Interfacing actors at nodes: Curriculum policy as bricolage

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Abstract
In this paper, we provide accounts of the situated realities in the terrain of practice with regard to curriculum reform in a democratic South Africa. It is argued that policy reform is not linear, but complex and dynamic and as a result it can never be understood in isolation. The argument is based on the findings of a recent doctoral study on policy reform conducted on the north coast of Kwa–Zulu Natal (Singh- Pillay, 2011). The topography of Singh- Pillay's (2011) study was underpinned by the transformatory agenda attached to curricula reform in South Africa. The findings of Singh- Pillay's study illuminate that policy reform is a "bricolage", a complex networked process, performed by multiple actors in multiple locations and in multiple ways. Policy reform is construed as webs of interactions at a particular location. The webs of interaction involve both human (sociality) and non-human (materiality) actors. Therefore policy reform is envisaged as nodes of practice. The role that materiality plays, is crucial in bringing to the fore the situated reality in the terrain of practice. Practice is therefore construed as incorporating the objects that they are enacted with and the setting in which they are enacted. For the purpose of this paper the situated reality in the terrain of practice is explored by tracing how practice gets performed when the National Curriculum Statement- Further Education and Training (NCS FET) Life Sciences policy moves across the Department of Education (DoE) and school nodes. Actor Network Theory (ANT), as associated with Latour (2005) is employed to model the tensions that exist in the terrains of practice and to highlight how policy gets constructed and translated as it moves from one node to the next. The pivotal concept that emerges is that of interface which foregrounds curriculum policy as "emergent" and "bicolage". The findings emphasize the importance of materiality in studying policy reform.
Key words: Interface, emergent, "bricolage", sociality, materiality

Introduction
Curriculum policy reform in the new South Africa (post 1994) is underpinned by a transformatory agenda, which promotes the use of education as leverage for human resources development. This agenda is aimed to overcome the skills shortage by developing high skills and high knowledge, promote our human resources development, alleviate poverty, overcome the injustices of the past and compete in a global economy. This agenda grants agency to structures like the Department of Education (DoE), schools and industry to promote the goals of human resources development. These structures are crucial during

policy reform and are considered as nodes[14] in the network of policy reform. Therefore, there was a need, in the main study, to interrogate how the NCS-FET Life Sciences policy is constructed and translated in practice as it moves across the DoE, schools and industry nodes in order to bring to the fore: how practice gets performed during reform and the actors that shape practice during reform.

Theoretical framework

Actor Network Theory (ANT) is a sociology of associations that is used at a theoretical and methodological level. In an ANT study the social is placed under erasure (Latour, 2005). This means, the overarching existing context is suspended and it cannot be used to explain a scenario as if it is applicable to all actors. Rather, the context is allowed to emerge via the actors' actions, associations and the trails they create. Tracing associations shows how socio-material elements participate in practice and what gets performed through their participation (Mol, 2007). The tracing and assemblage of networks illuminates how and why actors form the associations they do during practice. In observing movement via shifting associations, we see relations that were previously oblivious. Not only is the actor coming into being, but the practice is also made apparent, is reinforced, changed or reproduced. The actor and the practice is inter linked. From an ANT perspective curricula policy reform can be viewed as a field of socio-material practices (Harris & Marsh, 2005). Therefore curriculum policy reform becomes an accomplishment of a network rather than of an individual actor (Latour, 2005). Since socio-material networks are traced, ANT extends the analysis to both human and non-human actors. Such analysis illuminates convergences, alignments, strengthening of ties among elements in the network, divergence and non-alignments and weakening in the ties among elements in the network. An ANT analysis illuminates emergences within a network. To unveil emergence within a network the concept of Interface[15] was used, which is drawn from the discipline of physics.

Research design

To follow actors, we trace what they say and do in order to establish which other actors are enrolled into their practice (Latour, 2005). Following actors entails tracing of associations formed by the actor and an assemblage of these associations. The associations formed are collaborations and alliances among the actors, they reflect the kinds of work the actors are doing in the practices observed. The associations formed make visible the socio-material context, reality or ontology of the nodal networks. The alliances formed are fluid, they have the ability to shift and (re)associate in response to the conspicuous actor facilitating practice.

[14] Nodes: Connection point or distribution boundary in a network(Heads, 2004)

[15] Interface: meeting point between two media of different optical densities(Dufresne, Gerace & Mestre, 2008 p.2)

At the DoE node one national and two provincial curriculum developers were interviewed to clarify the goals and agenda of the gazette NCS-FET Life Sciences curriculum. The gazette NCS-FET Life Sciences policy was followed by observing the mediation of policy (professional development offered to practicing teachers) which is conducted by subject advisors. The mediation of policy was observed for its duration of 5 days. The NCS-FET Life Sciences policy was traced at the school node during its implementation. Teachers are responsible for the implementation of policy at schools. The tracing entailed observation of lessons (theory and practical) for 7 days at 5 schools, observations of teachers CASS portfolio, journal entries and a post observation focus group interview.

Data sets collected at each node were transcribed and read several times to identify key terms, actors and establish patterns of meanings. Special attention was paid to what actors said or did in practice in order to allow actors to develop and construct their realities of what constitutes their practice. In each practice observed there was a conspicuous actor who is supposedly responsible for the practice at that node e.g. subject advisors are responsible for mediation of policy whilst teachers are responsible for implementation of policy. All the trails created by the conspicuous actor were woven together by repeated reading and inspection of the transcript. A functional sketch of the actors enrolled into the network was made for each node. The sketch was created to re-enact the multiplicity of actors participating in practice. In creating the sketch it was important to note the number of ties an actor has with other actors. Noting the number of ties an actor has shows how embedded these actors are in the practice observed. The more ties an entity has, the more stable it becomes in the practice. The alliances formed by the conspicuous actor unearth their strategies used to enroll actors for specific practices. Patterns with similar meanings were grouped together to form categories for how practice gets performed. Analysis entailed juxta- positioning of associations formed within a node and across a node. At a theoretical level the analysis emphasises the interconnectedness among the actors in the network.

Findings and Discussion

Analysis of data collated at the DoE node reveal that during the mediation of policy the subject advisor skillfully and creatively involves many actor's not conventionally considered to be associated with mediation of policy, as reflected in figure 1 below

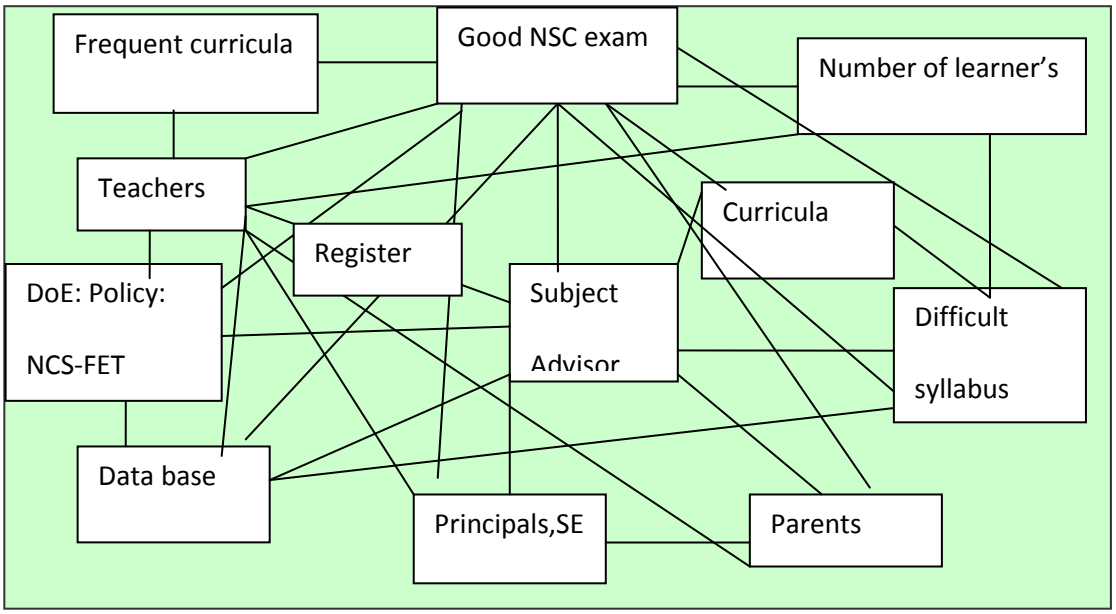

Figure 1: Actors enrolled during mediation of policy at the DoE node

The material and social elements that are woven together in the mediation of policy by the subject advisor are captured in figure 1. These actors are used to enact different realities during the mediation process. Good National Senior certificate (NSC) exam results, difficult syllabus, stakeholders (parents, principals, SEM's) and fewer Life sciences learners shape the mediation of policy. Figure 1 shows that good NSC exam results are networked more frequently than any other actor during mediation of policy, therefore it shapes how practice gets performed at the DoE network.

The alliance formed with good NSC exam results demonstrates how these get enlisted during mediation of policy to confer a particular vision for policy implementation. Good NSC exam results are transformed into a negotiation tool to validate implementation of policy as successful and to allay the fears of stakeholders, as reflected below:

> *"The public feels policy was implemented before schools and teachers were properly trained. Good exam results will dispel fears and concerns of the public about implementation; it will stop criticism, good results will show that the curriculum is successfully implemented"*
> Subject advisor during mediation of policy

Policy is annulled in terms of its shortened timeframe between the formulation and implementation process and its goal of involving all stakeholders in its formulation. This alliance with good NSC exam results is supposed to obviates stakeholders' criticism of the premature implementation of policy. Furthermore, the alliances formed with good NSC

exam results are used to negotiate and reduce conflict with other actors encountered in the mediation network as shown below:

> *"I'm aware that numbers of learners pursuing Life Sciences is decreasing, but our good results will attract more learners to Life Sciences"*
> Subject advisor during mediation of policy

The dwindling number of learners epitomises the tension, conflict and contradictions between policy mediation and policy goals. The NCS-FET Life Sciences Policy is annulled in terms of its goal of broadening access to science. Good NSC exam results are enrolled to serve firstly as a motivation to prevent the extinction of Life Sciences from the school curriculum (in South Africa Life Sciences is not a compulsory subject in the FET band), and secondly as an agent that can reduce the conflict caused by the decrease in the number of learners pursuing Life Sciences. These results are construed as a magnet that can attract learners into Life Sciences, thereby providing continued employment for Life Sciences teachers and subject advisors.

An astonishing comparison is made between other learning areas and Life Sciences in terms of curricular content ("difficult length of syllabus") and examinations ("other subjects have no shocks"), as is seen in the excerpt below:

> "*It's a difficult, lengthy syllabus, other subjects have no shocks in the exam*, *I will take you through it step by step and show you what you need to focus on for good exam results, provide multiple opportunities for learners to master these testable competencies, focus on hypothesis testing, translation of data, drawing tables and graphs, identifying trends and concepts*, *terms, use past year exam papers for examples, include all competencies in assessments so they can be mastered and learners can pass well remember practice makes perfect … use a drill method to teach. I design the mediation to focus on exams. You must provide multiple opportunities for learners to master these testable competencies. It's gazetted now and you have to teach it, that's the bottom line."*
>
> Subject advisor, mediation of policy

The difficult, lengthy syllabus and different exam weighting serve as a barrier and social control mechanism for access to Life Sciences. It serves to multiply injustices by certifying learners' eligibility for access to science, universities, and better jobs. The alliance formed with good NSC exam results serves to counteract the difficult curricula content and exam strategy and motivate teachers for curricula implementation. These alliances reduce the severity of the conflict with the difficult, lengthy syllabus and exams in Life Sciences. The alliance formed with good NSC exam results subverts policy in terms of teaching approach ("use a drill method"), the image of the learner ("practice makes perfect") and assessment practice ("master testable competencies"), but affirms policy in terms of curricula content.

Mediation of policy focused on the 'how' and 'what' in terms of the preparation of learners for exams. Meeting NSC exam requirements forms the crux of the mediation process. The alliance formed by the subject advisor with NSC exams translates skills development into a cookbook recipe for good NSC exam results. In reality, the preoccupation with good NSC exam results and competencies testable in the NSC exams refracts the policy's goal of redress in terms of human resources development, teaching approach and kind of learner emerging from the FET band.

Mediation of policy is supposed to craft pedagogical change in teachers for implementation in line with the intentions of the NCS-FET Life Sciences Policy. The subject advisors' preoccupation with good NSC exam results sets a ceiling on teachers' enrolment of policy. What also becomes visible from the above excerpt is that mediation of policy is performed in a hierarchal "top down" approach. The practice of mediation of policy illustrates how teachers are positioned by subject advisors during policy transformation. This positioning of teachers exposes the micro politics of policy reform. The subject advisor resorts to using formal ("it's gazetted now") and informal ("you have to teach it") power to seek the obedience of teachers during mediation and implementation of policy. The subject advisor uses both formal and informal power to regulate the practice of teachers. This means that teachers have no option but to comply with protocol and the powers that be.

The above findings dispel the myth that the subject advisor is in control of the mediation process. Good NSC exam results become a mediator that shapes the practice of mediation of policy at the DoE node. The findings highlight that in comparison with DoE gazetted policy, different patterns of curriculum practice - that were not what they were "supposed to be" - surface. Practice gets performed in ways that can be described as sitting differently or divergent from the gazetted expectations of implementation and mediation. The alliances formed with good NSC exam results help show how the practice of mediation of policy gets performed. The alliance network elucidates that the practice of mediation of policy gets performed as negotiable moments with good NSC exam results. The alliances formed with good NSC exam results are a strategy used by the subject advisor to enroll teachers for implementation of policy, to create the impression that policy is implemented successfully, to attract learners into Life Sciences, to affirm policy and to form alliances with teachers and the DoE. The power of good NSC exam results as a credentialing agent becomes apparent at the DoE node. The repeated recruitment of good NSC exam results during mediation of policy clarifies the subject advisors' preoccupation with the latter. It also exposes the tension and contradictory cartographies between mediation of policy and the gazetted policy goals. This has implications for the professional development of teachers, policy implementation and skills development. My finding highlight that mediation of policy is not a smooth easy going process. It is a collage of tension, conflict, uncertainties and power dynamics that cohere together and hold the practice of mediation momentarily.

At the school node policy implementation involves more that the performance of teachers as reflected in figure 11 below:

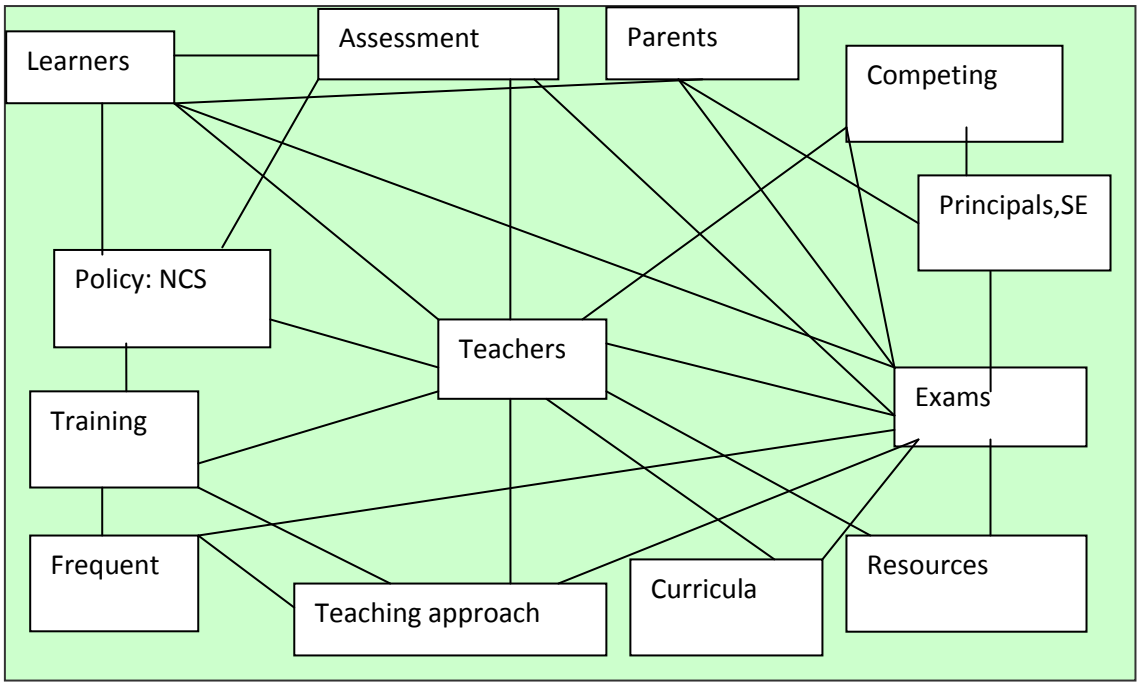

Figure II: Actors enrolled into implementation of policy at the schools node

At the school node policy reform is portrayed as being a repeated clinical trial process, as foreign or lacking familiarity with teachers, and as an abusive experiment conducted on teachers as shown in the excerpt below:

> *"I'm just so sick of all this inadequate training, re-training, deskilling, reskilling, trying to implement this curriculum only to have it changed before I get the hang of it, We are both guinea-pigs in DoE's experiment, we didn't have a say in drawing up this curriculum. Now we have to implement it successfully"*
> Teacher, focus group interview

The analysis depicts the uncertainties teachers encounter during curriculum policy reform, and illustrates that the policy-reform process ignores the teachers' experiences in dealing with frequent mandatory policy changes. Teachers are overwhelmed by the frequent changes, become disempowered, and feel uncertain about their pedagogical practice. The frequent de-skilling and reskilling leads to teacher frustration and leaves them in a state of "limbo". They never seem to be able to meet their own expectations and are uncertain about meeting the many expectations of other actors. As a result, practice gets performed with uncertainty, as a dress rehearsal for the NSC exams and an investment game as is reflected in the excerpt below:

> *"I teach for the exams, so I do what I can with the poor training I receive, we need to show that we are* au fait *with the content and requirement of the curriculum. One way of illustrating this is by teaching for the exams so learners can acquire good marks. We are judged by exam results, everybody expects good results so why not teach for exams? Good exam result enhances our IQMS[16] rating. These results will go on learners CAO forms for university entrance. It's a win- win situation for all of us and everybody is happy."*
> Teacher, focus group interview

The notion of policy as a game dismisses policy as an arbitrary exercise, for which teachers have developed manageable mechanics of play. This particular notion of policy highlights that policy implementation is reduced to a high-stakes game ("win-win situation"), with good NSC exam results being the valued prize for learners and teachers.

To secure the investment, alliances are formed with the NSC exam results and learners. The alliances formed with learners serve to motivate and instill qualities and a particular image of success in learners in order to affirm them and their progress. Deposits into learners are construed as an investment that allows learners access to university (CAO forms). The investment returns for teachers are that good NSC exam results get equated to best practice (au fait with content, high IQMS ratings). The implications of this investment game are that teachers use learners' performance in the NSC exams to validate their own success as teachers. The NSC exam results are used as a yardstick for measuring good practice, IQMS scores, the efficacies with which teachers implement policy and learners' access to tertiary institutions. These alliances with learners and the NSC exam results are formed during implementation of policy due to other competing agencies teachers encounter at school as shown below:

> *"There are many dynamics within the school situation that impact on our teaching time such as curtailment of teaching time for fund raising activities, attending to social welfare issues like house parties, drugs and alcohol abuse, sport, observing peers' lessons for IQMS, completing admin work, stats returns for department or district office, dealing with discipline issues on a daily basis; therefore it's easier to teach for the exams."*
> Teacher, focus group interview

The above excerpt brings to the fore the various activities that teachers engage in besides teaching, and reflects the laborious process of teaching. It illuminates the web of socio-material actors that impact on implementation of policy and exacerbate teacher anxieties, tensions and uncertainties. These competing agencies, such as fund raising, sport, departmental stats, discipline issues, social welfare issues and IQMS create divergences in the network of policy implementation (impact on teaching time) and subvert policy goals. These agencies bombard teachers and vie for space and time during policy implementation.

[16] IQMS: Integrated Quality Management System

Teachers allude to the pressure of these competing agencies and form alliances with the NSC exam results (*"teach for exams"*). The alliance formed with the NSC exams is intended to reduce the severity of the conflict teachers encounter over the contestable f(actors) like time and space. Valuable teaching time gets juggled with competing entities, and implementation of policy gets performed as a juggling act. The metaphor of juggling connotes competing agencies maintained in continuous motion. The teacher is the juggler who engages in this balancing act to prevent competing agencies from collapsing onto him/her. Juggling becomes an adaptation strategy for survival and continuity in the network. Thus the classroom may be seen as an ecosystem with competition, co-operation, frequent environmental changes and natural selection. Teachers have no choice but to deal with these compromising entities as and when they arise. In the process, teaching is illuminated as a complex and demanding task where teachers have to develop strategies that allow them to make decisions, investigate problems and understand learners' needs simultaneously. To cope with the constant daily juggling they have to endure, teachers form an investment alliance with the NSC exams, which benefits both learners and teachers. Therefore, the gazetted policy is not a "stable thing" to be implemented as proposed, it evolves and adapts in the school environment. As it evolves it gets (re)produced, (re)constructed in certain ways within the practice of implementation.

Significance of the interface

The (re)assemblage of networks at cross-nodal level reveals the interface(s) and actor network of this study. The interface is construed as a meeting point between media of different optical densities. It elucidates what gets propagated into the next node, what is refracted or translated, what is responsible for the refraction, and which entities are mediators that mobilise practice. When a light beam travels between media of different optical densities, such as from air to glass or vice versa, two things happen at the interface - it is reflected and refracted[17]. This means that the light beam experiences a translation in its direction of travel. It is this change that I am interested in exploring, particularly the change that is brought about by refraction. The translation is caused by the associations formed during practice and the f(actors) that shape practice within a node. The cross nodal re-assemblage of networks show the nature of the interface is dynamic; it evolves out of shifting associations among heterogeneous elements such as the NCS-FET Life Sciences Policy, subject advisors, NSC exam results, IQMS, fundraising, sport, teachers, microscopes, specimens, models, and apparatus. The multiple coalitions with good NSC exam results at the DoE node are powerful and durable. They mobilise and translate mediation of policy into a dress rehearsal for the NSC exams. Alliances are also formed with teachers and good NSC exam results in the construction of their pedagogical identity to motivate them to produce good NSC exam results. The synergised alliance formed with good NSC exam results at the DoE node restructures itself and emerges as an exam alliance at the schools This

[17] Refracted: Bending of light beam as it passes between media of different optical densities (Dufresne, Gerace and Mestre, 2008, p. 2).

means that the nodes select (much like natural selection) how the alliance network proliferating it must evolve or adapt to its internal environmental dynamics. Therefore, the interface cannot be considered as something arising out of a linear relationship. It emerges as part of an interactive network that is in a state of translation. The interface illuminates policy as an emergent effect of an actor network.
Emergence refers to the dynamic process arising from the shifting ties among heterogeneous elements.

The emergent effect of policy has revealed that curriculum policy reform does not occur in isolation or in an insular way; that the context in which reform occurs is not a discrete or a separate entity. The context is not context *per se,* but a source of material, social and other actors that participate in practice (Latour, 2005). The emergent effects of curriculum policy reform illustrate that policy reform is a complex, networked process involving many actors rather than the heroic performance of a single actor (see figure1 and 11). In other words it is a "*bricolage*" (Barrette, 1998, p. 615). Therefore curriculum policy reform invokes the metaphor of a dynamic ecosystem to account for the interconnection, convergences and discontinuities that sculpt it. In Life Sciences, ecology is the study of the relationship between organisms and their environment. Each f(actor) in the ecosystem has an influence on another f(actor), and many complex dynamic inter-relationships among them are required to sustain the system. Policy reform's dynamic ecosystem works in a similar way. The dynamic ecosystem metaphor helps us to conceptualise the curriculum policy reform process as being complex, networked and involving elements of sociality and materiality. This means that humans are not entirely in control of practice (Harris & Marsh, 2005). Thus, from an ANT perspective curriculum policy reform is a matter of practice co-performed by sociality and materiality that are interwoven and entangled in practice (Mulchay, 2007). Together sociality and materiality highlight how practice gets performed in a dynamic ecosystem.

The metaphor of a dynamic ecosystem brings to the fore the gaps, disjuncture or missing link between policy formulation and implementation, viz. mediation of policy. As an analytical tool, ANT has offered a unique way of understanding mediation. Mediation is perceived as an intervention offered by actors to bring about enrolment, enactment and translation in a network (Latour, 2005). This means that mediation of policy entails the diffusion of curriculum policy from its formulation (gazetted form) to its implementation. Like diffusion, which is an ongoing process that occurs until equilibrium is reached, ANT perceives mediation as an ongoing process that will result in the gazetted policy being espoused in practice. Therefore mediation, from an ANT perspective, is not constructed as a rapid, one-shot intervention offered to practicing teachers. Rather, it is visualised as a link that bridges the divide between policy formulation and implementation.

Curriculum policy as an emergent effect highlights that curriculum practice and policy reform remains a political and symbolic gesture when the espoused policy (gazetted policy) interfaces with the enacted policy. The espoused policy marks the shift from apartheid to post-apartheid society on paper but in reality nothing has changed.

Conclusion

ANT emphasises the interconnectedness among actors in the network. The assemblage process has revealed that each node in this study is equivalent to a dynamic ecosystem. The dynamism is the outcome of associations, co-operations, competition, acts of persuasion and challenges that occur among the actors to ensure their survival. The practice occurring at each node is comparable to diffusion. The actor network indicates that the network undergoes metamorphosis in ways that are unpredictable. The gazetted policy is the Government's "script" for transformation via education. The actor network demonstrates that the "script" is not enacted as envisaged. Thinking of curriculum policy reform as emergent has provided for the making of complex accounts of the ways in which socio-material elements negotiate their participation in policy reform (Latour, 2005). In this way, ANT makes visible the work of all entities involved in shaping practice.

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