

# Unravelling the text book as embodied curriculum: An Actor-Network Theory view of an Android-based eBook implementation in a South African Secondary School

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## ABSTRACT

This paper uses ANT to trace the network-effects of two artefacts, an Android Tablet and an eBook as they are released into a newly formed e-learning actor-network (MobiLearn) inside a South African secondary school. Attention is given to the network effects on the identity and role of both tokens and how they in turn influence other actors inside the network. Of special interest is the effect that both tokens have on the understanding of the "book as a container" and the "knowledge is an object" metaphors as they dismantle and destabilize the notion of a text book as embodied, authorised curriculum - despite the fact that this intention is never verbalised by any of the actors inside the network.

## Author Keywords

Android, Tablets, Actor-Network Theory, Mobile Learning, curriculum

## INTRODUCTION

In January 2012, a high school in the East of Pretoria, South Africa issued all of their Grade 10 learners with Android Tablets. In doing so they became one of the first schools in the country to replace *traditional printed* learner text books with *interactive digital* (Tablet-based) text books aligned to the local curriculum. From the outset, the school administration was clear that if the pilot project (named "MobiLearn") proved successful, it would become the cornerstone of a process envisaged to transform the entire school from a "traditional 'chalk-and-talk' school" to a "digital school" by 2013. As early as the last week of May 2012, the MobiLearn project was deemed such a success that the decision was taken to start planning for "MobiLearn 2013 and beyond". As a result, a meeting with the most important stakeholders was set up by the administrative head of the school to discuss teething issues experienced during the first five months of the project. The meeting also addressed the financial and other implications of expanding the project to the rest of the school and to its full potential.

The mention of "teething issues" is deliberate because the fact that the MobiLearn project was deemed a success by both the school administrator, academic head, IT manager, educators and learners so early in the process (barely four months into the academic year), should by no means be taken as an indication that the pilot was without compromises, persuasions, resistances and coercions. Indeed it was (and still is, at the time of writing) messy and fluid while challenging established networks, processes, procedures and habits - as could be expected with the introduction of a brand new, fairly revolutionary technology into a well established, well-functioning and efficient local school ecosystem. The aim of this paper is to use insights from Actor-Network Theory to follow the Android Tablet and the MobiReader (eBook) application as "tokens" through the "messy and fluid" implementation of the project. This documents the extent to which both were/are transformed by the emergent assemblage(s) while they in turn play crucial roles in destabilising some established networks and effecting the emergent-but-not-yet-stable MobiLearn network environment.

The most significant of these is how the implementation of MobiReader and the eBook destabilizes the local-global actor-network with its notion of nationally approved "text books" based on an authorised and endorsed curriculum in favour of a much more open-ended eBook as gateway to interactive, collaborative and participatory learning events.

## ACTOR-NETWORK THEORY AND INNOVATION IN EDUCATION

ANT, or Actor-Network Theory is an umbrella term used to refer to a field of enquiry into technology, innovation,

scientific discovery - almost any network effect or system involving humans and non-human entities - on the premise that there is a symmetry between the way that human and non-human actors in a network are transformed and in turn translate interests inside a network. Law, while not comfortable with a meta-narrative of what ANT is (Law, 2006) nevertheless provides an eloquent description of what it entails elsewhere: "Actor-Network theory is a disparate family of material-semiotic tools, sensibilities and methods of analysis that treat everything in the social and natural worlds as a continuously generated effect of the webs of relations within which they are located" (Law, 2006).

ANT originated in the work of Callon (Callon, 1986b, 1986a) Latour (Latour, 1993, 2001) and Law (Law, 2006). It "tries to trace and explain the processes whereby stable networks of aligned interests are created and maintained"(Rhodes, 2009) and concerns itself with describing heterogeneous networks and the relations that hold these together. Crucial to an ANT understanding of the world is that no a-priori hierarchical distinction is made between humans and non-humans (animals and inanimate objects) within a network – especially not in terms of agency. In other words, all objects within a network, human and non-human are treated equally in writing up the "narrative" of a network in a sociology of associations (Latour, 2005, pp. 63–86)159ff).

All objects within a network are seen as actors each with agency and the ability to influence and determine the stability or instability, success or failure of the actor-network (Callon, 1986b, 1986a). In order to describe the interactions and relationships within a stable or failed (attempted) actor-network, Callon developed the notion of translation which involves four moments; Problematisation, Interressement, Enrolment and Mobilisation (Callon, 1986b) and also (Latour, 1993). "These moments constitute the different phases of a general process called translation, during which the identity of actors, the possibility of interaction and the margins of manoeuvre are negotiated and delimited" (Callon , 1986a, 203).

All actors in a network are defined as part of their interactions with other actors in the network and become strong only by virtue of forming alliances. "Eventually these dynamic attempts by actors to translate one another can appear to become stabilized: the network can settle into a stable process or object that maintains itself. Like a black box, it appears naturalized, purified, immutable and inevitable, while concealing all the negotiations that brought it into existence" (Fenwick & Edwards, 2012, p. 10).

Although Callon's notion of translation as four moments became somewhat programmatic in early ANT studies, this was later recognised by ANT practitioners and addressed in the material semiotics of Law (Law, 2006) and Law and Hassard (1999) among others, partly because of a recognition that reality is often "fluid", "messy" and unpredictable. It is simply not always possible to follow these neat categorisations in the description of an actor-network or of a token as it translates through a network (cf. the relation between the MobiReader application and eBook below). "As a philosophical and theoretical approach more recent ANT studies recognise and validate this picture of the mess, fluidity, contingency and vitality of everyday social practice, and offer resources to explore pathways through it to uncover the workings of power" (Hamilton, 2012, p. 42). ANT draws on Foucault's notions of the performative nature of power in micro-interactions and shares his interest in excavating how social projects build and become sedimented and institutionalised within everyday practice. "The ANT approach, therefore, offers not so much an explanatory theory, but methods for understanding "messy practices" from empirically grounded cases, and providing descriptions, and "telling interesting stories about, and interfering in, those relations" (Law, 2009). ANT is a radical break from the implicit dualism of approaches in which technologies are viewed as separate from their interpretations of them. Latour (2005) opposes an ontological separation between materiality and meaning, and is concerned not with what objects and texts mean but what they do."

One could argue that initially the tablet and MobiReader enter the project as black boxes, since their roles have been pre-defined quite clearly early on in the project and their roles stabilized by the alliances with the school administration, the service provider, the publisher and the Virtual Learning Environment (VLE). The Tablet will become the replacement of the physical text books, while the MobiReader (eBook) application will become the means by which the curriculum become accessible to the learner. However, as soon as the project starts, and the MobiLearn network is brought to life so to speak, it becomes quite obvious that neither of these are stable objects with clearly defined roles. As the emerging MobiLearn network interactions force new, powerful connections onto both tokens which weaken the initial ties and associations with which they entered the new actor-network their black box status is challenged.

In the past decade or so, Actor-Network theory has become increasingly popular in IS research - often related to case studies of ICT implementations (Law, 2006). However ANT has not quite gained the same traction in education innovation studies as noted by Fenwick and Edwards: "With a few limited exceptions, however, educational research in the main has not demonstrated a similar enthusiasm in the uptake of ANT." (Fenwick & Edwards, 2012, Intr.).

This paper shares the views of Fenwick and Edwards (2012) that "ANT offers truly important insights about the processes and objects of education" especially with regard to the value it brings to a discussion and evaluation of education case studies that involve new technologies.

### **The Tablet as token**

In ANT the notion of a token is closely aligned to the concept of translation and it differs substantially from the conventional idea of an object diffusing through society. While it has some commonality with conventional diffusion

studies in that it signifies a brand new innovation being deployed or adopted into an existing, fixed and fairly stable environment, a token in ANT is not, by definition, viewed as a stable entity (Latour, 1993). As Gaskell and Hepburn (1988, 66) point out, in a diffusion approach a discovery or invention moves through society unchanged as it encounters people who use it or resist it. However, "...the concept of translation provides us with an alternative way of understanding these movements across space and time. Here a token is usually not passed unchanged, but can be ignored or taken up and translated as different interests are invested in it. As a result, the token itself is changed" (Edwards, 2012, 28).

The token engages with other entities inside a network of associations and resistances as part of a process through which both the network and token co-evolve. Only once the token stabilises is it regarded as an artefact and will it become "black-boxed" - but only for as long it remains inside a stable network of associations. "Eventually these dynamic attempts by actors to translate one another can appear to become stabilized. ... Like a black box, it appears naturalized, purified, immutable and inevitable, while concealing all the negotiations that brought it into existence" (Fenwick and Edwards, 2012, Intr.).

When we consider the Android Tablet as a token from an ANT perspective in its relations to other entities in the MobiLearn network it initially manifests as just another "tablet device". When it is introduced during the pre-pilot phase as part of the negotiations between the school and the service provider, it is a mobile telecommunications device that will be required to connect to a data-network, deliver data packages to a VLE, afford the rendering of eBooks, run applications, and provide sufficient battery life to comfortably last a school day with "normal" usage and "be durable" throughout the whole process.

But as soon as the MobiLearn project is launched the tablet as token changes. It is no longer a generic telecommunications device manufactured somewhere in China and sold locally as a tablet. Instead, it becomes an object of desire and prestige (the 21<sup>st</sup> century replacement for traditional textbooks, the differentiator between the Grade 10 learners and the rest of the school, and also between the school and its neighbouring schools), an object of envy. This elevated position is not only a local network effect, but translates itself into a global effect; first when newspapers report on the project while focusing on the *tablets* as text book replacements and then the most popular South African family magazine (You, 20 March, 2012) with a circulation of about 350000 writes an article on *tablets* and learning and features the school prominently. As a direct result of the publicity given to the *tablet* the local school gets translated into a focal point in a global network of Southern African schools, resulting in site visits, consultations and enquiries from schools as far as Namibia. The *tablet* as token becomes more than a physical object - as a result of its associations it becomes a reference point for a discourse about what it means to engage in 21<sup>st</sup> century learning. The tablet as token is redefined by the network through its local and global links.

Inside the local MobiLearn network, the Android Tablet as a token negotiates a somewhat different path as it engages the physical WIFI network, the educators and the learners. It completely destabilizes the school WIFI network which has been in operation for a number of years, and which had been upgraded before the start of the project. This happens when the WIFI network initially translates the tablet's "anytime-anywhere mobility" to a "sometimes-someplaces mobility" because the signal is not pervasive enough and the network setup limits learners' and educators' movements when they are connected.

However, the tablets are "anytime-anywhere devices" by nature and so they resist this restriction and in alliance with educators, learners and administrators the recently revamped WIFI network is destabilized to such an extent that it is replaced once again, this time allowing for pervasive connectivity. This is an example of why ANT insists on a symmetry between objects in a network (Latour, 2001).

As the Android Tablet is taken up by educators its path through the MobiLearn network is adjusted once again. Although it contains the MobiReader application with the electronic text books (which we will return to later) it manifests itself as a kind of a gateway to the world and in doing so changes the way in which educators think about their teaching and what happens in class. It is no longer a closed-off event happening inside four walls. In the words of one educator "it puts the world at our fingertips". The interaction between the token and the other actors in the network leads educators to "see new possibilities with the token" (Gaskell & Hepburn, 1998, p. 66). After the fact, this network effect seems almost too obvious to even mention, yet it had to first take place before educators came to the realisation of what had actually happened when they were asked to reflect on it. As will become clear in the following section, this gateway effect plays a significant role in the destabilization that happens to the "text book" through MobiLearn and the eBook(s).

Perhaps the most interesting network effect the Android Tablet as token is involved in relates to the learners; where it came to replace their traditional school bag with printed books. As was to be expected, learners accepted this change with open arms - not only did they no longer have to carry around heavy school bags, but the devices are "cool" and allow them to play games and socialise online to their hearts' content (outside of class). But apart from the pleasure learners derive from the tablet, the most interesting aspect is the feeling of being empowered. This is significant because empowerment is not necessarily ingrained in a traditional "chalk-and-talk" model of learning which tends to be hierarchical. As the tablet affords a shift in power within the MobiLearn network, it facilitates a renegotiation in the actor-network constituted by the technology, curriculum, educators and learners. The network and the token co-evolve

(Latour, 2001).

Finally, although it is perhaps too early to tell how the MobiLearn actor-network will stabilize around the curriculum and what constitutes knowledge and learning, it does seem as if the Android Tablet as token in the MobiLearn network is making its most significant contribution in the dismantling of the "knowledge as object" and the "book as a container" metaphors. This may sound like a contradiction since the tablets contain the canonised (CAPS) curriculum as prescribed by the Department of Education after all and which, apart from the interactive nature of the eBooks is not much different than the printed text books. Yet from the picture that emerges as we trace the token in its engagements with the educators and learners, it is obvious that boundaries are being eroded: The classroom is expanded beyond the walls to cover "the world" and with it the idea of knowledge as object in favour of learning as an event.

"This contrasts with a classroom only containing textbooks, blackboards, pencils, notebooks and chalk, which over the centuries has become a stable practice with well-established and well functioning ties to the producers of the artefacts used for teaching and learning. If the chalk breaks in two or a book is in bad condition there are well-known practices for fixing these breakdowns in the normal flow of activity, practices where teachers and learners exert a great deal of agency" (Arnseth, 2011, p. 359).

Simultaneously, books are no longer seen as closed, container-like entities that encompass all necessary knowledge or facts. Empowered learners now have the opportunity to change from passive receivers of knowledge to active learning subjects because the Android Tablet as token inside the MobiLearn network has started to erode the established hierarchical roles of "teacher" and "pupil" and "closed" book. This is similar to what Nespor (2012, 1) refers to when he says that: "... devices can be used to reorganize agency itself... shifting the location or attribution of who does what, shifting participants from one actor category to another, or creating new categories of agents." To what extent this redefinition of the actor roles of educator and learner will eventually stabilize is still unclear and it is certain that the entrenched power inherent in the commonsense understanding of "knowledge as object" and the curriculum as "authority" as well as the classic teacher-pupil framework will resist these changes. The final outcome will most definitely be a result of new alliances within the school actor-network where agents such as the Android Tablet, VLE, MobiReader, learners and educators alike will play a role as the MobiLearn assemblage evolves. As (Harmon, 2007) remarks "entities are not just effects of their interactions with others, but are also always acting on others, subjugating others and making things possible."

### **MobiReader (eBook) as token**

In what follows the MobiReader application and the eBook(s) which it renders/delivers are deliberately treated together simply because neither can exist meaningfully without the other (inside the MobiLearn network). Also, the term eBook is used to designate a class or type of object/token rather than a subject book.

The eBook as token enters the MobiLearn network when it is made available via the MobiReader application that was developed specifically to render interactive multimedia content from inside the EPUB format. It represents the digital version of the "approved"/aligned properly printed" hard copy text books which carry the authority of the Department of Education and the approval of the school administration - powerful allies indeed.

Yet, despite these credentials, it does not remain black boxed. In fact, because of its close ties with the MobiReader application its alignment with the "book as container" metaphor is almost immediately challenged. The same goes for its status as a canonized version of the curriculum put together by experts and endorsed by experts with the authority to do so. This happens because the MobiReader application is much more than simply an eBook rendering tool. It is at an important nexus between various powerful actors in the MobiLearn network. So in its own alignment with the VLE, the service provider, educators and learners, it is put in service of facilitating social constructivist *learning* rather than merely providing access to *knowledge*. As it is introduced into the MobiLearn network, its alliances force it to become a communication tool, a note taking tool and collaboration platform. But most importantly, however, it becomes a vehicle through which educators can add content to the prescribed, authorised and approved curriculum-based content.

In this process, the notion of an approved curriculum based text book is turned on its head. Educators will be able to add to what has been "canonised" depending on their own understanding of the curriculum or the needs of the learners and/or within the MobiLearn actor-network - even though this was never the *intention* of any of the actors within the network. There is no campaign to discredit or undermine the curriculum. It is simply taking place as a result of the network effect of the MobiReader (eBook) as token.

The MobiReader/eBook as token is a great example of how the closed-ness and authoritarianism of a traditional hierarchical education system will become increasingly challenged as digital learning gains traction in the 21<sup>st</sup> century, not necessarily because of a campaign against it, but perhaps even more so as a result of the inherent nature of the digital artefacts that will be used to assemble digital learning.

### **CONCLUSION**

Using ANT to trace how two tokens through the MobiLearn actor-network that was established when Android Tablets replaced traditional text books at a secondary high school in South Africa enables one to become aware of network

effects that may otherwise have remained hidden. Especially useful was how an ANT analysis of the Android Tablet and MobiReader application (eBooks) confirmed that no technology is value neutral, and that once introduced into an existing network it may lead to unexpected consequences. In the case study we examined, there was an existing network around approved, curriculum-based text books that involved both a local and global component, and which was apparently under no threat from either educators or learners. Yet, with the introduction of the tablets, MobiReader and eBook(s) an existing paradigm of authority and hierarchy is suddenly being dismantled and destabilized. What is even more interesting from a research perspective is the fact that neither the educators, nor the learners (and probably most other actors in the MobiLearn network) do not realise that they are in the midst of a mini (local) education revolution that goes far beyond the ability to collaborate or add notes to an electronic text book. This ties in with the ANT notion that network effects do not necessarily happen because of a specific intentionality.

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