ICT in Education: Aspirations and Tensions

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Abstract: Eight 'axes of tension', around which developments in the exploitation of ICT will revolve to achieve aspirations for schooling, are identified and explored in this paper. Possible interactions between these tensions and aspirations with the educational promises held out by the technology and constraints on change and innovation are illustrated with three main scenarios to portray possible futures for schooling. The main aims of the paper are to motivate and direct debate, and to provide access to a framework that others may use to etch out and explore their own preferred visions for the future of education.

1. INTRODUCTION: THE THINK PROJECT

Initiated by the European Schoolnet (EUN) and sponsored by the European Commission, the THINK project was designed to articulate and explore policy options in six national contexts, and an EU-wide one, for the exploitation of ICT to develop and strengthen school systems (Wood, 2002). The focus was on future educational *uses* of ICT, not provision of technical infrastructure. The time scale to be envisaged was short - three to five years.

Four scenarios were identified:

In **scenario 1**, ICT serves to augment the centralised control of all aspects of schooling, strengthening state regulation of curricula goals, content, delivery, pedagogy, formative and summative assessment, accreditation and finance.

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In **scenario 2**, policy makers acknowledge the fundamental uncertainty concerning the nature of the impact of ICT on learning and teaching processes. Any state controls are relaxed to engender and support a research and development role for teachers and schools. Schools strive to become knowledge producers and learning organisations.

In **scenario 3**, the most radical future, the role of schools as organisations designed to promote learning how to learn, responsible citizenship and as key nodes in new communities is brought to the fore as their function for knowledge transmission is downplayed.

A **4th scenario**, in which ICT fails to deliver and ‘melts down’, considers various possible failures in policy (in)actions that undermine attempts to innovate with ICT.

The first three scenarios overlap with those etched out over a much longer time horizon by OECD (2000; 2001). The THINK project thus provides a means of mapping aspects of policy options for the short-term future onto potential longer-term changes in school systems.

2. AXES OF TENSION

When ICT becomes mission critical for educational systems, several processes will be set in chain that will generate new tensions and dilemmas for schools and education authorities. The main dynamics driving innovation in schooling stem from strategies adopted to resolve a set of "axes of tension" created by the impact of the technology on learning.

2.1 Axis 1 - Innovation with ICT is inhibited and stifled by failure to re-think the curriculum.

Propositions: The definition of what is worth knowing and the skills and tools implicated in what it is to be knowledgeable are being transformed by the impact of technology on all aspects of professional, vocational, private and public life. There is a growing tension, and an inherent contradiction, between demands for radical change in educational priorities and processes and the expectations and goals embodied in school curricula.

The current trend is simply to pile new learning objectives and teaching responsibilities on top of the traditional ones. This creates an unnecessarily heavy load, undue stress and a confusion of aims for schools.

In scenario 1, this tension is refuted. The belief is that the curriculum can remain relatively intact, although there is some extension of the educational pathways available in the later years of schooling. The view taken is that

through appropriate changes in pedagogical practice schools can achieve both the old and the new priorities.

In scenario 2, the tension is accepted. A strategy is developed that preserves a core of traditional curricula goals and assessments but also creates significant space for innovation. School achievement is assessed by two independent means. One is based on national examination and the second on innovative, school-based assessments. Schools have the task of innovating in order to meet the new educational priorities.

In scenario 3, the traditional conception of school learning as primarily concerned with the mastery of a pre-determined body of knowledge is rejected. The overarching objective is to create and develop a system in which schools become the core centres of community life and the development of skills in self-managed learning, critical thinking and responsible citizenship form the major goals of schooling. Decision-making about specific educational goals, strategies and practices are primarily the responsibility of the school and its community. Their task is to translate overall priorities for education into practice. ICT networking is exploited to engage the expertise of different communities in new ways of assessing the value and impact of innovative approaches to learning and teaching.

2.2 Axis 2 - Innovation with ICT fails, being inhibited and stifled by a failure to capture the imagination and support of parents and the public.

Propositions: A tension exists between the need for radical change demanded by educational policy and the majority sentiments of parents, the media and the electorate. Attempts at educational reform are currently ignoring this tension, remaining too inward looking and failing to exploit the technology to modernise the policy making process itself.

In scenario 1, this tension is not acute in the short term since the curriculum and examinations reflect the status quo and have majority support. Investment in ICT and in teacher training rests on the promise that it will enable the extended educational priorities to be realised through improved teaching and learning. ICT networking is used widely in attempts to maintain the support and educational involvement of parents.

In scenario 2, public confidence will be supported by the fact that recognisable elements of the traditional curriculum and certification are maintained in the early stages of reform. Strategies to capture the public imagination and support include the use of networking to communicate and disseminate innovative uses of ICT for teaching and learning identified in the course of peer assessment by teachers.

In scenario 3, the use of ICT for extensive, deep and sustained networking between schools and the community are central to this educational system, so the nature and rate of innovation is directly influenced by parental and public support. One role for the educational authorities is to exploit ICT to help in identifying, celebrating and disseminating innovative examples of the new schools.

2.3 Axis 3 - Innovation fails because the tools and practices used to monitor and guide learner progress and achievement do not support the achievement of new objectives.

Propositions: The tools and practices used to assess learning and teaching are concerned with the memorisation, reproduction and mastery of approved bodies of knowledge. A failure to innovate and change these tools and practices inhibits the system's ability to realise innovative uses of ICT. Teacher training, and demands for change in pedagogical practice, are undermined by the fact that most teachers will appeal to the need for learners to succeed on traditional forms of assessment as a reason not to change. It will prove impossible to guide and coach the learning process effectively without new means of formative assessment. This will create confusion and resistance from learners, teachers and parents.

In scenario 1, this tension is not recognised initially. Later, regimes of national testing and the use of on-line assessment will be developed to acknowledge and support the development and assessment of new skills.

In scenario 2, since teachers and schools will become centres for educational research and development, the task of discovering and perfecting new approaches to learner guidance and formative assessment will rest on them. These will be validated against school-based assessments of learner achievement.

In scenario 3, this tension is not recognised since schools and the community will be tasked with the job of developing their own methods of assessment and guidance.

2.4 Axis 4 - The innovative use of ICT will increase the gap between high and low school achievement

Propositions: ICT is used to open up more choices for the learner. This leads to an increase in the magnitude of the gap between high and low school achievement, leading to accusations that innovation in schools is

promoting greater inequalities in educational opportunity and life chances, contributing to social exclusion and weakening social cohesion.

In scenario 1, the system seeks to resolve tensions by making schools accountable for minimal levels of educational achievement in key areas. It exploits ICT to strengthen and defend regimens of selection to accommodate the increasing variability in rates and directions of pupil progress.

In scenario 2, greater emphasis is placed on identifying and supporting individual potential. The aim is to minimise apparent under-achievement by expanding the range of opportunities to succeed and by enhancing the system's ability to offer sound guidance and advice. This leads to a greater diversity of provision, more varied educational pathways and a wider definition of educational success.

In scenario 3, individual differences in achievement do *not* figure strongly in educational accounting. The approach to assessment adopted is itself innovative. More emphasis is laid on the value and evaluation of contributions to the community and the development of responsible citizenship. Assessment is based on the documentation of individual and group portfolios and includes evaluations from school and non-school sources.

2.5 Axis 5 - Teachers as technicians versus teachers as professionals.

Propositions: Teachers are in the front line of attack of attempts to implement policies designed to reap educational benefits from investments in ICT. Innovations in the effectiveness of teacher recruitment, training and professional development are key issues and will remain so.

In scenario 1, the State defines in detail what is worth knowing, and prescribes how the assessment of knowledge and skill will take place. The role of teachers is to optimise their practices in order to maximise the fit between the stated goals and the measured outcomes of schooling. Teachers are essentially technicians.

In scenario 2, the professional roles of teachers expand to become far more demanding. They are tasked both with maintaining standards on nationally defined assessments of pupil achievement and with a research and development brief. Discovering how ICT can be exploited to realise the enlarged set of goals for education prescribed by the State is largely their responsibility. They must discover and demonstrate how changes in pedagogical practices and innovative forms of assessment can support the achievement of each learner's potential.

In scenario 3, the extent of the teacher's responsibility is even greater. Individual schools and teachers are professionally accountable to learners,

parents and the community for defining the content of the curriculum and for the documentation of evidence for what pupils learn and achieve. Additionally, teachers must work with their school to develop and sustain close community links as they collaborate with others to identify and realise the locally defined objectives for schooling.

2.6 Axis 6 - Learners as consumers versus learners as an asset.

This tension invites the most radical re-thinking about the role of schooling.

In scenario 1, learners and the taxpayer are viewed as consumers of educational products and services. The main role of schools, as providers, is to equip learners with the knowledge, skills and attitudes they will need to function as productive and prosperous future citizens thus minimising social exclusion and contributing to social cohesion. Taxpayers' contributions are defended as an investment in that future. Schools are held accountable for giving value for money by achieving standards that, in the State's view, are held to be the best and most reliable indexes of future potential.

In scenario 2, with its emphasis on schools as centres for creating and disseminating knowledge about learning and teaching, a similar view of learners and families as consumers prevails, albeit within the context of a broader and more differentiated definition of educational achievement.

In scenario 3, the major emphasis lies on learners as an asset to the local and wider communities. With a greatly reduced burden of knowledge transmission, learners and schools become "time rich". Learners are viewed and treated as junior citizens with the time, motivation and potential to make significant contributions to the social, cultural, intellectual and economic lives of their communities. Contributions are co-ordinated with the pedagogical goals of helping learners become more independent and better able to collaborate in identifying and tackling complex and authentic tasks. In so doing they will become critical, informed participants in national life.

2.7 Axis 7 - The burden of maintaining high quality of ICT provision exceeds available public funding.

Propositions: The cost of maintaining and upgrading ICT infrastructure and services in order to build sufficient capacity and redundancy into technological and human resource provision for schools is currently underestimated. A realistic assessment of the levels of recurrent investment

required will only become clear over the next five years when the technology becomes mission critical for schools.

In scenario 1, the educational system is best placed to augment public funding with private financing. Given the widespread use of common content in the delivery of the national curriculum, households present a large and recurrent market for ICT products and services. This supports a buoyant domestic industry that is then able to provide for the less lucrative school market. Teacher training provision as an element of commercial service provision becomes common freeing the State from the costs of updating and re-training teachers. The State is able to target additional resources for enhanced support to less well off schools and households.

In scenario 2, maintenance of the infrastructure remains a State responsibility but there is the expectation that, within five years, teachers will become the major producers of content and services to support educational uses of ICT. Expertise grows within the educational system leading to less reliance on external provision and support and to costs lower than those faced in scenario 1. ICT supports the continuous professional development of teachers reducing training costs as this function is served by professional networking.

Scenario 3 is the most demanding on public approval and financial support. Schools will rely heavily on gaining 'free' support and expertise from local communities. Where significant variation exists in the levels of prosperity of different communities these will be reflected in the levels and quality of ICT available to schools. The State will attempt to compensate for any such differences through selective regional funding.

2.8 Axis 8 - Protection versus Censorship.

Propositions: ICT creates enduring tensions between the goals of providing learners with access to the information society and the responsibility for regulating their own learning on the one hand, and the need to protect them from potential exploitation, indoctrination and crime on the other. Open access by young learners, and the potential for undesirables to have open access to them, raises the potential for morally repulsive, politically subversive and economically dishonest and illegal contacts. As never before, it is possible for the young to be exposed to the more mature in unaccompanied and unguided non-public spaces. Developments in the technological capacity to track and model the journeys that learners make as they explore and learn also leaves them open to new forms of exploitation.

In scenario 1, the potential for both state protection and censorship are strongest. The state exerts direct control over the content and functions of ICT in schools and attempts to become the gatekeeper to the world of

information. There will be a need for specific regulations or guidelines concerning the ownership of the information and intelligence gained from a learner's use of ICT and the rights of access to such information.

In scenario 2, the responsibility for placing constraints on access and privacy rests with schools and parents, albeit within a regulatory State framework. Since ICT content and function will develop within the schools issues such as intellectual ownership, copyright violation and access to personal information will be taxing issues for local management.

In scenario 3, the moral, legal and economic dimensions of ICT will be an integral part of the intellectual concerns of learners, schools and the local community. It is likely that early but guided and critical exposure to potentially harmful materials will be a feature of schooling from the early years. The timing and nature of such contacts will be determined at a local level in collaboration with parents and the community within a national framework of regulation. It seems likely that such an approach will only be tenable within a highly coherent system.

3. CONCLUDING COMMENTS

The axes of tension and scenarios developed in THINK represent imagined, possible futures generated by the interplay between educational aspirations, the promised powers of ICT to promote change, and sets of levers and constraints on change and innovation. Although the six areas of aspiration and the seventeen sources of constraint identified in THINK may be culture specific, the claim is that the eight axes of tension just outlined will challenge any education system bent on change.

The scenarios alluded to were not formulated as descriptions of likely futures, nor as predictions, nor yet as prescriptions for action. The aspiration is that the 'analytical tool kit' generated by THINK will motivate and support others as they try to envisage and bring about futures for schooling that they, and their society, come to view as desirable.

REFERENCES

- OECD in collaboration with CERI and the Netherlands Ministry of Education, Culture and Science (2000), *Schooling for Tomorrow*. An OECD/Netherlands Conference. Rotterdam, November.
- OECD (2001) *Education Policy Analysis 2001*, Centre for Educational Research and Innovation.
- Wood, D. (2002) *The THINK Report: Technology in Education Futures for Policy*.
[http://eminent.eun.org/THINK_FULL_DRAFT_2pp.doc]