# The process of developing distributed-efficacy and social practice in the context of 'ending AIDS'[1]

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**Abstract**

Introduction: this article reflects on data that emanated from a programme evaluation and focuses on a concept we label 'distributed-efficacy'. We argue that the process of developing and sustaining 'distributed-efficacy' is complex and indeterminate, thus difficult to manage or predict. We situate the discussion within the context of UNAIDS' recent strategy — Vision 95:95:95 — to 'end AIDS' by 2030 which the South African National Department of Health is currently rolling out across the country.

Method: A qualitative method was applied. It included a Value Network Analysis, the Most Significant Change technique and a thematic content analysis of factors associated with a 'competent community' model. During the analysis it was noticed that there were unexpected references to a shift in social relations. This prompted a re-analysis of the narrative findings using a second thematic content analysis that focused on factors associated with complexity science, the environmental sciences and shifts is social relations.

Findings: the efficacy associated with new social practices relating to HIV risk-reduction was distributed amongst networks that included mother—son networks and participant—facilitator networks and included a shift in social relations within these networks. Discussion: it is suggested that for new social practices to emerge requires the establishment of 'distributed-efficacy' which facilitates localised social sanctioning, sometimes including shifts in social relations, and this process is a 'complex', dialectical interplay between 'agency' and 'structure'.

Conclusion: the ambition of 'ending AIDS' by 2030 represents a compressed timeframe that will require the uptake of multiple new bio-social practises. This will involve many nonlinear, complex challenges and the process of developing 'distributed-efficacy' could play a role in this process. Further research into the factors we identified as being associated with 'distributed-efficacy' — relationships, modes of agency and shifts in social relations — could add value to achieving Vision 95:95:95.

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**Keywords:** distributed-efficacy; complex adaptive systems; complexity & management science; environmental science; HIV/AIDS

## Introduction

This article reports on the findings of, and reflections from, a programme evaluation undertaken in 2013. The purpose of the evaluation was to respond to a community based organisation that had requested an audit of one of their programmes called Boys 2 men (B2M). The evaluation design focused on the network that was involved with the programme and 'AIDS competent communities' (Campbell, 2009). We report briefly on those findings and then reflect in more detail on a theme we have labelled 'distributed-efficacy' because it could contribute to an increased understanding about one of the discrete dynamics of behaviour change in the context of HIV.

This reflection was prompted by the release of UNAIDS' Fast Track and Gap Report, 2014, which outlines the current ambition of 'ending AIDS by 2030'. Within this argument UNAIDS emphasise that "[we] have a fragile five-year window to build on the rapid [biomedical] results that have been made. *The next five years will determine the next 15* (emphasis added, UNAIDS, 2014b, p. 5; also see UNAIDS, 2014a, p. 1). Implicitly this means that a broad portfolio of new social practices — based on biomedical avenues for ending the epidemic — will have to become established in a very short time frame. Many reflections about the consolidation of new social practices in the context of HIV demonstrate that this is a major challenge that remains contested and is thus worthy of further critical reflection (Ellman, 2015).

### The initial focus of the evaluation: Competent Communities

AIDS Competent Communities have been described as "one[s] where community members work collaboratively to support each another in achieving: sexual behaviour change; the reduction of stigma; support for people living with AIDS and their carers; co-operation with volunteers and organisations seeking to tackle HIV-prevention and AIDS-care; and effective accessing of existing health services and welfare grants" (Campbell, 2009, p. 4). Campbell's 'competence model', influenced by the work of Freire (1973) and Habermas (1992), suggests that for knowledge to become an embodied process that increases resilience to HIV/AIDS-related challenges requires that it should be reinforced through interconnected factors that are primarily psycho-social in nature .

The model consists of:

i. Acquiring basic knowledge and skills of HIV prevention, treatment and care;
ii. Opening social spaces for dialogue and thinking about HIV/AIDS-related challenges - influenced by Freire's notion of critical consciousness (Freire, 1973) and Habermas' notion of a public sphere (Habermas, 1992);
iii. Taking ownership and responsibility for tackling the challenges;
iv. Developing solidarity of purpose; and
v. Bridging social capital so that links to other relevant institutions that have potentials to support the work is maintained (Campbell, 2009).

Our understanding of the 'competence model' is that it was designed to be a platform for creating an enabling environment within which people are able to adapt to the challenges

presented by HIV/AIDS, yet does not provide specific insights into the processes through which people will adopt - or reject - new social practices that facilitate a reduction in HIV-related challenges.

## Findings that prompted a re-evaluation of the narrative

During the initial analysis of the narrative a theme emerged that suggested that aside from the focus of the evaluation, there were indicators of change that were reinforced through social sanctioning, partially distributed throughout specific networks within the community and that shifts in social relations amongst the affected networks were a component of the change process. These processes were social, distributed in patterned, coherent networks (i.e. — it was not a random, disorganised form of distribution) and appeared to demonstrate nonlinear properties that are associated with complex adaptive systems (Stirzaker, Biggs, Roux, & Cilliers, 2010).

We tentatively labelled this phenomenon: *'the process of developing distributed*-efficacy', in contradistinction to the presence — or absence — of '*self-'* or *'collective'* efficacy (Bandura, 2000) and used the theme for the basis of the reflection. In order to frame our enquiry we made use of the Iceberg Metaphor.

## The Iceberg Metaphor

Throughout the article we make use of the 'Iceberg Metaphor' that was developed by futures scientist Sohail Inayatullah (2008), combined with the notion of 'first' (cosmetic) and 'second' (systemic) order change proposed by Watzlawick, Weakland, and Fisch (1974) as a heuristic (Table i).

**Table i: Causal layered analysis, contextualised by first and second order change.**

| Change typology | Layer | Concern / foci |
|---|---|---|
| First order (cosmetic) — *above the surface* | Litany | Issue presented as the uncontested truth, is superficial lacking depth, can result in a sense of helplessness or apathy |
| Second order (systemic, inclusive of values) — *below the surface* | Social / causal | Issues presented in terms of systemic and/or technical explanations |
| | Worldview / discourse | Deeper, more complex understanding of the issue. Relates to the meaning of the issue that is constructed. Worldviews shape understanding, and by understanding a worldview, researchers are able to determine insights as to how an issue is socially constructed.<br>Discourses express a worldview through the sorts of words, terminology or phrases that are used.<br>There may be multiple worldviews evident in the one data set. |
| | Myth metaphor | Deep mythical stories and social/cultural archetypes, emotional experiences and responses to the issue.<br>This is the most distal layer of analysis and is likely to require the greatest amount of analytical investment. |

*Source:* adapted from Bishop, Dzidic, Breen, and Bishop (2013, p. 5), influenced by Inayatullah (2013) and Watzlawick et al. (1974)

Table i represents the 'Iceberg Metaphor' combined with Watzlawick *et al.*'s conceptualisation of change. We disagree that the 'first order' change is purely 'cosmetic' and suggest — after Bishop et al. (2013) — that it is the *relationship* between 'first' and 'second' order phenomena that facilitates rich insights into change processes. Such a conceptualisation

requires that the 'cosmetic first' order be viewed as a dynamic aspect of a broader, relational focus of enquiry.

We also suggest that 'second order' change can be expanded to include not only systemic issues — but also myth and metaphor (Lakoff & Johnson, 2003) which we label as 'values' because it has been argued that peoples' value systems are discrete mediators of decision making (Rogers, Luton, Biggs, Biggs, Blignaut, Choles, Palmer, & Tangwe, 2013). Throughout the article we use the expression 'first order' to denote descriptive, visible aspects of change — the *litany level* — and 'second order' to represent the 'submerged', discrete mediators of change — the *levels of social causes, worldviews and myth and metaphor* and emphasise the *relationship* between the two as being a critical mediator for the deconstruction — and reconstruction — of the narrative.

### The primary influence of the reflection: UNAIDS' 'Fast Track' and 'Gap Report', 2014

The catalyst to this reflection is an urgent call from UNAIDS for a qualitative shift in the fight against HIV from the existing "response mode to a mission mode" that they labelled Vision 95:95:95 which they claim can facilitate the ambition of 'ending AIDS' by 2030 (UNAIDS, 2014b, p. 299) — also see UNAIDS (2014a). This ambition is explicitly underwritten by the need "for shaking up outdated modes of thinking", suggesting the need for multiple paradigm shifts in the new 'mission mode' era of HIV/AIDS (UNAIDS, 2014b, p. 296). South Africa was the first country to adopt this strategy and the National Department of Health is now preparing to roll it out across the country (Motsoaledi, 2014).

UNAIDS also emphasises that the epidemic is complex. Specifically, the report identifies twelve categories of populations who have been 'left behind' and attribute complex reasons for why they have been left behind — and remedial action as to how to 'close the gap'. The remedial actions to fix these complexities — primarily focusing on policies and social practices — represents a significant amount of the report (UNAIDS, 2014b, p. 118-280). Placing emphasis on confronting the complexities of the epidemic is welcome and echoes parallel calls (Piot, Bartos, Larson, Zewdie, & Mane, 2008; Whiteside & Strauss, 2014).

## The fly in the biomedical ointment

Despite this wave of optimism, some significant 'wicked' (Rittel & Webber, 1973) — or intractable — problems continue to dominate the HIV landscape in South Africa. These wicked challenges tend to be bio-*social* in nature and can often be characterised as complex. Examples of these complex challenges includes: non-adherence to antiretroviral medication (Stricker, Fox, Baggaley, Negussie, de Pee, Grede, & Bloem, 2014); a lack of basic knowledge about HIV/AIDS (Shisana, Rehle, Simbayi, Zuma, Jooste, Zungu, Labadarios, Onoya, David, Ramlagan, Mbelle, Van Zyl , & Wabiri, 2014); drug resistance (Manasa, Lessells, Skingsley, Naidu, Newell, McGrath, & de Oliveira, 2013); the intersection of HIV with other chronic conditions (Deeks, Lewin, & Havlir, 2013) and 'structural' issues such as the context within which sex workers are exposed to the risk of contracting HIV (Shannon, Strathdee, Goldenberg, Duff, Mwangi, Rusakova, Reza-Paul, Lau, Deering, Pickles, & Boily, 2014). Ignoring these 'wicked' problems risks the "epidemic springing back even stronger" — as UNAIDS (2014a, p. 1) has cautioned.

The themes identified above: the possibility of 'ending AIDS'; the compressed time frame and the complexity of the HIV landscape influenced the decision to investigate the notion of 'distributed-efficacy' further because UNAIDS is clear that radical changes are required, at multiple scales, yet the discourse surrounding these processes is distinctly contested (Nguyen, Bajos, Dubois-Arber, O'Malley, & Pirkle, 2011).

### A contested discourse implicitly situated within the call to 'end AIDS by 2030'

UNAIDS' recommendations are dominated by the necessity of changing social practices in multiple contexts and the current 'treatment as prevention discourse' surrounding the potential of biomedical 'achievements' (UNAIDS, 2014b) to become adopted as new 'bio-social' practices has been contested for some time (Ellman, 2015; Singer & Clair, 2003).

The challenge that underlies the contested discourse is that the process of integrating biomedical opportunities into HIV risk-reduction strategies is invariably a process of discovering new ways to integrate the biomedical opportunities within existing social practices so that novel intersections of bio-social practices arise. Proponents of the bio-social discourse critique the biomedical world's *presumption* that the new opportunities can be parachuted into a community and that they will necessarily absorb them (Adam, 2011; Nguyen et al., 2011) — as is evidenced by the reported ineffectiveness of the 'Abstain, Be faithful, Condomise' (ABC) campaign in sub-Saharan Africa (Lo, Lowe, & Bendavid, 2015). Much of the contestation implicitly circles around the binary distinction made between the sociological concepts of 'agency and structure' (Giddens, 1984).

### Secondary Influences: 'middle ground' emergence, complexity and 'everyday communication'

In the context of HIV/AIDS, Kippax, Stephenson, Parker, and Aggleton (2013) confront the binary distinction between agency and structure arguing for a 'middle ground'. They do this by arguing that in the context of HIV and 'vulnerability' the potentials of individual 'agency' to achieve the uptake of opportunities is reified, whilst almost erasing social 'structure'. In the context of 'resilience' — such as the competence model described above — the opposite tends to be the case, with structure taking precedence over agency. A 'middle ground' alternative that Kippax et al. (2013) proposed reflects the emergence of phenomena from the dynamic *relationships* between agency *and* structure, which has resonance with the nature/nurture debate (Cole, 1999; Levins & Lewontin, 1985). This argument is further developed after we present some background information about complexity and HIV/AIDS.

## Complexity science and HIV/AIDS

Increasingly, direct and indirect links are being made between health care and complexity science (Burman, Moerschell, Mamabolo, Aphane, & Delobelle, 2015b; Jayasinghe, 2011; Plsek, 2003). In 2008, it was argued that the HIV epidemic is an example of a complex health-related phenomenon which requires capacities to be developed that are "able to deal with complexity . . . . [and that] analytical tools need to be designed to capture these dynamics" (Piot et al., 2008, p. 853). Since that time there have been several attempts to do that (Leach, Scoones, & Stirling, 2010; Stillwaggon, 2012) and recently it has been argued that the HIV epidemic represents a 'complex adaptive epidemiological landscape' (Burman, Aphane, & Delobelle, 2015a).

Typically, complexity "refers to the nature of the problem[s] not the degree of difficulty" which are found in complex adaptive systems (Stirzaker et al., 2010, p. 600). Some guiding

characteristics about the system dynamics have been consolidated since Warren Weaver (1948) began the debate about the relevance of complexity over half a century ago, Table ii.

**Table ii: Key concepts associated with complex adaptive systems.**

| |
|---|
| ***Complexity and systems:*** These first three concepts relate to the features of systems which can be described as complex. |
| Systems **characterised by [patterned and coherent] interconnected and interdependent elements and dimensions are a key starting point** for understanding complexity science.<br>**Feedback processes crucially shape how change happens** within a complex system.<br>**Emergence** describes how the behaviour of systems emerges – **often unpredictably** – from the interaction of the parts, such that the whole is different to the sum of the parts. |
| ***Complexity and change:*** The next four concepts relate to phenomena through which complexity manifests itself. |
| Within complex systems, **relationships between dimensions are frequently nonlinear**, i.e., when change happens, it is frequently disproportionate and unpredictable.<br>**Sensitivity to initial conditions** highlights how **small differences** in the initial state of a system can **lead to massive differences later**; butterfly effects and bifurcations are two ways in which complex systems can change drastically over time.<br>Phase space helps to build a picture of the dimensions of a system, and **how they change over time**. This enables understanding of how systems move and evolve over time.<br>**Chaos and edge of chaos** describe the order underlying the seemingly random behaviours exhibited by certain complex systems. |
| ***Complexity and agency:*** The final three concepts relate to the notion of adaptive agents, and how their behaviours are manifested in complex systems. |
| **Adaptive agents react to the system and to each other**, leading to a number of phenomena.<br>**Self-organisation characterises** a particular form of **emergent property** that can occur in systems of adaptive agents.<br>**Co-evolution** describes how, within a system of adaptive agents, co-evolution occurs, such that the **overall system and the agents within it evolve together**, or co-evolve, over time. |

*Source:* adapted from Ramalingham, Jones, Reba, and Young (2008, p.8, emphasis added)

Not only do complex adaptive systems - ones where "at least some… components [within a system] have non-linear relationships between them" (Stirzaker et al., 2010, p. 600) - exhibit characteristics, they also have properties. These "properties are represented by [interconnected] variables or observables: quantities that have a range of possible values …. [and] describe the system's state", anchored to a particular moment within a historically analysed dynamic process. The way in which the state alters is described as the "trajectory of the system" and these dynamics of change represent a "system whose state (and variables) evolves over time, doing so according to some [patterned] rule …. [influenced by] its initial conditions" (Rickles, Hawe, & Shiell, 2007, p. 933).

Despite the claim that "the science of complexity can help all of us address the challenges and opportunities we face in a new epoch of human history" (Snowden & Boone, 2007a), the reality is that applications of complexity science to HIV/AIDS remain marginal. However, it is providing researchers with novel ontological opportunities to re-examine the HIV epidemic (Burman et al., 2015a) — which may gradually facilitate new bio-social frameworks for contributing to the 'end of AIDS'.

## Complexity and change

It has been argued that in complex situations it is necessary to go beyond the constraints of traditional scientific boundaries, such as the distinction between agency and structure, associated with attempts to identify discernible cause–effect linkages as *definable answers to problems* — and adopt alternative strategies. One alternative strategy is to surface the discrete second order relationships and patterns between, and within, systems that sustain the visible, first order descriptors and work *towards ambiguous solutions* by manipulating second order variables (Snowden & Boone, 2007b).

Based on this conceptualisation of change, Burman et al. (2015a) argue that the HIV epidemic can be characterised as a complex adaptive system influenced, and constrained, by dynamic second order interconnections — some of which are nonlinear. The change process within such a system reflects shifts in dynamics between — and within — a virus-human-environment landscape that generates and sustains patterned first order emergence, Figure 1. From this perspective, *emergence* is the *visible first order* indicator of change which is influenced by *shifts in discrete second order* relational dynamics.

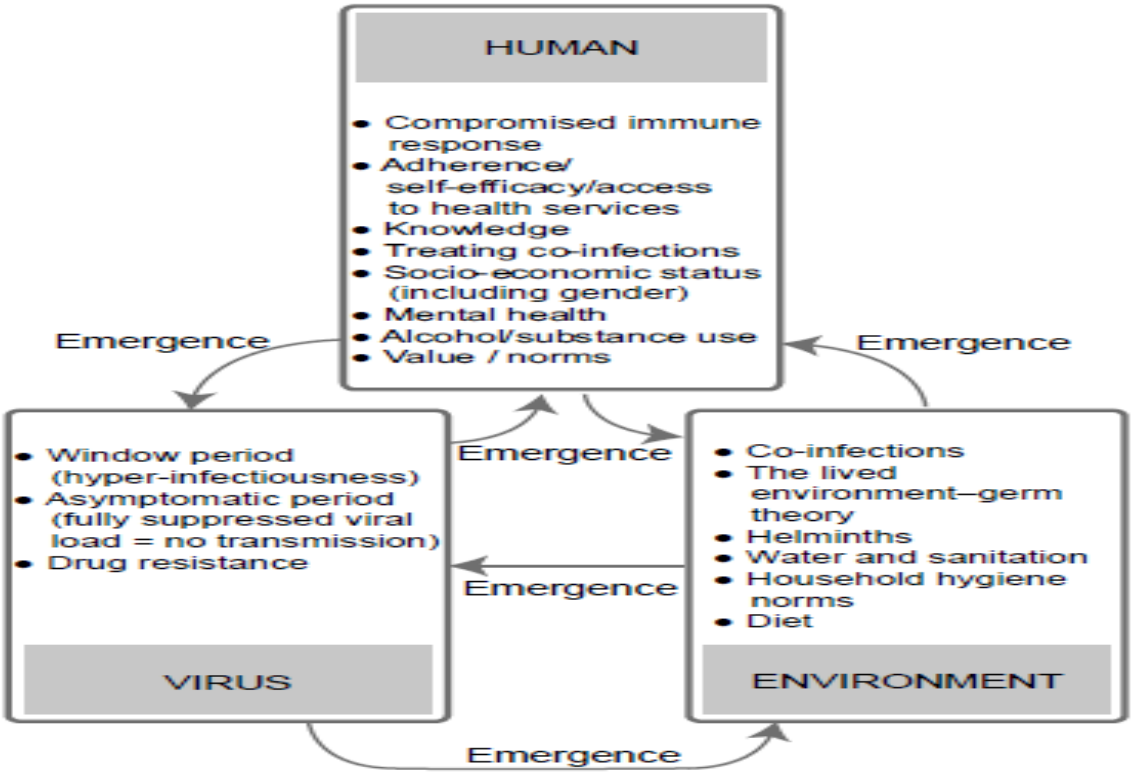


**Figure 1. A generic representation of the interconnections that produce emergence within a complex adaptive HIV landscape. *Source*: Burman et al. (2015a, p. 16)**

The first order emergence that is depicted in Figure 1 represents phenomena that arise through second order interactions of — or within — components of the HIV landscape. Some of the 'emergence' is linear — such as increases in the viral load due to co-infections (Modjarrad & Vermund, 2010) and the subsequent impact of this emergence at a population level (Abu-Raddad, Barnabas, Janes, Weiss, Kublin, Longini, Wasserheit, & Group, 2013). Some of the 'emergence' is nonlinear — such as a decline in condom use (Shisana et al., 2014), despite evidence that most people in South Africa are aware of both the effectiveness

of condoms as a risk-reduction mechanism and that the epidemic continues to pose both an individual and public health risk.

Living within — or managing — an HIV epidemic necessarily involves a number of on-going 'first' and 'second' order processes which influence the forms of emergence that become distinct characteristics of the virus-human-environment heuristic at particular historical moments. Some forms of emergence are *novel* — such as the change in condom use in recent years (Shisana et al., 2014, p. xxxii & 130); some are *relatively short lived* — such as the different government responses to the epidemic in South Africa (Fourie & Meyer, 2013) and other forms of emergence are *long term phenomena* — such as non-adherence to medication in resource scarce settings (Gabillard, Lewden, Ndoye, Moh, Segeral, Tonwe-Gold, Etard, Pagnaroat, Fournier-Nicolle, Eholie, Konate, Minga, Mpoudi-Ngole, Koulla-Shiro, Zannou, Anglaret, Laurent, & Group, 2013).

From the perspective of complexity science, the factors that set the different forms of emergence apart are the *degrees of connectivity* between the components of the system. Novel forms of emergence arise through new *interconnections* emanating from systemic changes that may gradually develop into strong *interdependencies* that are self-sustaining (Hatt, 2008). The trajectory from weak interconnections to strong, self-sustaining interdependencies is known as autopoiesis, first coined by Maturana and Varela (1980), and is a critical concept because self-sustaining, or 'locked-in' (Vergne, 2013) emergence can remain stubbornly resistant to attempts at altering it — if *only* 'first order' change efforts are made to address it (Wilson, Holt, & Greenhalgh, 2001).

From this perspective, change processes reflect systemic connectivity shifts at the discrete 'second order' level that produce visible, surface descriptors of change — emergence at the 'first order' level — which are influenced by history, systemic connectivity, ambiguity and context. The emergent first order change, may simultaneously become a reinforcing factor within the system which contributes to the degrees of connectivity within the system — hence first order changes are not 'purely cosmetic' as Watzlawick et al. (1974) suggested. This perspective also enables the analysis to circumvent the reification of either 'agency' or 'structure' because the focus is exclusively bound to a primary focus on the emergence of phenomena that emanate from dynamic first and second order relationships within complex systems — that is inclusive of the role of both individual agency and the influence of structural constraints or opportunities.

## Drawing the threads together: competence, social practices and complex 'middle ground'

A compelling argument is made that the 'competent community' model is "informed by an understanding of the centrality of community in social transformation" but although the role of "collective agency in HIV prevention is emphasized, collective agency is cast as an aggregate of individual agency …. with the result that the conceptual means to understand *modes of agency* as they arise in social relations are overlooked"(emphasis added, Kippax et al., 2013, pp. 1369-1370). Arguing for some 'middle ground' between agency and structure, Kippax et al. (2013, p. 1370 & 1372), claim that social transformation, including new social practices, ultimately emerge through contingent, localised "collective experimentation …. that may work in unintended [hence nonlinear and thus 'complex'] ways" — with the mediator of these outcomes arising from "the social connections within communities, groups, or networks". This process of change is normalised through community "dialogue [through

which] social practices are modified and other practices, such as safe sexual practices…. are produced [and] norms that enable and sustain safe sex …. are built".

From this perspective, the second order change process that reflects "*relations* between people, the *norms* that regulate such relations and the social practices that constitute them, and the ways in which groups and communities as well as institutions *respond* to *external forces*" implicitly emphasises the *mode of agency* referred to above (emphasis added, Kippax et al., 2013, p.1373).

This 'middle ground' notion of adopting a new social practice is deeply rooted within the constraints and opportunities that ambiguity, context, and connectivity present when confronted with an opportunity to develop a new social practice. It emphasises that both 'agency' and 'structure' — and the relationship between the two — are influential factors that contribute to the process of new social practices being consolidated. The centrality of the concept 'mode of agency' is particularly insightful: social transformation represents first order change; second order changes reflect shifts in norms and relationships which are discretely influence 'modes of agency' — with the 'mode of agency' discretely influencing norms, relationships and the first order identity of social transformation.

The process is nonlinear, with the relationships between 'mode of agency' and shifts in 'norms and values' providing the change process with identity — as exemplified by distinct social responses to the epidemic in particular contexts, such as Zimbabwe's grassroots response to HIV/AIDS in an era when there was scant access to antiretroviral medication (Halperin, Mugurungi, Hallett, Muchini, Campbell, Magure, Benedikt, & Gregson, 2011). This has resonance with an argument presented from the perspective of adopting new practices — as UNAIDS has called for — and 'everyday communication' derived from the environmental sciences (Leeuwis & Aarts, 2011).

## Innovation and 'everyday communication'

Recent thinking in rural innovation studies, influenced by complexity science, suggests an evolutionary perspective that reflects the intersection of coincidence, conflict, unintended outcomes, networks and interdependencies that have confounded more linear explanations of innovation (Prigogine & Stengers, 1984). This evolutionary perspective also promotes the idea that for a new practice to be accepted within a social space, it must be situated within pre-existing practices or to displace existing practices.

Displacement or overthrowing a dominant practice requires some sort of a social shift which usually includes social relations (Geels & Schot, 2007). From this platform, innovation theorists argue that "innovation is eventually performed by interdependent societal agents who interact with each other in numerous settings and networks" (Leeuwis & Aarts, 2011, p. 26). These societal agents are often prompted by professional facilitators, but the potential of the innovation to take root relies on the ability for localised self-organisation, at indeterminate scales — with self-organisation understood to be the emergence of a new form of order which incorporates and sustains the new practices (Nicolis, 1989).

These theorists argue that everyday communication is a major contributor to the dynamic process of an innovation being adopted that involves "network building…social learning [and] dealing with *dynamics of power and conflict*" (emphasis in original, Leeuwis & Aarts, 2011, p. 30). The argument concludes by suggesting that "everyday communication among

stakeholders is of critical importance for the re-ordering of social relationships and the emergence of space for change in networks" by normalising and reinforcing the new social practice (Leeuwis & Aarts, 2011, p. 33).

This perspective of innovation — implicitly the development of a new social practice — reiterates that there is a deeply rooted sociality embedded within the change process suggesting that it is necessary to go beyond an exclusive focus on individual 'agency' or 'structure' to explain the process of consolidating new practices.

### Overview of the above

We have provided a transdisciplinary account of different reflections on the process of developing and adopting new practices that is represented below (Figure 2)

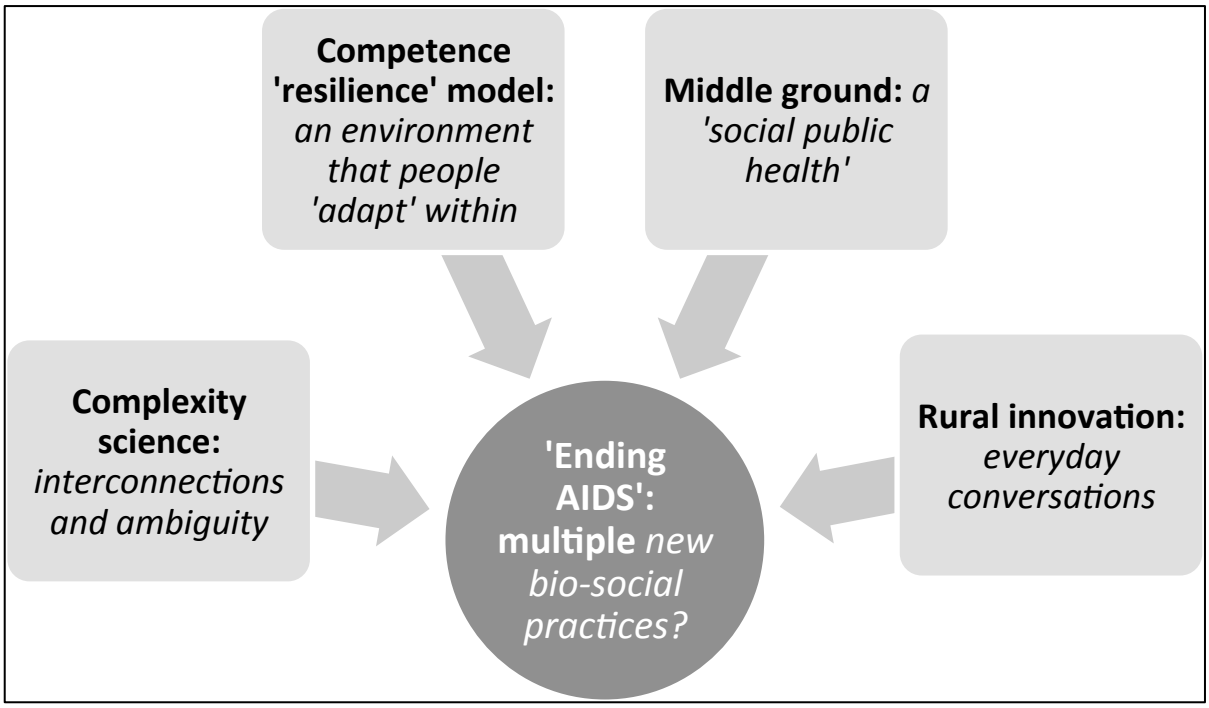


**Figure 2: An overview of the transdisciplinary perspectives. *Source:* authors' contribution**

Complexity, the 'middle ground' and 'everyday conversations' all converge on points of similarity: an adoption of a new practice is social, ambiguous, constrained and influenced by historical particularities. The 'competency model' appears to be based upon a belief about what 'should' happen if communities construct — and then adapt to — the structures that the model identifies. Based on the above we now turn to the case material.

## The case material

The evaluation focused on a programme called Boys 2 Men and was undertaken by the Development Facilitation and Training Institute, University of Limpopo, as a community engagement activity at the request of the host organisation – the Waterberg Welfare Society (WWS). The evaluation design was guided by the request for information about the competencies that could be associated with the programme; the network that the programme had reached; what ambitions the participants had for the programme and whether there was interest from teenage girls and young women for a parallel programme.

### The Waterberg Welfare Society

The Waterberg Welfare Society operates in the Waterberg district of the Limpopo Province. Waterberg is predominantly rural spanning over 44,000 square kilometres with a population of 679,336 of which many live extremely marginalised lives — with youth unemployment rates estimated to be as high as 35.5% (STATS-SA, 2012). Antenatal statistics indicate that HIV prevalence has increased amongst pregnant women from 28.8% in 2009 to 30.3% in 2011 (Department of Health, 2012p. 36) and the National HIV Prevalence, Incidence and Behaviour Survey, for 2012 suggests a prevalence rate of 10-12% in the district (Shisana et al., 2014, p. 48). WWS has been providing help and support for people infected or affected by the HIV/AIDS epidemic since 2000 and have a catchment area that reaches approximately 40,000 people. In 2007 WWS began piloting the B2M programme and by 2009 the programme became fully functional.

### Boys 2 Men

The B2M programme is based upon a combination of the social cognitive model of behaviour change (Bandura, 2004) and a Freirian framework of empowerment (Freire, 1973). The focus on a single sex programme was a deliberate attempt to design a 'male-friendly' initiative that would encourage teenage boys and young men to begin to enter into critical dialogue about their role in HIV/AIDS-related issues. At the time, drawing teenage boys and young men into these dialogues was an innovative move, which has since been adopted in many quarters and is now included in UNAIDS' mission to 'end AIDS' (UNAIDS, 2014a).

B2M recruits participants from local schools, sports clubs, local townships and outlying rural areas. The primary focus of the programme is to enable men to construct skill-sets that assist them to negotiate many challenges associated with HIV/AIDS and promote wellness.

## Methodology

A social network analysis technique called Value Network Analysis (Allee, 2008) combined with the Most Significant Change Technique (Davies & Dart, 2005) were used as the principal investigation techniques. The combination approach was designed to prompt semi-structured questions about the network (Value Network component), as well as open-ended prompts (Most Significant Change), followed by closed, telephonic, follow-up questions and queries with key informants ($n$=18) designed to clarify ambiguities within the preliminary round of data collection.

The evaluation focused on people with a long term involvement with the programme, including six facilitators of the programme who had been through the programme as teenagers; six teachers or sports coaches from institutions where the programme had been active for a minimum of two years and six mothers whose children had been through the programme. An overview of the approach is provided in Figure 2 below.

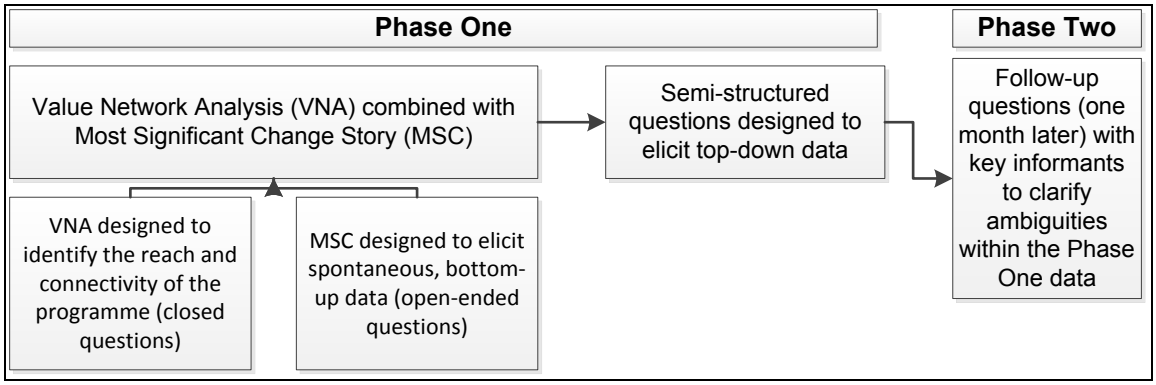


**Figure 3: An overview of the research methodology.** ***Source:*** **authors' contribution**

The methodological design was intended to elicit bottom-up and top-down information. The details of the approaches are provided below.

## The Value Network Analysis

Value Network Analysis (VNA) is a social network analysis technique that has primarily been utilised to provide indications of the robustness of a network by assessing the resilience of the network; the value creation, or impacts, within the network; the perceived value of transactions within the network; asset management; the channels of preferred communication and bottle-necks in communication throughout the network (Allee, 2008). VNA, influenced by both the complexity and management sciences emphasises the importance of both the formal and informal feedback within a network — as well as the role of relationships within the system. VNA is dominated by closed questions that are specifically designed to gradually construct an overview of the network under analysis.

## The Most Significant Change technique

The Most Significant Change (MSC) is an evaluation technique that was intentionally designed to capture the unintended consequences of an intervention, as well as the intended consequences because many lessons can be learnt from both (Dart & Davies, 2003; Willetts & Crawford, 2007). The MSC technique was incorporated within the VNA and required that when the mapping process triggered memories of significant events the participants were requested to explain the real event — and the way in which this event influenced the programme. The story was indexed to the map by facilitators during the evaluation and the narrative content was later analysed using Nvivo 10. The MSC component was participatory and open-ended.

## Key informant interviews

One month after the evaluation the participants were telephoned and asked the following questions:

i. On a scale of one to five [one is no change and five is high change], did the boys that you know who went on the B2M programme change their behaviour?
ii. Can you tell me of a real life 'behaviour change story' that you know of from boys who have been through the programme?
iii. In the transcriptions people talked about how the 'boys are able to talk about difficult subjects'. Can you tell me which subject they now find easier to talk about (Violence, HIV/AIDS, Drugs / Alcohol, Parenting, Relationships, Peer pressure, Other)?

iv. Many of the transcripts talk about 'bonds between the boys'. Why is this important?
v. Please indicate whether there is interest from girls in a similar programme.

### Analysis

In order to triangulate the data so that it was inclusive of the various techniques it was analysed in complementary ways. The VNA and MSC data were mapped visually and empirically. Two thematic content analyses (Elo & Kyngas, 2008; Hsieh & Shannon, 2005) were linked to the five pillars of the competence model described above and also to a complexity framework, adapted from Ramalingham et al. (2008) — see Table 2. This was followed by a third thematic content analysis that focused on social relations.

## Findings

### The Value Network Analysis

The Value Mapping technique indicates that the network members included The Development Facilitation and Training Institute (DevFTI) of the University of Limpopo; The Waterberg Welfare Society (WWS); the Boys 2 Men programme (WWS–B2M); schools, sports teams, community groups and a community outreach programme attached to WWS called Stepping Forward. The map (Annexure One, Figure 4) shows both the informal and formal relationships within the network, the most significant impact stories and areas that require future research.

The mapping technique also demonstrated that B2M is situated within a broad network with impacts occurring at multiple sites. The network is connected through formal transactions (73%) and informal transactions (27%); with WWS and B2M producing 50% of the transactions. 80% of the transactions were perceived to add value to the network. Generally, the speed of the transactions was slow and the preferred medium for communication was face-to-face, with less than 20% of communication happening electronically with DevFTI, WWS, and B2M absorbing the bulk of the costs of the network. The map is provided in Annexure One for reasons that we explain in the discussion section, below.

### The narrative analysis

The findings of the MSC technique highlighted six dominant categories:

i. Critical thinking;
ii. Confidence to confront ambiguous challenges relating to HIV such as teenage pregnancy;
iii. Voluntary counselling and testing;
iv. Community support and interest for the programme;
v. Community champions; and
vi. Life-skills.

The follow up telephone calls indicated that there had been mixed success with regard to behaviour change, with voluntary testing and counselling (VTC) being the largest change. It also suggested that the dialogue spaces that had been opened included: teenage pregnancy, alcohol abuse, HIV/AIDS, STIs, peer pressure and relationships. The question with regard to 'bonds changing' suggested that the following relationships had altered: sense of freedom

to talk, privacy, openness, solidarity, respect for others, and young male identity and that there was demand for a parallel programme for girls and young women.

## Characteristics and properties of the network

The narrative fragments were coded against Campbell's notion of a 'competent community' and also the characteristics of a complex adaptive system. In order to provide a brief overview the original narrative fragments were used — rather than the coded findings. Both the competence frame and the complexity frame are presented below (Table iii).

**Table iii: Narrative fragments coded against both the competence and complexity frameworks.**

| Evidence | Attribute of a Competent community | Yes / No | Attribute of a complex adaptive system | Yes / No |
|---|---|---|---|---|
| **B2M facilitator:** We are seeing more young men going to the clinic for testing. This is very important to us …. he disclosed his HIV status…. we can live with HIV in a positive way …. confidence to share problems with others… I have seen boys changing their lives | Knowledge and Skills | ✓ | Interconnected & interdependent elements & dimensions | ✓ |
| **B2M facilitator:** Before many of the boys couldn't cope with their problems but now they can begin to solve the problems. … *This group of youth helps other youth to solve issues* ... like making a step to being a good parent or a good father | Social spaces for dialogue and critical thinking | ✓ | Emergence | ✓ |
| **Football coach:** They have started to respect other players *and other teams& the confidence and skills learned in the programme has helped him to excel in the college* | Ownership and responsibility | ✓ | Dimensions are frequently nonlinear | ✓ |
| **Mother:** So much more have changed in my son. As a single parent I want to be thankful that B2M programme has helped to address some of the issues that were difficult for me to discuss with my son as woman - such as how my son should deal with girlfriends, talking about sex | Solidarity and common purpose | ✓ | Sensitivity to initial conditions | ✓ |
| | | | Co-evolution | ✓ |
| **WWS and B2M** are involved with networking for resources and partners | Bridging social capital | ✓ | | |
| **Football coach:** when other boys in the community see my boys changing they ask why? My boys tell them about the B2M programme | | | Adaptive agents react to the system and to each other | ✓ |
| **Football coach:** I had to leave at first because they [the boys] were shy....after they were joking and talking | | | Self-organisation | ✓ |

*Source:* author's contribution

Table iii indicates that the B2M initiative does reflect *characteristics* associated with a competent community and that the properties of the B2M programme can be associated with the complexity framework. From this data there was no findings that can be associated with

'phase space' changes or that the programme had been at 'the edge of chaos'. The data also surfaced shifts in social relations, including participant—participant relations; participant—facilitator relations and participant—parent relations.

The overview indicates that while the mapping of the network provides a description of the existing network and that B2M shows characteristics associated with both a 'competent community' and a 'complex adaptive system', however, the properties and dynamics of the network are less visible — but there is evidence that shifts in social relations have occurred — Table iv.

**Table iv: Shift in social relations surface some of the properties and dynamics of the complex adaptive system.**

| | |
|---|---|
| **Shifts in social relations** | **Volley ball coach:** they [the boys] had a bond...and confidence to share problems with others… |
| | **Basketball coach:** when they [B2M] first came my boys were a bit shy at the beginning cos some of the questions were difficult....I had to leave so that they [the boys] could talk openly...but when they [B2M] left the boys said that "you have to make them come back.... because some of the questions happen in real life and it is a challenge to us.... And it helps us open our eyes" |
| | **Community member:** I have seen boys changing their lives, … they now share their problems with each other |
| | **Mother:** So much more has changed in my son. As a single parent I want to be thankful that B2M programme has helped to address some of the issues that were difficult for me to discuss with my son as woman - such as how my son should deal with girlfriends and talking about sex. |
| | **B2M participant:** When he came he disclosed his HIV status....very positive influence on us |

*Source:* authors' contribution

Table iv suggests that there are discrete second order shifts taking place amongst the properties of the system, producing a dynamic shift in the nature of the social relations amongst participants.

## Discussion

Prior to reporting on the findings of the evaluation we introduced four concepts which we briefly touch on again. Complexity science was introduced because UNAIDS (2014b) attribute a significant amount of the challenges that have to be overcome to 'end AIDS' as being complex. For complexity theorisers, change arises from fluctuations of the interconnections within, or between, components of a complex adaptive system resulting in the system 'state' altering. As such, the catalyst of change can be first and / or second order.

The competency model was explored because it formed part of the initial enquiry and it appears to argue for the construction of a model environment within which people are enabled — through adaptive capacities — to develop strategies which could have the effect of improving community health outcomes.

The 'middle ground' concept explicitly aims to go beyond the binary agency / structure distinction was introduced because it not only surfaced a critique of the competency perspective, it also provides a clear statement of the '**modes of agency**' that influence the identity of bio-social practices in HIV landscapes. The 'middle ground' approach reflects 'modes' that implicitly involve both first and second order changes.

'Everyday communication', in the context of rural innovation, suggests that for a new social practice to be adopted requires some sort of social sanctioning amongst social networks and

that the 're-ordering of social relations' is part of the process — which also points towards first and second order changes.

### A reflection on the analytical position

'Complexity', the 'middle ground' and 'everyday communication' implicitly — or explicitly — lift the conceptual restrictions located within the linear agency / structure dichotomy. This represents an expanded ontological position that opens alternative epistemological avenues to be explored. In this instance this has included second order changes that influence and provide identity to processes of adopting new, first order bio-social practices within an HIV landscape.

### A reflection on the methodological techniques applied

All the techniques that were applied required qualitative research skills that were not beyond a small research team. Our primary criticism of the mapping technique is that the utility of developing the map is located in the process, whilst the visual representation (Appendices One) provided little utility for WWS or for disseminating the findings because the representation is too complicated. In order to construct the map, the research team was required to reflect at length about the interconnections within the network. Arguably, this deep level of analysis resulted in the shifts in social relations becoming visible, prompting the secondary reflection and analysis. However, in this instance, we suggest that the map, as a standalone heuristic, offers little — if any — value.

### The findings of the evaluation

The combination of the VNA and MSC analyses indicates that B2M has developed a male-competence programme with a broad network. The reported effects of the B2M programme include: creating and nurturing a space for participants to build confidence; enabling participants to become critical thinkers within their own contexts and enabling participants to make changes in their behaviour. These characteristics can be associated with the notion of the competent community model.

The analysis also suggests that the network exhibits characteristics that can be associated with a complex adaptive system. The shift in social relations points towards the properties of the system changing, creating a system 'state' in flux. The trajectory of this dynamism included a novel form of emergence within the landscape: shifts in social relations appearing between the B2M participants and members of their 'intimate network' (between themselves, parents, teachers and sports coaches) that we label 'distributed-efficacy'. We suggest that as well as insights into the presence or absence of 'self-', or 'collective efficacy' which have dominated the HIV landscape for over 25 years (Jemmott, Jemmott, O'Leary, Ngwane, Lewis, Bellamy, Icard, Carty, Heeren, Tyler, Makiwane, & Teitelman, 2014) — the process of constructing 'distributed-efficacy' is indeterminately patterned, coherent, embodied and that 'everyday communication' plays a role in the process. The findings were also punctuated by counter-narratives that suggest an iterative process:

> *We do get frustrated coz sometimes you teach boys a lot of things. At the end of the day they seem to act as if they do understand when they don't understand they change and later on down the line they go back to the old bad stuffs ….*

These findings correspond with other reports that 'everyday communication' plays a role in sustaining the process of HIV risk-reduction, for example in Uganda during the 1990s (Low-Beer & Stoneburner, 2003).

### Patterned networks and 'distributed-efficacy'

Corresponding with the complexity science's focus on patterns of connectivity, the reports of shifting social relations appear to be patterned because the networks are not completely random and there is interconnected coherence within the contents of the narrative — for example the word 'bonds' was used throughout. The dominant patterns that are clearly defined are between the participants; the participant—facilitator relationships; between mother—son relationships (in a single parent context) and there is some evidence that the participants were expanding the network experimentally with other soccer teams. This has synergy with the concept of 'distributed cognition' within which cognitive potentials are considered both embodied and distributed within loosely coupled, yet patterned, networks (Perry, 2013). This enables an abductive possibility that the development of a new social practice needs both an individual host — a person — and a social 'home' within which — and from which — it is activated and sustained.

### Shifts in social relations and distributed-efficacy

The insights provided by Leeuis and Aarts, 2011, suggest that the effect of 'everyday communication' not only opens spaces for dialogue, but may simultaneously be accompanied by a re-ordering of social relations that is associated with the consolidation of some new social practices. It is uncertain from these findings how significant the re-ordering of social relations was; whether the re-ordering came before the dialogue, or arose through the dialogue during the process of developing a new social practice. What is more certain is that the shift in social relations appears to have had the effect of enabling a more horizontal platform that improved communication about sensitive issues:

> *So much has changed in my relationship with my son. As a single parent I want to be thankful that B2M programme has helped to address some of the issues that were difficult for me to discuss with my son as a woman — such as how my son should deal with girlfriends and talking about sex.*

We acknowledge that this evidence is inconclusive and therefore suggest that more work is required to better understand how dialogue and social relations intersect — and whether this intersection can contribute to the 'mission mode' that UNAIDS is calling for.

### Self-organisation, co-evolution, nonlinearity and distributed-efficacy

The final comment we have about the process of developing 'distributed-efficacy' is that the way in which the capacity was developed was iterative — which corresponds with the observation by Kippax et al. (2013, p. 1370) that social practices arise through people exploiting co-evolutionary opportunities and the process involves 'self-organised' "experimentation":

> *When they [B2M] first came my boys were a bit shy at the beginning cos some of the questions were difficult .... I had to leave so that they [the boys] could talk openly ….*
>
> *I have seen boys changing their lives, … they now share their problems with each other.*

We also suggest that the process is nonlinear, as the counter-narrative indicates:

> *…. and later on down the line they go back to the old bad stuffs ….*

This suggests that the process of developing skills that would correspond with the notion of 'distributed-efficacy' demonstrate characteristics that Ramalingham et al. (2008) associate with a complex adaptive system. This hints at the possibility that one of the reasons that social change is a slow process is because one of the mediating factors is to develop new forms of 'distributed-efficacy'; as well as to learn new skills and consolidate them as routines and norms that can be applied to activate the new knowledge base that prompted the process in the first place.

## A theoretical reflection the concept of 'distributed-efficacy' in the context of Vision 95:95:95

UNAIDS has called for a major paradigm shift to a 'mission mode' in order to 'end AIDS' by 2030. They claim that the next five years will be critical if the ambition is to be achieved. Many of the changes they call for require a widespread uptake and adoption of new social practices — from policy makers, government employees and communities. However, the 'discourse' that surrounds the notion of what is precisely entailed in a change process such as the adoption of a new 'social practice' is contested (Adam, 2011; Nguyen et al., 2011).

### The relevance of first and second order change

The theoretical sketches outlined at the beginning of the article — complexity science, the environmental sciences and the 'middle ground' — all suggest that changes that are absorbed and adopted into social practices are necessarily social, contingent, constrained and patterned. We have argued that this is because a first order 'practice' implicitly requires 'second order' reinforcement and — for autopoietic linkages to develop — the consensus about the local legitimacy of the practice has to be distributed within bounded networks that are catalysed by a form of collective sense making, which is linked to shifts in social relations.

For both Kippax et al. (2013) and Leeuwis and Aarts (2011) there is a conceptual common denominator: first and second order change are co-constitutive of the process of change as it is negotiated, modified and ultimately absorbed (or not) into social practice within a social network. Through diverse *modes*, individuals *contribute* to the process, but underlying — discrete — mediators, such as collective norms, material realities, worldviews, discourse and values are critical mediators of the *modes* of engagement, identity of the engagement which influences outcomes. The second order change components infuse an element of nonlinear ambiguity and unpredictability into the process which brings complexity science into the analytical frame.

From this perspective — focusing exclusively on the visible first order, descriptor of change provides only part of the story. A fuller story takes account of the interdependencies between first and second order change. Ignoring any of them — and the relationships contained within and between them — erases the autopoietic energy required to sustain the change, or to begin negotiating new change, from the analytical frame.

Based upon the above, we tentatively suggest that the process of constructing 'distributed-efficacy' entails dialogue, shifts in social relations — influenced by a dialectical tension between modes of agency and particular contexts — providing dynamic essence for the

emergent identity to both the process of developing, and the consolidation of, a new social practice.

### Implications in the context of 'ending AIDS'

The position we argue for poses a challenge: an increased emphasis on a biomedical response to the epidemic, enabled by the "extraordinary changes in the AIDS [biomedical] landscape achievements"(UNAIDS, 2014b, p. 296), risks that these 'extraordinary changes' will be parachuted into communities, without providing people and institutions the opportunity to adapt, respond, reject or exploit them. To avoid this will require careful negotiation of existing practices situated within landscapes that communities 'know' (Wilson & Halperin, 2008) — and the associated 'sensori-memorabilia' (Burman, Mamabolo, Aphane, Lebese, & Delobelle, 2013, p. 22) — so that the new biomedical opportunities can intersect and build on what already exists within the communities that UNAIDS and the South African NDOH wants to support. Achieving this in the critical five year time frame will require attention to both first and second order changes at multiple scales, encompassing multiple intersections — both planned and unexpected — to which clearer understandings about the process of developing heterogeneous forms of distributed-efficacy could meaningfully contribute.

## Limitations

The findings we have used to develop this hypothesis were drawn from an evaluation that primarily focused on first order change. The analysis has been constructed because within the data we noticed an unexpected shift in social relations that was related to the 'spaces for dialogue' that Campbell (2009) identifies as being a component of the 'competent community' model. In order to confirm — or reject — the hypothesis that 'distributed-efficacy' is a legitimate and potentially useful concept, we suggest that further investigation into the relationships between 'first and second order' dynamics is required.

## Conclusion

We have reported on a programme evaluation and taken the opportunity to reflect on the unexpected second order findings and argued that both first and second order dynamics may coalesce into nonlinear forms of 'distributed-efficacy'. We have applied complexity science, environmental science and a 'middle ground' position — all of which promote different spaces beyond the agency/structure dichotomy — to construct our position. We suggest that the shifts in social relations that were associated with new social practices is a second order dynamic that is connected to first order outcomes. The emergent 'secondary' change in social relations may reflect a shift in shared values and practices that is gradually reconfiguring both the properties and the characteristics of — and within — a complex adaptive HIV landscape system in the Waterberg district of South Africa.

We suggest that it is a possibility that the concept of 'self-' and 'collective' efficacy may currently underplay the discrete process of distributed-efficacy' that include second order shifts in social relations. We also suggest that the second order shifts may represent the autopoietic glue that enables nonlinear grassroots dynamics to facilitate the introduction and uptake of new social practices in particular contexts.

Given the short timeframe of five years that UNAIDS claims will 'determine' the next fifteen and the amount of new bio-social practices that are required to achieve the 'end of AIDS', further research into the dynamics that we have labelled as 'distributed-efficacy' — that

facilitate the introduction, consolidation and sustainability of new social practices — could contribute to accelerating the ambition of 'ending AIDS'.

## Appendix 1.

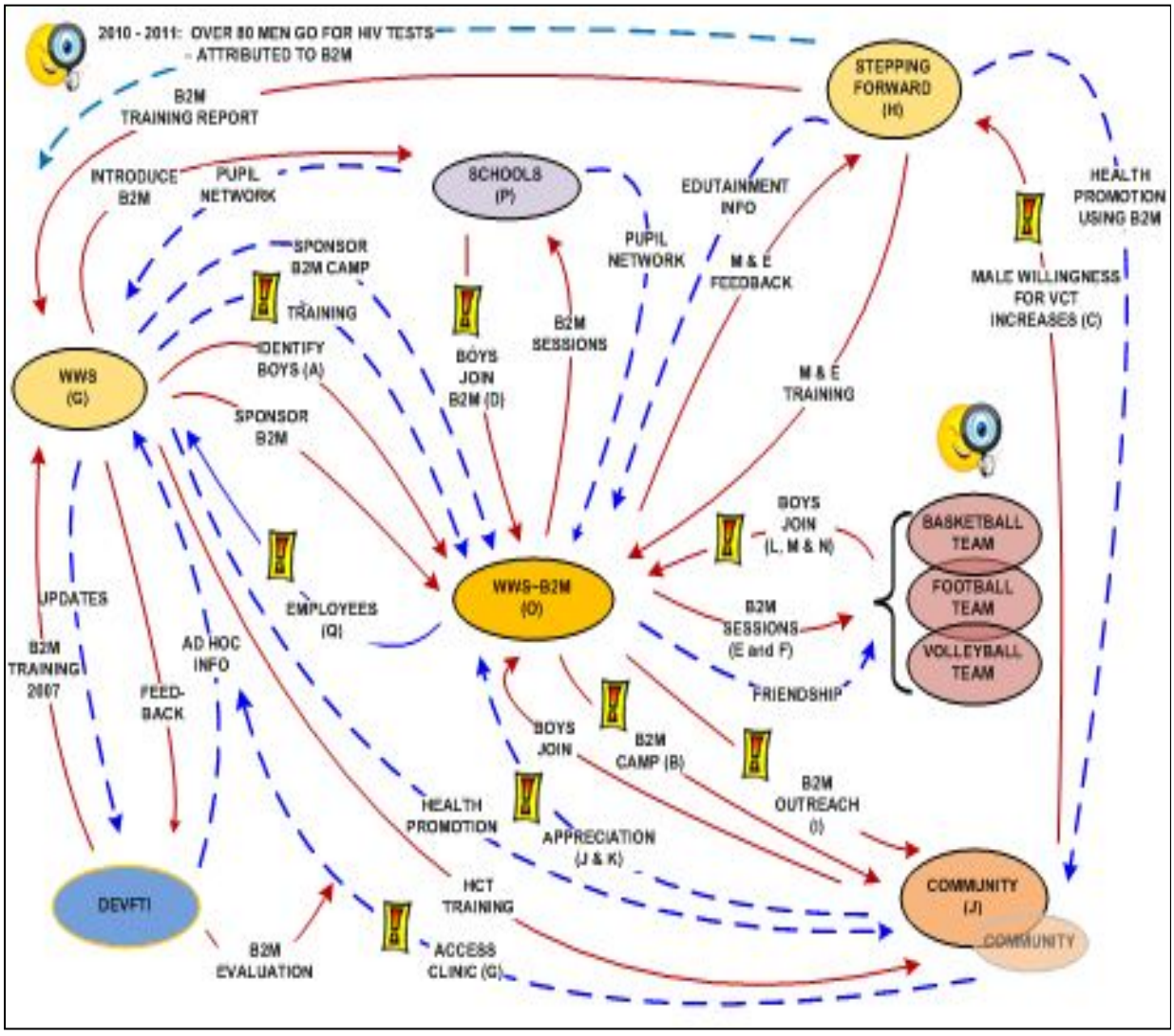


**Figure. 4. The overall network with the formal interactions represented by solid lines and the informal interactions represented by dotted lines. *Source*: authors' contribution**


Representing a potential site for further enquiry


Representing an 'impact' site - identified by the participants

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