e-Learning Korea 2017: Conference

August 30-31, 2017　|　Coex, Seoul, Korea

SOCIO-TECHNICAL TRANSITION TOWARDS NEXT-GENERATION E-TEXTBOOKS IN ESTONIA

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Recently, the e-textbook research and development has more focused on designing and testing out e-textbooks as a new medium that would replace paper textbooks. These studies do not yet provide the wider picture of the e-textbooks as a new socio-technical system that will change also the way knowledge is created, shared, negotiated, applied and redefined in schools of tomorrow. According to Geels (2002), socio-technical regime can be described as 'the configuration that work'. Transition to new socio-technical regimes does not only involve technological changes, but also changes in elements such as user practices, legal regulation, production and business models, infrastructure, and symbolic meaning (Geels, 2002). Transition to e-textbook as a new socio-technical regime will not just digitalize the medium of books, but will bring along the emergence of new teaching approaches and conceptualizations of learning and schools, as well as requires revising business models in textbook industry and many more. Such transition can bring along unexpected consequences and requires meeting new challenges. This paper aims at identifying the wider components of e-textbook as a new socio-technical regime, and mapping the current e-textbook research and development in Estonian context.

Broader interdisciplinary social science approaches to innovation – techno-economic paradigms (Perez, 2010) and socio-technical systems (Geels, 2002) view innovations as dynamic processes that are rooted to micro-foundations of technical change (Perez, 2010). Perez (2010) suggests that incremental innovations form the growth path following each radical innovation. Individual technologies are not introduced in isolation but they enter into a changing context that strongly influences their potential and is al-ready shaped by the previous innovations in the system. Geels (2002) distinguishes the concepts of socio-technical landscape, socio-technological regimes embedded within the landscape and radical technological niches (innovations) that cumulate and may shift the mainstream trajectory and reorganize the socio-technical landscape. He highlights several mechanisms in the breakthrough of radical innovations: a) technological add-on and hybridization new technologies in their early phase physically link up with established technologies in a sort of symbiosis solving particular bottlenecks and not immediately competing with the mainstream regime, b) riding along with growth in particular markets, through a stepwise process of reconfiguration, series of adaptations and changes over time gradually growing the new regimes out of old ones. In this paper the focus is on e-textbook as an emerging socio-technical regime that is ought to radically change how we conceptualize the schools and learning. Similar regime change from oral/narrative to text-based teaching was observed with inventing printed press by Gutenberg (McLuhan, 1962). Hakkarainen and Paavola (2014) have outlined the learning design principles for cultural interface already in their concept of trialogical learning. Main core of their design approach is organizing work around shared knowledge artifacts - the emergent interactional resources, which can mediate between individual learning, group cognition and community

knowledge building (Stahl, 2012), will structure the shared work and reflective practices, may be versioned and iteratively transformed during long term knowledge creation, leading to forming cultural knowledge and practices.

In 2014, the Ministry of Education and Research (MoER) of the Republic of Estonia issued a decree on e-textbooks which requires that all new publicly funded textbooks for primary and secondary schools should be published in the digital form since spring 2015. While in the beginning there was no technical requirements specified, the situation has changed over the last two years. In partnership with Tallinn University, MoER has commissioned a new online content aggregation platform for Digital Learning Resources (DLR) called eSchoolbag, that will become the heart of the next generation digital ecosystem for commercial e-textbooks, Open Educational Resources created by teachers as well as other types of DLR. eSchoolbag is a hub that automatically harvests metadata of learning object from tens of different repositories (both commercial and public/free ones) using OAI-PMH protocol, thus connecting two e-learning ecosystems that until now existed separately. It is not just a catalogue of learning resources, it offers learning analytics based recommender system that helps teachers to compile collections of learning objects that can be shared with students through online gradebook used by all teachers and students in Estonia on a daily basis.

This paper summarises our study of research-based design (Leinonen, 2010) on eSchoolbag platform and ongoing massive initiative that involved more than 100 experienced high school teachers and university staff in developing a set of interactive content objects that cover almost 80% of all courses in the national curriculum in grades 10 to 12. Tens of thousands of interactive Learning Objects are currently being created on an interoperable, open-source technological platform consisting of Drupal Content Management System and H5P module. These Digital Learning Resources will populate the eSchoolbag platform and will be piloted by teachers in 20 schools next schoolyear. Our research analyses this new digital ecosystem using the framework of socio-technical regime provided by Geels.

Keywords: e-textbook, socio-technical transition, open educational resources

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