Understanding Change from a Socio-technical Perspective: The Case of an E-Textbook Implementation

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ABSTRACT

In this paper the authors report on a socio-technical analysis of the change caused by an e-textbook implementation in a secondary school in South Africa. The Punctuated Socio-Technical Change (PSIC) model was considered because it affirms the socio-technical nature of existing educational research on ICT enabled change, and also extends it by recognising the episodic nature of change. On a vertical level the model allowed the authors to identify and distinguish between the factors and events which influenced the change in the organisation on four different levels. On a horizontal level, the model makes the disequilibrium between the socio-technical system components visible as they happen over time. Data was collected during the first phase of action research and analysed using the PSIC model. It is found that, despite the preparatory events leading to the full roll out, as well as the positive affordances of the new technology, the equilibrium of the socio-technical components of the work system was severely disrupted. The technology infrastructure did not support the e-textbook platform and the implementation of more than one platform clearly caused confusion. The experience of the teachers was that they were not offered sufficient support and that the e-textbooks they were expected to use, did not support the teaching and learning task. Consequently, the authors suggested some interventions to stabilise the socio-technical work system, of which some have already realised. As the ST-model used within the PSIC model fails to address the vertical gaps between levels in sufficient detail, the authors intend to apply ANT in future research to overcome this shortcoming.

KEYWORDS

INTRODUCTION

In a seminal article by Markus and Robey (1988) ICT and organisational change is labelled a vital matter in the field of IS. According to Avgerou (2001) the change studies done in the field of Information Systems, differ in terms of the change ‘content’ they address; the explanation of the ‘environment’ they study; as well as the way in which the ‘process’ of change is understood, relative to the environment within which it takes place. On the relationship between content and context, she reports that most IS studies focus on technological change, attempting to develop effective technologies and ways in which to manage and use it effectively. Such studies would focus on the environment for the sole purpose of it being a source of opportunities or constraints for the technology implementation, ignoring the unfolding of the organisational and social changes interacting with the technology implementation. Other studies focus on technology as the ‘content’ of change, and the
socio-organisational conditions under which it takes place, as the ‘context’ of change, thus separating the two. A third group of IS researchers study IS as socio-technical systems and have drawn on several different theoretical and epistemological aspects of the social sciences to highlight the social effects of new technologies, incorporating ideas such as duality of technology; social constructionism; and actor network theory, to study the joint partaking of technology and human actors in forming intertwined socio-technical entities.

Selwyn (2011) points out, that in contrast to ICT implementation in organisations, technology implementation in schools is generally done in haphazard and inconsistent ways, resulting in little systematic research on ICT enabled change in schools. The few existing studies addressing the need for the understanding and management of changes resulting from new technology in schools, support Selwyn’s notion that the aim should be to try and understand “how these technologies are socially constructed, shaped and negotiated by a range of actors and interests” (Selwyn, 2010, p. 69). For example, Ng et al. (2013) propose a people-centred framework for mobile technology implementation in schools which recognises the technical and people-related aspects of such complex environments. This includes management, teachers, students, technicians and the wider community (parents, suppliers, software developers etc.). The change dynamics is caused and driven by the interpersonal relationships between these role players. Similarly, Lim (2002) acknowledges the social and technical factors involved in ICT integration in schools. He uses Activity Theory to view ICT implementation in educational environments from a sociocultural angle. Risquez and Moore (2013) focus more on selected groups within the changed environment. They argue for determining the change readiness in educational environments by considering the psychoanalytical dynamics of the teacher group. The two psychoanalytical concepts of individuation and congruence are used. Similarly, by focusing on selected aspects of the change environment, Tondeur, Van Keer, Van Braak, and Valcke (2008) established that structural (e.g. infrastructure, planning and support) and cultural (leadership, goal orientedness and innovativeness) characteristics of schools affect educational change. Related to the management of change, Ng et al. (2013) mention the importance of inclusive and communicative leadership. Lim et al. (2013) emphasise the importance of a technology policy plan setting out an agreed vision for the use of technology in the school. According to them this plan also needs to describe expectations, goals, content, professional development and evaluation. The opinions and suggestions of all stakeholders, especially of the learners and teachers, should be reflected in such a policy plan. It is clear that scholars working on change, resulting from ICT implementation in educational environments, recognise the social, technical and multi-faceted nature of such environments. Watson (2006) notes that although it is recognised that IT implementation in schools implies change, existing models or theories of change which might provide conceptual underpinnings of a systematic understanding of it, are largely ignored.

In this paper we aim to address this need by applying a socio-technical model of change, the Punctuated Socio-Technical Information System Change Model (PSIC) of Lyytinen and Newman (2008). This change theory is used to enable a socio-technical understanding of the change process which took place in a secondary school in South Africa due to an e-textbook implementation. The case described in this paper, provides an interesting departure from most research cases concerning ICT implementation in schools. This implementation is not seen as an experiment but is institutionalised by a management decision, which is very much in line with ICT implementation in organisations. In 2013, this school embarked on a journey to replace printed textbooks with e-textbooks. Initially a pilot project was run which involved only one school grade. This was followed by a full roll-out early in 2014, which was plagued with several problems and due to the fact that considerable resistance was experienced, the school’s principle approached the authors for advice a few months into the implementation. Using action research, the authors decided to gain an understanding of the change in
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