occur in creative and communicative ways where stakeholders are invited to participate rather than taking a 'management by correction' approach (Kuhn 2009). For instance, when issues arise within the SI/PASS program, such as low numbers attending sessions, or lack of support from subject coordinators, I can choose as coordinator to impose responses to the situation or I can facilitate dialogue with the people involved. Where a team based approach underlies the organisation of an SI/PASS program cooperative and innovative solutions are more likely to emerge.

Edge of chaos

The edge of chaos is another feature of complexity that has application to the SI/PASS model. This tem relates to the "narrow region between fixed behaviour and chaotic behaviour" (Kuhn 2009, p.5) where potentiality can best flourish. It is understood to be an optimum state which can catalyse change that occurs quickly and unexpectedly. Contrary to popular parlance, it does not mean that all things fall into disarray; rather it is a highly creative zone where fertilisation of new ideas and possibilities is most likely. This is not to diminish the stability that comes from a sense of equilibrium, but it is necessarily an impermanent state and being aware of the edge of chaos prevents a false lulling into stasis. Systems that are well connected and contain diversity are more likely to move towards the edge of chaos than homogenous systems.

An organisation that functions at the 'edge of chaos' embraces change and recognises the afore-mentioned aspects of complexity approaches as integral elements of an adaptive organisation. If an 'edge of chaos' lens were to be applied to a SI/PASS program it might enable the coordinators to reflect on their openness to new opportunities and scenarios arising in their program. For instance, we have been piloting various forms of SI/PASS at my institution that diverge from the classroom model. Although they have been used in other institutional settings, we are moving beyond our current structure and embracing risk and creativity. Where I perceive, for example, our foray into online PASS as an adventure in complexity that is creating opportunities for students who otherwise cannot experience SI/PASS, I am more emboldened to explore possibilities than intimidated by potential barriers. Similarly, when our student Leaders offered a pre-exam SI/PASS session in the study week and were inundated by 300 students, they operated at the edge of chaos as they ensured an interactive, semi structured learning experience. They could easily have fallen into creating a rigidly controlled, or alternatively, a chaotic environment but instead admirably adhered to the principles of SI/PASS and enabled students to form groups to work collaboratively on the practice exam paper.

CONCLUSION

It is important to consider conceptual frameworks that enhance our understanding of the SI/PASS model and the local programs that comprise it. Through conceptualising the processes that underpin the model, stakeholders can be more empowered to pursue adaptations for their particular contexts, without losing the essential features of SI/PASS. A complexity perspective, whereby organisations are understood to be essentially about people (Lewin & Regine 2001) emphasises the need to facilitate optimum opportunities for interaction across all scales of the model. In my experience, SI/PASS is an effective and rewarding program, supported by evaluations which continually attest to the benefits for SI/PASS Leaders and attendees. By looking at the SI/PASS model and the many different programs that comprise it, through a complexity lens, we may find new and useful ways of articulating and exploring the potential within the model. This paper has suggested the usefulness of a complexity approach to SI/PASS, and hopefully it will begin some conversations that will consider the implications and opportunities of seeing the program in all its complexity and potential.

Although I have focussed strictly on the SI/PASS model of peer learning it is possible to transfer the complexity approach to any organisational setting. The quintessential feature, I suggest, is the recognition that the interactions between all stakeholders are the underpinnings of organisations. Where these are enabled and fostered an innovative and effective model can emerge that is appropriate to the local context. If principles and processes are the guiding raison d'être for a program, whether it is based on an international, national model or sector wide model, there is greater scope for growth and adaptation. A complexity lens provides both a wide angled and penetrating view of organising that can offer rich insights. There is much scope for application of this perspective in the educational arena.

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