Background to the Future Classroom Maturity Model

The origins of the Future Classroom Tools concerned with Maturity Modelling, are in the 1990s, and are related to the rise of technology in schools, largely in the United Kingdom.

Generally speaking, innovation in schools before this period tended to be related to pedagogy (e.g. 'the 1960s child-centred approach', communicative methodology in language learning) and structural reforms (for example, raising the school leaving age, comprehensive education, vocational schools, changing the age of transfer from primary to secondary education). There was relatively little activity related to whole school development.

When computers and associated technology began to be introduced in schools in the 1980s, then, as now, the focus of attention was on the technology itself, schools (and ministries of education) schools 'jump[ing] to new technologies like frogs on lily pads'[1], investing in headline-grabbing schemes: modems for schools, interactive whiteboards, portables for teachers and so on, with little thought for the educational purpose of their acquisition or support for their use. In the 1990s pressure built up for more accountability, not surprising in view of the investment of public money and teachers' time: the search for evidence of impact was stepped up and benchmarking of technology in schools became widespread and with it the idea of ever declining ratios of students to computers. This gave rise to the idea of taking stock of progress since the pioneering days of computer assisted learning, and of defining an end-point for the innovations – what does the future look like and how will we know when we get there?

Such thinking was predated in business and industry where ideas such as business process reengineering were taking hold[2]: the notion that as firms invested in technology, so processes and thereby profits could be improved, and ultimately the business became transformed to take advantage of new opportunities.

[1] Comment in response to Larry Cuban piece, http://larrycuban.wordpress.com/2014/08/16/tissue-paper-reforms-coding-for-kindergartners/

[2] e.g. Hammer and Champny, *Reengineering the Corporation: A manifesto for Business Revolution*, 1993.

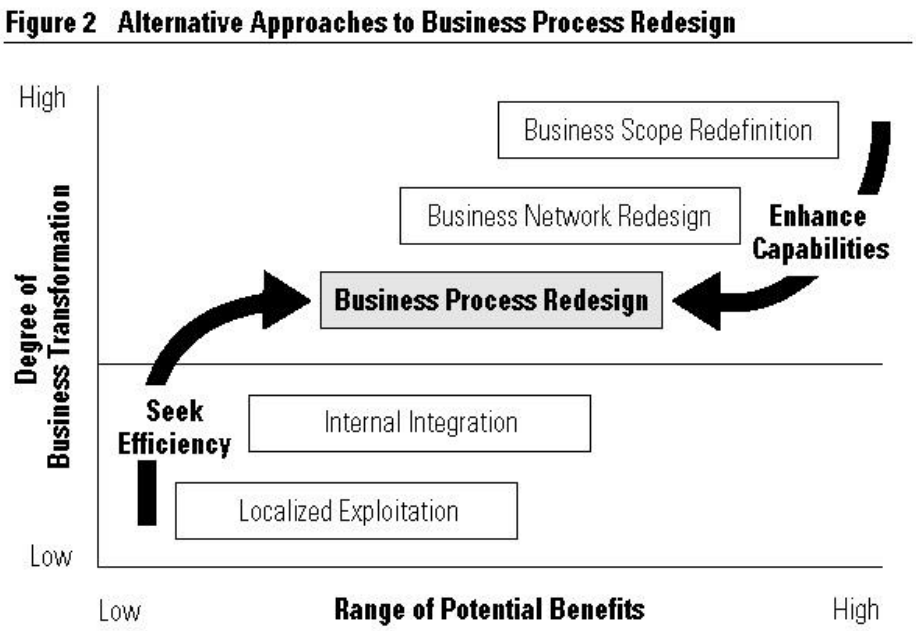

Fig. 1: Example of BPR[3]

The methodological approach in iTEC is inspired by this and the more recently developed Benefits Realisation Management (BRM) approach[4], mentioned previously. Benefits are defined as "an outcome of change which is perceived as positive by a stakeholder". While different approaches to design science research for IT exist (see earlier), iTEC adopted the approach described by Peffers et al[5].

A key thinker in making the crossover from business to education in the UK was ICL's Chris Yapp[6]. He persuaded ministers, industry stakeholders (BT) and NCET, the UK agency for ICT, to think not of one-off interventions, but of system-wide change based on connectivity and the free flow of information, christened the National Grid for Learning. This became an inspiring vision under the Blair government and NCET (reincarnated as Becta) was charged with implementing and monitoring progress towards this goal. A number of evaluations were commissioned by Becta, among which was Underwood et al's study[7] of the impact of ICT and a proposal for an e-maturity model for schools. This was taken up by Becta and, together with inspectorates and other key organisations an online self-review framework was developed[8] and taken up by NAACE[9] (the UK subject association for ICT) following Becta's closure. Since then other countries have adapted and localized the framework, notably Norway, and others have appeared, e.g. SAMR[10], State of Massachusetts Technology Self-Assessment Tool[11] and a model for better understanding

[3] Venkatraman, IT-Enabled Business Transformation: From Automation to Business Scope Redefinition, in MITSloan Review 1994. http://sloanreview.mit.edu/article/itenabled-business-transformation-from-automation-to-business-scope-redefinition/
[4] Bradley 2010
[5] Real-Time Systems Engineering and Applications, edited by Michael Schiebe, Saskia Pferrer. 1992, Springer.
[6] See for example http://www.tes.co.uk/article.aspx?storycode=307353
[7] Underwood, J D M and Dillon, G (2004), Maturity Modelling: A Framework for Capturing the Effects of Technology, Technology, Pedagogy and Education, 13 (2), pp213-224.
[8] http://en.wikipedia.org/wiki/Self-review_framework
[9] http://www.naace.co.uk/ictmark/srf
[10] http://www.educatorstechnology.com/2013/06/samr-model-explained-for-teachers.html
[11] http://www.doe.mass.edu/odl/standards/sa_tool.html

ICT-enabled innovation in education and training developed by the Institute for Prospective Technological Studies, as part of its project Up-scaling Creative Classrooms in Europe (SCALE CCR)[12].

The design of the iTEC project included such maturity modelling within a wider context of managing change, innovation, and capacity building. As Futurelab argue in D2.2:

> *There is a body of literature that looks specifically at the dynamics of innovation, analysing the emergence of breakthroughs, 'disruptive' discontinuities or incremental evolution, and highlighting the factors that can act as enablers or barriers (Rogers, 1995; Tushman & Anderson, 1986; Utterback, 1994). Most notable among these factors is the presence of conditions of 'maturity' whereby individuals and organisations know how to effectively identify and select tools and resources according to their own needs and priorities. These conditions are universally seen as necessary to generate a climate of dynamism which drives creativity as individuals experiment and collaborate, and sometimes compete, with one another to achieve common goals (Utterback, 1994).*

The first stage involved identifying trends and challenges facing schools, and then imagining and agreeing on future scenarios for classrooms, defined in iTEC as "narrative descriptions of preferable learning contexts". Futurelab, a partner in iTEC, had developed and tested a range of tools to support teachers, learners, and school leaders in this process. As described in the project proposal:

> *The iTEC approach in WP2 builds from and aims to extend co-design methodologies (Druin, 2002, Facer and Williamson, 2004 etc.) as well as Rogers' concept of innovation that it is something 'perceived as new by an individual or other unit of adoption… If the idea seems new to the individual, it is an innovation.' (Rogers 2005, p11) As such, as part of the stakeholder engagement processes (Tasks 2.1 and 2.3), participants will complete a survey from which data can be used to create local pedagogic baselines across the iTEC areas of focus: infrastructure, practices/usage and content. This approach recognises that the ways in which the scenarios are then implemented locally (in WP3/4) will be different across all contexts and relevant to the needs/baseline of each classroom. The measurement of the new practice (as part of WP5) and in particular the distance from previous practice will take into account the pre-intervention baselines gathered at the start of WP2.*

Futurelab was well placed to lead this work, by leveraging its expertise in futures-facing scenario and prototype development, as developed in the Beyond Current Horizons programme[13], Futurelab's Innovation Workshops[14], and the Future Technology Workshop approach[15]. For scenarios, the DELPHI structured communication approach was used[16] whereby different points of view gradually coalesce and converge into a consensus. Student voice was expressed particularly strongly using the Power League[17], a free web resource for exploring any topic, through sampling group opinions and provoking group discussions. Teachers and students can create their own online leagues or use our existing ones. In the toolkit, other tools for gathering and ranking opinions are also suggested, some of them, allourideas, Padlet and Socrative, for example, used in the online future classroom course in 2014.

[12] http://is.jrc.ec.europa.eu/pages/EAP/SCALECCR.html
[13] www.beyondcurrenthorizons.org.uk
[14] http://futurelab.org.uk/projects/innovations-workshops
[15] http://www.springerlink.com/content/e76825532068ruv1/
[16] http://en.wikipedia.org/wiki/Delphi_method
[17] http://www.futurelab.org.uk/resources/power-league

In the toolkit, this approach has been developed and can be seen in the elements relating to trends and scenario-building. In Deliverable 2.2 Futurelab reported how the approach was modified over time in the light of experience and research, while retaining the core principle of empowerment:

> *Drawing on 'classic' work on end-user innovation (Hippel, 1991; Rogers, 1995), iTEC and WP2 in particular have assumed that the commitment and the energy of individual users (teachers) is crucial to developing new practices and approaches, and that the most effective way to foster innovation and change is to create the conditions for these individuals to develop their own solutions to problems. With this in mind, iTEC has been keen to avoid the simplistic and top-down 'rolling out' of innovations, which assumes that dropping a technologically advanced and attractive piece of kit in as many classrooms as possible will automatically lead to scalable 'transformation'. The project has remained sceptical about approaches of: 'if you build it they will come' – the idea that if you give something inherently useful to people, they will use it - that has led many genuinely innovative solutions to be neglected and then unceremoniously shelved, not only in education.*

The expected outcome of this approach is the initiation of a process of 'diffusion' in which innovation spreads across a system organically. Although focused on end-user innovators, the scenarios reflect a steadfast concern for the multifaceted nature of educational change. In this respect, we have drawn inspiration from studies which have adopted an 'ecology' approach to change. Viewing schools as parts of complex ecosystems, these studies have suggested that shifts in certain areas or subsections have repercussions on other areas and on the system as a whole[18].

However, achieving a future state imagined in a scenario requires a concrete understanding of the present state, and this is the why the future classroom maturity model forms part of the toolkit. As described above, it has a long history (in technology terms at least) and has been further refined in the toolkit for use by individual teachers and schools, the changes reflecting experiences in workshops and schools in iTEC, and also aligning with similar developments on mapping innovation in teaching and learning elsewhere, notably the UNESCO ICT competence framework for teachers[19], New Pedagogies for Deep Learning[20], key competence assessment, the Survey of Schools: ICT in Education and the notion of digital confidence[21], the London Knowledge Lab's tool, and observations of schools in the Living School Lab project[22].

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[18] Law et al 2008, Zhao and Frank, 2003

[19] http://www.unesco.org/new/en/unesco/themes/icts/teacher-education/unesco-ict-competency-framework-for-teachers/

[20] http://www.collaborativeimpact.net/Blog/Post/30/New-Pedagogies-for-Deep-Learning-Hub

[21] http://essie.eun.org

[22] http://lsl.eun.org