Practice as Policy in ICT for Education: Catalysing communities of practice in education in South Africa

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Abstract

The e-Education policy was introduced into schools with the intention of "transforming learning and teaching" (DoE, 2004, p.1). The policy places an obligation on education to use educational technology to deliver on expectations of quality education for economic growth and social development. Utilising a case study approach and backward mapping principles to policy implementation, this study set out to explore how teachers appropriate[1] information and communication technology (ICT) policy to influence teaching and learning in South African schools. Qualitative methods were employed to capture data through classroom observations, interviews and document analysis. Data was analysed using grounded theory methods. Findings that are unique to the South African context were fivefold. First, the national e-Education policy existed as an invisible policy within the school context. Second, there was a lack of policy support and district presence in schools. Third, districts and schools had conflicting ideas of establishing collaborative support. Fourth, teachers' beliefs, attitudes and agency promoted ICT practice as policy. And fifth, the absence of district support catalysed the emergence of communities of practice. This study asserts the notion that for policy to be implemented teachers should be instrumental partners in the formulation of policy. Teachers should be encouraged to form ICT communities of practice to support their teaching practice and foster policy implementation.

Key words: Information and communication technology; practice as policy; policy absence; systemic deficits; teacher beliefs and attitudes; agency; communities of practice; appropriation; teacher professionalism

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[1]Appropriation focuses on the way teachers "take-in" and incorporate elements of policy into their existing frames of reference.

Research Highlights

It was found that teachers' professionalism and agency are crucial in formulating and implementing a school-based e-education policy in practice. The national e-education policy currently exists as an "invisible policy" within the school context. Secondly, teachers reposition themselves as social and cultural actors of school-based policy appropriation and formulation rather than as recipients of, or reactors to the national e-Education policy. Thirdly, the lack of systemic support to teachers acted as the catalyst for the emergence of communities of practice between schools. The notion of "our" system as opposed to an imposed system prevails. Fourthly, teachers' ignorance of the national e-Education policy indicates the need for an inclusive approach to policy development and implementation at schools. I theorise that teachers' beliefs, attitudes, agency and will to improve teaching and learning through the use of ICT are integral and necessary conditions for effective policy implementation.

1.   Introduction and background context

Within the South African context policy making is a competence of the national Department of Basic Education (DBE), thus all policy-making related to education is centralised. However, the hierarchy support system is decentralised through policy implementing structures at provincial and district levels. Although policy is made by central government, there is devolution of power that allows districts and provinces to make decisions about policy implementation. Recently the Policy on the Organisation Roles and Responsibilities of Education Districts further empowered local districts with significant delegated policy formulation and implementation functions (DBE, 2012). As systemic intermediaries their core policy functions are the formulation, analysis, implementation, monitoring and evaluation of implementation, and providing guidance to schools on policy formulation and implementation.

ICT in the education arena has been on the policy agenda in South Africa since 1996 (DoE, 1996). National focus on ICT as a catalyst for economic growth and social development has prompted provincial governments to respond by initiating ICT projects in education. The OECD's report on South Africa's policies found that the ICT revolution had a major impact on the way in which societies are organised and managed, resulting in "fundamental and far-reaching" changes that are key to wealth creation and social and economic development (OECD, 2008, p.330). In 2000, "Khanya" and "Gauteng-On-Line" were education initiatives of the Western Cape Province and Gauteng Province respectively in pursuit of provincial economic development. These projects may be considered as the first "education-centred" initiative not only in South Africa, but in Africa as a continent. However, there was no guiding policy on how the relevant stakeholders would implement ICT in education objectives. Finally, in 2004 the Department of Education responded with the e-Education policy and motif of "transforming learning and teaching through information and communication technologies" (DoE, 2004, p.3).

The e-Education policy (DoE, 2004) and the Guidelines for Teacher Training and Professional Development in ICT and Training (DoE, 2007) are two main policy documents that frame the ICT in education policy environment. The main principle of the e-Education policy is the achievement of national education goals by "providing modern technologies to schools in order to enhance the quality of learning and teaching" (DoE, 2004, p. 6). The

second mentioned policy for Teacher Training and Professional Development in ICT and Training (2007) identifies ICT knowledge, skills, values and attitudes required by teachers to implement the national curriculum effectively. Though this policy makes frequent reference to meeting the principles of the e-Education policy, it falls short of defining specific roles and responsibilities of provinces and district e-learning directorates to support schools. The e-Education policy also allocated specific roles and responsibilities at various systemic levels.

At national level the e-Education policy expects the Department of Basic Education (DBE) to develop a national framework for ICT competencies for teachers, school managers and administrators. The national DBE was also mandated: to revise the norms and standards for teachers, review in-service and pre-service training programmes as an enabling factor for teachers to use ICT, create appropriate teacher accreditation with an ICT focus and allocate a dedicated ICT trained teacher to support teaching and learning. The e-Education policy mandates provinces and districts to provide schools with both professional and technical support. In response to this policy directive, e-learning directorates were established at district and provincial levels to support schools in the implementation of the e-Education policy objectives. The policy tacitly expects that provinces, districts and schools would take up the challenge to drive the process beyond ICT planning and ICT experimentation. However, the policy does little to direct provincial and district officials to comply with policy mandates and strategies to change teachers' pedagogy.

At institution level the e-Education policy suggests that school managers and administrators promote the use of ICT, with the realisation that ICT is a 'transformative tool' for education. To date, the e-Education policy has made significant strides in developing and supporting ICT administrative systems in institutions, but falls short from achieving the main strategic target of influencing and changing classroom practice. Sadly, the e-Education goals that every learner will be ICT capable by 2013; that teachers will be qualified and competent to enhance teaching and learning; that schools will become e-schools fostering socio-economic growth is far from being achieved.

Despite policy implementation delays, the introduction of ICT into the South African education system has become common place in most schools. ICT as a 'new' teaching technology gradually made its entry into a broader range of schools, without schools being ready to exploit its usefulness to improve the quality of teaching and learning (Czerniewicz &

Hodgkinson-Williams, 2005). Recently principals, school governing bodies and communities are demanding a higher return on investment on ICT (other than for administrative purposes), that ICT needs to enhance teaching and learning. Accordingly this study asks: How do teachers use information and communication technology to mediate the e-Education policy in their practice?

The research is presented as follows: First, I begin with a brief review of existing empirical literature. Second, I describe the sociocultural approach to policy studies as a theoretical framework to guide this study. Third, I explain the research strategy of enquiry. Fourth I present the findings of this study. And fifth, I analyse and discuss the findings. I conclude with a presentation of new knowledge that was generated from this study.

2.   The ICT policy in education landscape

A review of the voluminous literature reveals that there are significant issues that influence the integration of ICT into the practice of teachers (Ertmer et al., 2012; Lim, 2007; Inan & Lowther, 2010; Bingimlas, 2009; Gu, 2011; Sherman, K. & Howard, 2012; Tondeur, van Keer, van Braak & Valcke, 2008; Underwood et al., 2007; Ng & Ho, 2012). Some of the critical issues are systemic (access, policy guidelines, policy overload, systemic support, national curricula, teacher training) and others are meso-micro level issues such as school leadership, institutional culture, teacher competence, teacher professionalism and teacher pedagogy.

At the systemic level, researchers (Gu, 2011; Plowman & Stephen, 2003; Beastall, 2006; Mulkeen, 2003a, 2003b) suggest that governments are often misguided by the focus they place in their ICT policy in education. ICT policy and the management of ICT policy seemed to be on provisioning of hardware and infrastructure, rather than on to inform *how* ICT might be used in classroom practice. The lack of policy guidelines to support schools seems to depict a familiar policy implementation problem that is apparent in most education systems in the international arena (Dale et al., 2004). The lack of macro-micro level policy interaction is illustrative of the principle that though policy sets limits to practice, it is also the reality of practice that sets limits to policy (Dale et al., 2004).

The introduction of ICT into schools has created the need for most governments to revisit their national curriculum in order to integrate ICT into teaching and learning (Gu, 2011; Tondeur, Braak & Valck, 2006). However, there is a lack of a common vision of what integration of ICT for learning really means in practice between relevant stakeholders (Underwood et al., 2007; Gu, 2011). Fullan (1992, p.3) presents a caveat to policy makers, that the implementation of ICT in schools is a phenomenon that is uniquely different to minor policy changes in curriculum content. He explains that it is not simply a question of re-organising the knowledge base of teachers but essentially getting "teachers to start from base zero". Accordingly, Fullan (1992) argues that ICT is an innovation that presents a major challenge for the professional growth of teachers. There is an identifiable gap between what policy legislation requires and what is actually happening in the school classroom (Younie, 2006; Tondeur et al., 2006). This gap between the proposed ICT-curriculum policy requirements and the implemented curriculum suggests that there has been little inclusion of ICT into the 'modern' curriculum learning areas as a means to improve teaching and learning (Robertson, 2003; Underwood, 2007; Tondeur et al., 2007).

There seems to be a huge mismatch between policy intent and classroom practice. At the school level, school managers and teachers experienced huge challenges in transforming multiple policies into educational experiences within the policy frameworks. Significant research (Ng & Ho, 2012; Lim & Tay, 2003; Lim, 2007; Mulkeen, 2003a; Pedersen et al., 2006; Lim & Tay, 2003) indicates that institutional culture and institutional leadership are inextricably linked and crucial for the successful implementation of government ICT policies at micro level. Research also suggests that school leadership is central to identifying the level of ICT penetration into the teaching learning situation at schools (Elmore, 2005; Ng & Ho, 2012).

Teachers are significantly positioned at the crossroads of policy and practice and as such teacher professionalism is key for the integration of ICT policy in their teaching and learning repertoire. Beastall (2006), Chen (2008), Lim and Chai (2008), Younie (2006) and Sang et al., (2009) argue that the introduction of ICT in education did not have a complementary effect of increasing the professional development of teachers. Furthermore, they claim that changing teachers' classroom practice to embrace the new technology did not unfold naturally as expected by policymakers, even in countries with the most developed ICT in education policies. Although numerous ICT initiatives and policy intentions had been

established and supported through government interventions, "the impact of it on the actual practice of teaching and learning has not been significant" (Belawati, 2003, p. 110; Ertmer & Ottenbreit-Leftwich, 2010).

Czerniewicz and Hodgkinson-Williams (2005, p. ix) argue that research in ICT within the South African context is "under theorised" meaning that there is a "paucity of research regarding relevant ICT policy", particularly on how schools have taken up this challenge. There is limited research on ICT integration in teaching and learning and even less on how ICT policy influences teaching and learning in South African schools. Drawing on the debates in the field, it would seem that South Africa has a rich and thorough policy base from which to draw but lacks implementation in classrooms (Czerniewicz & Hodgkinson-Williams, 2005; Blignaut & Howie, 2009). The integration of ICT into the curriculum and effective management strategies for the successful implementation of ICT in all schools have yet to occur.

3. Theoretical scaffolding: A socio-cultural approach to education policy studies

Sutton and Levinson's (2001) socio-cultural approach to education policy studies is the framework used to anchor this study and to affirm its relevance to the inquiry of teachers' experiences in implementing education policy. The socio-cultural approach to educational policy is distinguished by various significant empirical research case study findings and differentiates between *policy as practice* and *policy in practice*. For the purpose of this study I teased out two complementary conceptions, namely; *policy as a socio-cultural practice* and *policy as agency* which serve as guiding principles of a sociocultural approach to education policy.

3.1 Policy as a socio-cultural practice

Firstly, how individuals construct knowledge and locate their experiences is dependent on the socio-cultural context of the individual. The socio-cultural approach to policy studies (Sutton & Levinson, 2001) seeks to expand our understanding of the cultural, contextual, and political dimensions of education policy. According to Sutton and Levinson (2001, p. 1), the socio-cultural approach to education policy studies redefines the notion of policy as "a complex social practice, an on-going process of normative cultural production constituted by

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diverse actors across diverse social and institutional contexts". Particular attention is given to the cultural meanings people use to interpret their experience and to generate social behaviour. Policymakers and recipients of educational policy are cultural beings with unique value systems, beliefs, attitudes and identities that influence the policy implementation process. Furthermore, processes of policy formation occur across many social contexts.

The socio-cultural approach views policy as a social practice that categorises and shapes actors at various levels of the system depending on the context and perceptions of the actors at each level (Sutton & Levinson, 2001). As an on-going social practice, policy is applied in ways that are particular to specific situations, and within these situations there exists an interaction in which the social actors, policy, and situations inform one another. In this way, the cultural phenomenon to be studied is constituted by the way in which the policy, practices, social actors, and the present social definition mutually constitute the situation. This view suggests that policy can be somewhat incongruent at different levels of organization in educational institutions, and as an official policy moves across multiple settings in a school, it is appropriated by various social actors, thus it can and often does, take on many forms. This current study focuses on teachers' experiences as implementers of the e-education policy and in this regard a socio-cultural approach attends to the "cultural meanings people use to interpret their experience and generate social behaviour" (Sutton & Levinson, 2001).

3.2   Policy as agency

Contrary to policy that exists as the official tool of government, officially authorized and supported by enforcement mechanisms, policy formation also occurs across other varied social contexts. Policy may develop spontaneously and informally in places not officially mandated with making policy. Schools and teachers may enact their own policy to determine appropriate procedure and conduct, which may be "documented and codified, or it may exist in unwritten form, through ongoing institutional memory and practice" (Levinson, Sutton & Winstead, 2009, p.770). The socio-cultural approach to policy studies is used in this study to emphasize the validity of local, unauthorised forms of policy, as implemented by teachers in schools.

Practice on the other hand, takes place within particular situations across varied social contexts, "practice gets at the way individuals, and groups, engage in situated behaviours that are both constrained and enabled by existing structures, but which allow the person to exercise agency in the emerging situation" (Sutton & Levinson, 2001, p. 3). How teachers mediate and understand the e-education policy depends on their beliefs, attitudes and professionalism which in turn influence their social interactions. In this regard qualitative socio-cultural research into the everyday practice of teachers conceives the policy process as a spontaneous response to socio-cultural contexts, in which "the purposeful practice of diverse social actors reinstates agency across all levels of the policy process, making it possible to see policy not only as a mandate but also as a contested cultural resource" (Sutton & Levinson, 2001, p. 3). Elmore and McLaughlin (1988) posit the notion that implementation shapes policy and that the attention is focussed more on the meaning of policy in the lives of those affected by it.

Policy can also be a practice that works on the view of the self in relation to the policy context. Policy within an institution is constantly 'negotiated' and 'reorganised' by the actors in their daily repertoire of institutional life. Aligned with the socio-cultural epistemological view of constructing knowledge through social and cultural participation, teachers' perceptions of e-education and what decisions they make relevant to the policy also influence their view of self. The socio-cultural approach to policy studies further suggest that as policy filters down to be implemented at varying levels within the school context, the local actors at the lowest level of implementation may modify their actions in adherence to policy, or purposefully delay implementation or simply resist policy directives through inaction. Policy thus needs to be analysed in terms of how people appropriate its meanings. Appropriation as defined by Levinson et al. (2009, p. 779) refers to the ways in which 'creative' recipients of policy interpret, 'take-in' and incorporate elements of policy into their own 'schemes of interest, motivation, and action'.

4.   Research Methodology

This exploratory research (Keaveney, 1995; Bowen, 2005) was an attempt to understand how teachers experience and respond to national e-education policy in their classroom practice to improve teaching and learning. A social constructivist lens (Ponterotto, 2005) and a qualitative research design (Creswell & Miller, 2000) represent the socially constructed

realities of the participants as they perceive it to be. The strategy of inquiry was a case study based on backward-mapping principles as expounded by Elmore (1980).

Elmore (1980, p. 604) explains that backward mapping is an analytic approach that is positioned to observe specific behaviour of the policy implementer at the "lowest level of the implementation process that generates the need for policy". This is where I chose to focus my research, at the smallest unit in the system where change is expected, namely the teacher in a classroom context. In applying a backward mapping approach (Elmore, 1980), I also selected participants (that had an influence to change the behaviour of teachers that are the target of the policy) at various systemic levels as I backtracked through the education system. Thus the principal, officials within the district and provincial's e-learning units[2] responsible for policy implementation were purposefully selected. An instrumental case study was selected to gain insight and understanding of the phenomenon of policy appropriation by teachers (Stake, 1995).

Primary schools were selected as social sites across which policy moves and are parallel in status (a set of similar schools that are all subject to the same policy). Thus, through maximum variation sampling (Patton, 1990; Lincoln & Guba, 1985) three urban primary schools were selected from diverse socio-cultural settings. Accordingly, a well-resourced inner-city former model C[3] public primary school, a poorly resourced township[4] public primary school and an independent[5] school were purposeful selected (Berg, 2007). These schools represent a stratum of various types of schools within the South African education context and subjected to the same policy. Primary schools provided a good site for this research because numerous policy efforts namely; Curriculum 2005 (C2005), the Revised National Curriculum Statement (RNCS) and Curriculum and Assessment Policy Statement (CAPS), filtered into school environments in an attempt to change teaching and learning practices. These schools were also using ICT in their all aspects of the school, but in particular in their teaching and learning practice. At each research site two teachers were

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[2] E-learning units are e-education support structures at district and provincial levels.
[3] Former model C schools (classified prior to 1994) are public schools that catered mainly for white learners, traditionally well resourced.
[4] Township schools are public schools that are currently situated within 'black' communities, traditionally poorly resourced.
[5] Independent schools are autonomous private schools that receive minimal state subsidy and target affluent communities.

purposefully (Glesne, 2006; Berg, 2007) selected by virtue of their use of ICT in daily teaching repertoire.

Six instruments (semi-structured face-to-face interviews, classroom observations, researcher journal, field notes, document reviews and informal conversational interviews) were used to collect data and integrate (Settlage, Southerland, Johnston & Sowell, 2005) the data collection method. Interviews were digitally recorded and subsequently transcribed. Classroom observations were captured using unstructured observation methods (Mulhall, 2003) allowed me to capture not only the process of policy implementation but also the context. In using unstructured observation I adopted a role as a reactive observer (Angrosino, 2005, p. 732). All empirical data garnered through semi-structured interviews were coded and analysed through grounded theory techniques (Charmaz, 2005, 2001). The use of Atlas.ti™ as a computer assisted qualitative data analysis software (CAQDAS) facilitated the coding and categorisation of data for analysis, text interpretation and content analysis (Stemler, 2001; Silverman, 2006).

5.   Findings

Findings that emerged from this study were fivefold. First, the national e-Education policy existed as an invisible policy within the school context. Second, the existence of constraining context in the form of a lack of systemic policy support from district. Third, there were conflicting visions of collaborative support. Fourth, principals' and teachers' beliefs, attitudes and professional identity promoted engagement, participation and practice in a social learning context (Handley et al., 2006). And fifth, within the schools communities of practice were emerging.

5.1   An invisible e-Education policy

Principals of all three schools were seemingly oblivious of the existence of the e-education policy. One principal did not mention the policy, another suggested that policy 'will be coming' and the third principal indicated that there must be policy 'out there'. The principal of a former model C school describes his (lack of) knowledge of the e-education policy, indicating that he anticipates a national policy *will* be forthcoming as soon as all schools are equipped with computers. The principal of the township school did not refer to the e-

Education policy as resource document for curriculum implementation. He had no knowledge that such a policy existed. The independent school principal openly acknowledged his lack of knowledge of the existence of such a policy.

> "But the answer we get lately is that you must do what is right for your school. And do what's best for your learners. I think once the Gauteng-On-Line [Provincial initiative for computer provisioning to school] computers are installed and are operational, there will be a policy from the top coming down for that." [Principal – former Model C school]

> "It's probably available out there but we are unaware. I know that when I was in a government school, I'd get those documents and I'd end up just filling them away… I'm not sure if I have seen the white paper policy document {laughing}" [Principal – Independent school]

In the same vein some teachers had a superficial understanding of the e-Education policy and indicated that they had some idea that the national e-Education policy existed. Other teachers did not mention the policy as an essential resource document for their planning. Jolie, a mathematics teacher at a former model C school echoes the sentiments of all teachers in this study. She explains her lack of knowledge of the contents of the e-Education policy:

> "I haven't seen it [e-Education policy] {laughs}. I haven't seen it, haven't been through it, but know about it that there's a White Paper on e-learning. Yes, the White Paper isn't familiar to all educators. I heard of the White Paper when I went to an e-learning exhibition." [Math teacher – former Model C school]

5.2   Constraining context: Lack of district support

Coupled with the absence of the national e-Education policy, incremental policy or guidelines from systemic structures, schools were also isolated from district by district's apparent lack of support and visibility in schools. Most schools were not aware of an e-learning district official, neither were they mindful of e-learning units or directorates that exist at all systemic levels. The former Model C school principal explains that there should be e-learning specialist to support his teachers. He also describes the type of superficial encouragement he receives from the local district office with regard to his ICT-integration endeavours. The principal explains that district needs to more proactive in the manner in which it supports schools with regard to ICT, he expresses his feelings:

> "In terms of human resources, we need to have a GDE [Provincial Education Department] - ICT specialists appointed or a media co-ordinator that will help the

educators with this and that…Ja, I think the time is right now for the district to play a bigger role. To come forward and say guys we are implementing GOL [Gauteng On-line – a provincial computer initiative] centres in your schools, we starting this Mathematics, we starting this and this, this is the bigger picture. This is where we are now this is where we want to go, and this is how we are going to get there. …This is what we going to do. There's no big picture" [Principal – Former Model C School]

A principal of a township school also describes his experience with the lack of district support and guidance. He too expresses his ignorance of the existence of the district e-learning specialist who is responsible for policy implementation.

"No, there might be a unit for this that I am not aware of…However, there's isn't a facilitator as such and that is where we are lacking" [Principal – Township School]

Furthermore, all teacher participants were adamant that the local district did not have the necessary capacity or competence to support their ICT curriculum integration needs. An Afrikaans[6] teacher at an independent school expresses his lack of confidence in seeking district support with issues pertaining to ICT integration into the curriculum:

"No I would not. I would not, because if I see what is happening in government schools, we are way beyond that. And I don't think they [District officials] have, this is a personal opinion, that they have the knowledge, expertise or the resources to be able to do it the way it should be done." [Teacher-Independent School]

The local district e-learning specialist acknowledges both teachers' and principals' frustrations in response to their need for support. She indicates that the district officials may not have adequate competence to support schools as they integrate ICT into the curriculum

"I mean you are a curriculum specialist from the district, coming to check if teachers are sticking to policy [curriculum] and doing the outcomes and so on. Now they [teachers] show you an aspect of the curriculum that you have never even heard of, they show you high tech [ICT] stuff that you can't even understand." [District Official]

The district official in the e-learning directorate, responsible for e-Education policy implementation justifies the principals' lack of interest in participating in district initiatives as a means of support to schools.

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[6]Afrikaans = a curriculum language subject

"Yes, because people want to know, that you know your stuff. When you are giving a workshop they want to know it's worthwhile. I remember was I was doing my conferences, you phone the school and say, we have sent you an invite you haven't responded, we want to know if you will be sending somebody. And then the principal will just say 'tell me are we not going to waste our time there?', and you don't blame them because there have been conferences and workshops where it was just a waste of time." [District Official]

5.3   Conflicting visions of collaboration and communities of practice

The e-learning official at the local district seemingly had different ideas from teachers about establishing collaboration between schools. She felt that teachers were over-burdened with formal curriculum cluster[7] meetings (subject meetings) and that these cluster meeting "did not work". She advocates for direct intervention with each school and a "hands-on individual approach, even if we can do two schools a year". She explains further:

> "Ja, I…ehm. I personally don't like the idea of cluster meetings…No I really wouldn't like to form clusters, because I feel this is too much on the schools and all that. I would rather see ourselves working together with curriculum [District directorate responsible for curriculum policy] within their cluster meetings… but I am not thinking of separate ICT clusters." [District Officer]

Contrary to the district e-learning official's ideas, teachers and principals believe that schools can benefit from each other through some form of collaboration. Teachers apparently desired ICT cluster groups as an effective form of mutual learning, sharing and collaboration between schools. Two teachers portray their ideas of collaboration between schools and at the same time express their frustrations about the absence of district support. Both teachers, one from a township school and another from a former Model C school convey their feelings:

> "there's so much we can do but we don't know how, maybe set up better syllabus, maybe have meetings, cluster meetings, do this...get ideas, exchange ideas. This must come from the department [District]" [Teacher –Former Model C School]

> "But to access what teachers are doing through a databank of resources, a pool of data centres. And the other thing is the departments [District] support for teachers with regard to what they can do is actually non-existent. I mean the department should be accessible, should pool teachers, develop lessons, connect schools…" [Teacher – Township School]

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[7]Clusters are official groupings of subject teachers, meetings are conducted under auspices of the local district

5.4 Teacher beliefs, attitudes and professional identity

All teachers in this study were steadfast in their belief that the use of ICT in teaching and learning enhances learning. Teachers' classroom practices, beliefs and professional identity enshrined the notion that the use of ICT in teaching manifests multiple benefits for learning. Teachers' experiences suggests numerous aspects of ICT-integration improving the teaching-learning milieu, namely: catering for different learning styles, improved learner attendance, enhanced motivation and participation, catering for both 'learners with special educational needs and gifted learners', developing life and career skills, bringing "real-life" context into the classroom and the respect for intellectual property.

Therefore, all teachers in this study expressed their beliefs and attitudes about the value of ICT in teaching and learning. The science teacher at the township school describes with conviction some issues that ICT may address:

> "But the greatest advantage of ICT is that learners must experience the real world in the class. The class mustn't be a place where it is 'kunsmatig[8]' you know…But I think that is the challenge to get to the slow learner. And another challenge is to use the tool [ICT] to stimulate the fast learner. And I think in education in broad, those two gaps we fail as teachers. And the sad thing with OBE [outcomes based education] the educator does not see the approach of OBE is so broad. Every learner can learn, that is the principle of outcomes based [education]. And we don't see how we can use a variety of tools like ICT as one, to make that learner to understand that he can learn." [Township School – Teacher]

Listening to the life history of teacher participants it became evident that three teachers in this study left teaching, entered the corporate world and subsequently returned to the teaching profession. Their corporate experience in ICT impacted significantly their beliefs, attitudes and professional identity. One such teacher was the principal of the former Model C school who talks about his conviction for using ICT as a tool for teaching and learning.

> "Yes! you need open minded guys [referring to other principals], guys that have been outside the box, that sees the bigger picture. The bigger picture is not the school's premises, we not teaching for today, we are teaching for life…we teaching for life. It's beyond that" [Principal – Former Model C School]

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[8]Kunsmatig = Afrikaans word for artificial

5.5   Emergent communities of practice

In their dire need for ICT-integration guidance and support schools "looked" to each other as an opportunity for mutual learning and support. Principals and teachers initiated their own "communities of practice" to support each other in the implementation of ICT into their teaching practice. All participating schools in this study attempted to develop a network of like-minded schools within their sphere of influence. Initially, communities of practice developed through mutual engagement and a shared vision about the use of ICT. Schools and teachers collaborated with other schools as members of a community of practice and tried to understand and negotiate meaning about the implementation of ICT. In each of the socio-culturally diverse research setting, schools formed communities of practice. The former model C school aligned itself with forty-two other former Model C schools, the township school forged links with another public school, and the independent school developed mutual engagement with other private schools.

At all three sites schools formed informal communities of practice within the context of the school and externally, beyond the school boundaries. Teachers engaged with each other by developing ideas on pedagogy, producing artefacts such as their own syllabi and developing lessons. The economic sciences teacher at the model C school explains how interest groups formed with teachers from other schools, when they met at cluster meetings dedicated for other curriculum subjects:

> "NO…NO…NO When we have an EMS [Economic Sciences – curriculum subject] meeting we will talk about the computer centre or when we have an athletics meeting. I'll know that that guy there runs the computer centre so I'll sit with him and chat to him and say how do you do this and how do you do that. So it is not formal about ICT."   [Teacher – Former Model C School]

The science teacher at the township school describes their collaboration with an independent school, and the nature of the learning that resulted from this context. The principal of this school also explains the communities of practice that emerged between his school and another township school.

> "We are in partnership with the German school, it's a private school. We met once a month to discuss computers as well as ways to move forward but that has stopped. We wanted to know to how to set up a computer centre and how to manage it. At that time, we had computers but we needed them to tutor us and

show us how to get the network running. Later on, they helped us with lessons for the whole syllabus starting from grade 1 to grade 7. Actually, we still follow that syllabus" [Teacher – Township School]

"We sent 50% of our teachers to a college in Lotus Gardens once a week for basic computer literacy lessons. While we were there, the relationship between our two schools grew."[Principal – Township School]

The principal of the former Model C school explains how 42 like-minded schools formed a community of practice. He describes how these schools benefit from this collaborative arrangement.

"Now In Pretoria, there's [takes a moment to ponder] 42 schools that's on the KAD programme. That's good for us, because we all moving in the same direction, and it actually activates the other schools as well, to do the same. Ja, so you can see the schools that move more or less in the same direction, having the same things because we talk weekly…And then between the schools we talk a lot, when we get to principals meetings; how do you do this? what do you do? and what do you think about that?…Then the guys share websites and they share ideas. It's very interesting." [Principal – Former Model C School]

Though not formally structured, these voluntary partnerships between schools signalled the emergence of communities of practice. Schools looked to each other for support and guidance in the integration of ICT for teaching and learning. The district e-learning unit identified the benefits of developing collaboration between schools, but only formed school clusters for curriculum designated subjects. Hence, they were not instrumental in establishing similar collaboration structures to enhance the much needed ICT communities of practice. A teacher at a township school elaborates on his vision and frustration about the lack of action from the district to initiate collaboration between schools:

"I would like schools to be connected…I would connect the department with the schools to access what teachers are doing through a data bank of resources, a pool of data centres… And the other thing is the department's [GDE] support for teachers with regards to what they can do is actually non-existent. I mean the department should be accessible, the department should pool teachers like us…Connect with teachers on the internet, what lesson is he doing today? Use this lessons, channel that lesson to that school. You know, a centre, a network centre if you can call it that. A network centre where we can exchange information, exchange strategies on how we presented this lesson…"
[Township school: Teacher]

In this study although all schools formed their respective communities of practice, schools also aligned to a "social consciousness" code of sharing resources and skills with less advantaged schools and thus promoting social upliftment of communities. A teacher at the independent school explains the collaboration that was informally established between his school and another school from a disadvantaged community. A township school teacher also describes their attempt to forge communities of practice with another township school that is even less advantaged.

> "I'm involved with Irene [a township public primary school], but not yet on an educational level, because at this stage it's just to get infrastructure there. And as soon as that is there, then I will be doing training sessions with the teachers on how to integrate it into their lessons."[Teacher – Independent school]

> "But the one school is a disadvantaged school as well, but they never came, they said they would come, we said come we are open, but they never came."
> [Teacher –Township School]

Significantly, all schools in this study developed some form of social responsibility as a practice of their moral obligation to assist other less advantaged schools. While each of the schools operated within a particular social context, each school also assumed a role of contributing to other schools that were deemed to be less ready to implement ICT in their classroom practices. Thus, it was evident that all three schools demonstrated social responsibility towards the identified resource scarce schools by offering professional support in terms of ICT skill and pedagogy development to these schools in a collective vision of a better society.

6.   Analysis and discussion of findings

An invisible e-Education policy

So why is the national e-Education policy not implemented as planned? Why has the e-Education policy not been instrumental in changing the classroom practices of teachers? Why are schools in South Africa seemingly unaware of the e-Education policy? According to McLaughlin (2005, p.58) those tasked with policy implementation at various levels of the policy system "responded in what often seemed quite idiosyncratic, frustratingly unpredictable, if not downright resistant ways". In this study, district and provincial officials charged with the main responsibility of implementing the e-Education policy also responded

in very idiosyncratic ways. Their personal response to policy implementation invariably resulted in the e-Education policy innovation falling short of policy intent.

In most first world countries the concern with policy implementation seems to be on policy interpretation, whether the target of the policy interprets the policy according to the policy makers' intent (Yanow, 1993). However, in a developing country context like South Africa which has a rich and thorough policy base, one would not anticipate that mere access to the e-Education policy would be a policy implementation deficit, yet research results indicate this is evident. The national e-Education policy clearly mandates provinces and districts to create agencies to implement the national e-Education policy (DoE, 2004, p. 37; Jansen, 2002). These agencies do exist as "e-learning directorates" within district and provincial departments. So what are the contextual issues that plague these agencies from implementation of the e-Education policy?

First, e-learning directorates seem to (mis)interpret strategic directives of the e-Education policy as a mere "guidelines". According to Spillane et al. (2002) certain signals may emerge when "misinterpretations" of policy is evident. These "misinterpretations" may suggest wilful efforts by implementing agents to sabotage implementation or justify their modifications of policy. However, district officials did not interpret, modify or transform the policy but rather understood their policy implementation roles as being mere conduits of the policy. Perhaps the nature of the policy text in as conveyed in the e-Education policy is too tacit and not explicit enough (Yanow, 1992), thus creating tacit meaning and not communicating that meaning as intended. It would seem as though policy stakeholders formed their own interpretations of policy language, legislative intent or implementation actions, and these interpretations may differ from one another and diverge from the policy maker's intent. Levinson et al.,(2009) explain that formation and appropriation of policy is a kind of knowledge and meaning making. Earlier work by Spillane et al.,(2002) affirms this conception indicating that differences in 'policy interpretation' and 'sense making' of policy is what makes local implementation difficult. The socio-cultural approach to policy analysis suggests that the context and perceptions of the actors at different levels may interpret policy in "somewhat incongruent" ways. In this regard did the e-learning officials understand what policy makers are asking them to do? Did their 'sense making' of the policy offer ambiguous meaning? Did they appropriate policy and exercise agency? There is not much evidence that alludes to answers for these questions. However, evidence in this study suggest that the e-

learning officials at both district and provincial levels did not 'read' policy text as mandatory for implementation, and thus there seemed to be no sense of urgency to get the policy to schools, let alone get schools to understand and implement the policy.

Second, teachers were in dire need of a tangible policy document that would guide them to the integration of ICT into their teaching practices. But, in order for policy to be (re)formulated as guidelines at district or provincial levels, there must be a will to make policy (Levinson, Sutton & Winstead, 2009). Although district and provincial directorates are authorised agencies (Jansen, 2002) having an on-going mandate to make incremental policy, they seem to lack the will to make policy. The authorised text or policy intent as it circulates across implementing agencies and institutional context to which it applies, did not seem to be appropriated[9] by the very agency tasked with implementing the policy. Thus these local actors did not develop or formulate authorized or unofficial types of incremental policy as an outcome of their encounter with the official e-Education policy. Teachers' genuine call for more workable ICT in education policy were neither formulated by district or provincial agencies nor enacted in teachers' practices.

Third, since 1994 the education system has undergone three major curriculum changes namely; Curriculum 2005 (C2005), National Curriculum Statement (NCS) and more recently the Curriculum and Assessment Policy Statement (CAPS). Each of these curriculum policy revisions has not made significant inroads in promoting the integration of ICT in curriculum delivery. Furthermore, Jansen (2002, p.203) observes that "symbolic prominence of education policy is evidenced in the lack of integration of various national policy statements. There is very little policy coherence across the different White Papers and other policy documents since 1994".

Fourth, it seems as though the national Department of Education (DoE) has not promoted the e-Education policy with the same enthusiasm as it has with the various revised national curricula. A number of questions may be asked. Was the national e-Education policy intended as a mere symbol of South Africa's policy making prowess (Jansen, 2002)? Is the e-Education policy a façade by policy makers in appearing to improve teaching and learning, and not destined for implementation (Hess, 1997)? At the school level the results are quite

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[9] Recipients of policy interpret and take in elements of policy into their own schemes of interest, motivation and action

different from the idealized school as posited by the policy. While government remains misguided by the ICT policy focus on provisioning of hardware and infrastructure, schools are in the throes of curriculum integration and pedagogic need. This may be attributed to the fact that district and provinces as implementing agents are novices in implementing policies that demand for "complex or novel changes" in extant behaviour (Spillane, Reiser, & Reimer, 2002). The e-Education calls for a radical and innovative shift in teaching pedagogy, one that expects teachers to effectively use ICT in curriculum delivery. However teachers lack policy guidelines, pedagogic know-how and external support from districts. I also add the notion that the e-Education policy may be too ambitious or pre-mature within a developing country context without the necessary resources, capacity and competence of the implementing agencies (district and province).

Communities of Practice

The lack of transmission of the e-Education policy to various policy stakeholders and how policy intent is shared (or not shared) is a policy impediment. Furthermore, the e-education policy neglects to inform schools on *how* ICT might be used in classroom practice. Schools are left to their own devices, they accrue meaning to their own policies that guide their actions and classroom practices. Initial findings of the current research also suggest that different categories and subcategories of actors in the school systems such as principals and subject teachers comprise a community of practice that influenced the interpretations and appropriations of the policy that were made within the school context (Levinson, Sutton & Winstead, 2009).

All schools in this study reflected their awareness that they do not exist nor function as "self-contained units" that is cocooned from the outside world, but is part of a "broader learning system" Wenger (1998). Teachers aligned themselves with like-minded schools as communities of practice, sharing a concern for improved ICT pedagogy and ICT curriculum integration, learning how to do it better. These communities of practice were groups of teachers informally bound together by shared expertise and a passion for joint enterprise. Wenger's (1998) three prongs defining communities of practice were evident at some sites: First, a community of practice should have an identity which is defined by a shared domain of interest. Members within a community of practice value their collective competence and learn from each other. Second, a community must exist that pursues their interest in their

domain. Members are bound as a social entity by mutual engagement and purpose. Members in a community must engage in joint activities and discussions with the intention to help each other and share information. The community that emerges builds relationships and an enabling and supportive environment. Third, practice is a key component that defines a community of practice. Members of a community of practice are practitioners that exist because of their "shared repertoire of resources: experiences, stories, tools, ways of addressing recurring problems."

7. Conclusion

So why did communities of practice emerge within these schools? Some affirming conditions were apparent. The absence of an e-Education policy within the school context coupled with the lack of district support compelled schools to seek alternate means of support for ICT integration. Schools and teachers sought each other as a source of situated learning to improve their teaching practice. This study found that teachers were disillusioned by the lack of policy and adequate policy guidelines. Furthermore district officials seemed to lack both capacity and competence to provide ICT-integration and policy support to teachers. Initially, schools seemed to operate in vacuums by implementing their own ICT practice as policy. Communities of practice thus became the panacea to address the needs of schools for ICT integration, support and collaboration. Furthermore communities of practice tend to nurture practitioners' situated learning which enhances their pedagogy and ultimately influences policy in practice.

The irony of the argument is that though the e-Education policy was not mediated by teachers in schools, their school-based ICT practices actually reflected policy intentions of the national e-Education policy. This raises questions about teacher agency and practice as policy. In this regard practice gets at the way teachers, and groups, engaged in situated behaviours that were both constrained (lack of policy and district support) and enabled (exigency conditions in schools) by existing structures, but which allowed teachers to exercise agency in the emerging situation.

Since teachers' classroom practice mirrored the policy intent of the e-Education policy, policy makers may use school sites to learn from the field of "what works". This evidence based practice of teachers extends the theory of "practice as policy", giving policy makers an

opportunity to learn from practice in order to inform policy. A voluminous number of policy implementation studies focus on "policy in practice", however this study pushes the boundaries back in the field of policy implementation, by arguing that evidence based practice may inform policy. It may be further argued that policy making should be grounded in more reliable knowledge of 'what works' to retain its relevance and importance to practice. Practice as policy may provide a window into exploring *how* ICT might be used in classroom practice.

If teachers are instrumental in policy development that is concurrent with their beliefs and attitudes, it gives rise to agency, which is a necessary condition for effective policy implementation. As teachers attempted to implement their school-based ICT practice, their life histories, ideological formation, and professional experience determined the specific interpretations they made of the local ICT context. Findings of the study conducted by Jansen (2002) reveal that teachers do not constitute a more 'authentic voice' for policy change. However, contrary to this finding, my study found that teachers changed their pedagogy, formulated and appropriated a school based e-education practice, without any external policy or systemic support. Findings indicate that teachers' beliefs, attitudes, professional identity and life histories are mainstays of policy implementation. The will, beliefs and attitudes of teachers in the implementation of ICT was not driven by the e-Education policy mandates, but rather by teachers' professional identity and a desire to improve teaching and learning. The socio-cultural approach to policy studies revealed teachers' *practice as policy*, rather than the e-Education *policy in practice*.

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