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# **Educational transformation with open and social technologies in the non-formal school curriculum**

## **An analysis of three case studies in the United Kingdom**

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**Abstract.** This paper explores ways that open and social technologies relate to educational transformation, analysing three case studies of exemplar school-based projects. Schools in England have been asked to develop ‘educational transformation’. Although there is no single definition, aspects of community and social interactions and networking are intended, as is development of appropriate uses of digital technologies. Managing educational transformation with digital technologies requires knowledge, levels of expertise, and willingness to manage innovation. Curriculum position and intention, management models and roles of intergenerational learning are fundamental to developments. Future implications for educational support and schools are considered.

**Keywords.** Educational transformation; social networking; school community developments; intergenerational learning; digital technologies.

## **1 Introduction**

Educational transformation is of international concern at policy and practice levels. A recently published INTEL White Paper reported findings of educational transformation research in 5 countries [1], while Becta (former government agency in England for e-strategy) stated clearly its aims to provide: “strategic leadership in the innovative and effective use of ICT to enable the transformation of learning, teaching and educational organisations for the benefit of every learner” [2]. But the definition of educational transformation is unclear even at a single national level.

Educational transformation and school build and structure have been considered as related areas in England. In 2003, the government department for education announced the Building Schools for the Future (BSF) Programme, aiming to renew all 3,500 English secondary schools over a 15-year period from 2005 to 2020 [3]. The National Audit Office report stated that: “Refurbishment includes providing new [information and communications technology] ICT to recently built schools” (p.4). The Partnerships for Schools, an executive non-departmental public body responsible for the BSF programme, gave a clearer statement on its web-site [4] about intentions for ICT, stating that: “The whole process begins with the [local authority] LA and its schools drawing up a strategy for improving secondary education. This is informed by an understanding of the ways in which new technologies can improve educational

provision” (n.p.). ICT is clearly seen as a means to improve education and learner outcomes. Indeed, the web-site states more precisely that ICT should be considered in terms of: “the development of real and virtual workspaces which help to make effective, personalised learning a reality for all pupils ... access to high quality learning materials in a wide range of settings through as wide a range of end-user devices as possible ... infrastructure which is extremely reliable and easy to use” (n.p.).

Schools and teachers have not necessarily found it an easy task, however, to use digital technologies and to bring about forms of improvement through transformation. In a speech at the UK’s largest schools’ ICT exhibition and conference, BETT 2012 [5], the Secretary of State for Education stated that: “The fundamental model of school education is still a teacher talking to a group of pupils.” He went on to say that: “It’s clear that technology is going to bring profound changes to how and what we teach. But it’s equally clear that we have not yet managed to make the most of it.” Most importantly, perhaps, he said that: “While things are changing so rapidly, while the technology is unpredictable and the future is unknowable, Government must not wade in from the centre to prescribe to schools exactly what they should be doing and how they should be doing it. We must work with these developments as they arise: supporting, facilitating and encouraging change, rather than dictating it.” A key question for schools is, therefore, how is this achievable?

These statements advocate educational transformation, using ICT; they ask for something different, to meet tomorrow’s needs rather than those of yesterday. This is not a new concern; but it appears it has not yet been achieved. In a study involving a survey of 2,611 pupils aged 12 to 13 and 14 to 15 years, and data from 60 focus groups held with some 300 learners, from 15 English schools representing a range of school types and demographic variables and from 12 schools representing school environments in which Web 2.0 activity was flourishing, Luckin, Logan, Clark, Graber, Oliver and Mee [6] concluded that: “The types of activity evidenced suggest that of the categories of user identified in the literature, there are readers, gamers, file-sharers, communicators and newscasters (in the sense of sharing experience through social networking sites) amongst study participants. However, relatively few learners are engaging in more sophisticated Web 2.0 activities such as producing and publishing their own content for wider consumption. In order to be motivated to publish content, learners must perceive that publication carries utility for the self or important others. In addition, learners may lack the technical knowledge and skills needed to publish content online” (p.3). Yet in informal settings open and social technologies can effectively support learning (see Yaşar and Karadeniz [7]). So, how can these technologies be positioned across curriculum elements – formal (in-class), non-formal (after-school and home-directed) and informal (undirected but related by the learner)?

## **2 Educational transformation**

How should educational transformation be conceptualised? An article exploring school design and educational transformation [8] concluded that, from a study of four case schools in Scandinavia: “underlying learning intentions and values of the schools

can be successfully incorporated into, and supported by, design” (p.931). However, it would be wrong to assume that new buildings automatically generate transformation in forms intended and stated above by policy makers. Transformation at a structural level is not necessarily used by teachers, and indeed, can be ignored if teachers are more concerned with maintaining a traditional teaching approach. To bring about transformation, there needs to be full and adequate consideration of features other than structure - curriculum, content, process and outcome.

For this study and paper, a definition adopted of using ICT in educational transformation will include previously-cited key features: transformation is concerned with improving educational provision; it has a community focus (either school or wider); it integrates new ICT into its structure and practices; it uses a reliable and usable infrastructure; it offers high quality learning materials, personalised learning opportunity, real and virtual workspaces; and it offers encouragement to engage and develop ‘readers, gamers, file-sharers, communicators and newscasters’ including ‘producing and publishing their own content for wider consumption’ [6].

### **3 Research approach and method**

The research approach taken in this study is a secondary analysis of findings from three projects previously evaluated by the author as case studies. The three projects all involved uses of emerging technologies including open and social technologies, and were all identified by schools and local education policy makers as being innovative and transformative (leading to improved educational provision and wider community involvement). These three projects were selected additionally on the basis of their providing evidence from a range of schools representative of a width of contexts.

The case studies here are reported using a framework suggested by Yin [9]: an overview of the case study project (its objectives, issues, and topics being investigated); field procedures (including role of the researcher, access to sites, and sources of information including documents, interviews, and direct observation); case study questions (specific questions that the investigator explored during data collection that related to the topic of this paper); and an analysis of results (in terms of relevance and relationship to the focal research questions in the secondary analysis in this paper):

- How is the project concerned with improving educational provision?
- In what way does it have a community focus (either school or wider)?
- How does it integrate new ICT into structure and practices, using a reliable and usable infrastructure?
- How does it offer high quality learning materials, personalised learning opportunity, and real and virtual workspaces?
- How does it offer encouragement to engage and develop ‘readers, gamers, file-sharers, communicators and newscasters’ including ‘producing and publishing their own content for wider consumption’?

#### 4 Case study 1 – links to homes and home learning

An overview: in 2004, a project was initiated in an area in the north of Birmingham, the second largest city in England. Placed in the 10% most deprived areas in England [10], the project, called Aston Pride, involved 14,314 residents in 4,500 households. Concerned with community development and regeneration, it focused in part on aspects of education and learning, as key elements to address short and longer-term needs of the community. The education theme was implemented in three phases.

Field procedures: the author evaluated the project over 7 years [11], had access to implementation documents and to parent training attendance records, met with project managers regularly, and in the final phase gathered evidence through 812 home installation and 154 follow-up questionnaires, test data for mathematics and reading from 14 classes of 7 to 9 year old pupils, 32 teacher and 134 pupil mid-phase and 85 teacher and 20 parent late-stage questionnaires, and 20 parent interviews.

How was the project concerned with improving educational provision? The project aimed to increase quality of resources for teachers and pupils in schools and at home, as well as parent involvement with children's learning. In 2010, using standardised test comparisons over a 9 month period, with t-tests, ANOVA and multiple regression factor analyses to check significance of outcomes, positive shifts in mathematics and reading results were identified in a large population of pupils (over 500 in total). Impacts at statistically significant levels were identified: on mathematics scores for all pupils ( $t=-8.58$ ,  $p=.000$ ); particularly for girls in the final test ( $F=4.577$ ,  $p=.033$ ); on reading scores for all pupils ( $t=-3.141$ ,  $p=.002$ ); and particularly for boys ( $t=-3.778$ ,  $p=.000$ ). Teachers and parents reported widely and positively on impact; reports were supported by improvements in terms of national test and inspection scores (between 2004 and 2008 performance in English for 11 year-old pupils improved by 16%, from 50% to 66%, and in mathematics by 8%, from 56% to 64%, and by 2010 the attainment level in mathematics reached 74%, and in English 73%).

In what way did it have a community focus? The project aimed to increase access to resources in homes, and to benefit community members through training. By 2011, 2,680 computers were deployed in homes; some 60% of homes gained up-to-date ICT access, with possible leverage to almost the entire population (as family members shared facilities with other residents). At least 1,227 adults (1,171 parents, 47 school staff and 9 advanced learners) had been involved in ICT-based training run in schools.

How did it integrate new ICT into structure and practices, using a reliable and usable infrastructure? By 2008, funding enabled all 8 primary schools to put interactive whiteboards into all classrooms, personal digital assistants were trialled in 2 schools, computers in homes were deployed through one school, shared school training and support were facilitated, local community centres gained ICT facilities, a mobile ICT facility was established, and a pilot wireless network was set up. By 2010, the wireless infrastructure covered the entire locality; reports indicated that it was robust, providing high bandwidth and good coverage, with few instances of issues reported.

How did it offer high quality learning materials, personalised learning opportunity, and real and virtual workspaces? The third phase focused on aspects of learning, particularly providing home access to online learning resources (such as *Education City* and *Mathletics*). In 2010, 74 out of 85 teachers reported using online facilities to

support homework activities. Most (52 out of the 85) reported that this practice had shifted types of homework activity; some teachers asked pupils to undertake tasks such as research at home, not previously demanded of them. This heralded a shift in demands on pupils outside classrooms, and was seen to change qualities of learning expected.

How did it offer encouragement to engage and develop ‘readers, gamers, file-sharers, communicators and newscasters’ including ‘producing and publishing their own content for wider consumption’? The project developed pupils and teachers as ‘readers’; pupils accessed online educational games at home, they shared files of completed homework with some teachers, and increased their communication with parents. They did not develop as ‘newscasters’ in this project.

## **5 Case study 2 – the focus of after-school clubs and group work**

An overview: in this case study pupil teams aged 11 to 14 years used Little Big Planet 2, a popular Sony PlayStation videogame, in 15 secondary and special schools in one LA. The project focused on: development of 21<sup>st</sup> century skills required by employers and trainers; widening career opportunities in the videogame industry; and ‘building scenes for learning’ by creating levels in the game. Using the videogame, a range of skills were brought together, some technical, but others including artistic, team working, logical thinking and planning skills, to construct ‘levels’. Teachers ‘advertised’ the project, selected team members, provided working space and ICT resources, and facilitated the teams. Largely, they did not teach; the work was outside their experience or understanding, but they could access technical support to aid the pupils. Teams worked mostly in after-school clubs, but some in lesson times. Pupils often had specific roles (such as artistic director or lead programmer), but also worked collaboratively and flexibly to bring elements of planning and structure together.

Field procedures: the author evaluated the project over 6 months [12], had access to implementation and interim pupil notes, met with project managers regularly, interviewed teachers in 4 schools, and gathered evidence through 12 teacher and 107 pupil questionnaires at the outset, 8 teacher and 77 pupil questionnaires at a mid-stage, and 3 teacher and 42 pupil questionnaires at the end of the project.

How was the project concerned with improving educational provision? Looking at individual pupil responses, some pupils gained more in terms of skill development than did others. Across a group of 31 pupils responding in both the first and last surveys, by the end of the project 28 scored above the mid-point of 12 (on a range from -72 to 96, collating scores for 80 different elements in 16 sets of skills). Over the period of the project, 12 pupils neither increased nor decreased in terms of their self-reporting of skills, while 19 increased in this respect (an increase of up to 65 points).

In what way did it have a community focus? Involvement in after-school clubs required a high commitment from pupils, both in terms of attendance and in terms of work undertaken. Many pupils also worked on the project at home, individually or in groups. In team group activities, whether in-class or after-school, high levels of in-depth and focused discussion were generated and recognised in many instances.

How did it integrate new ICT into structure and practices, using a reliable and usable infrastructure? The videogame technologies were not widely integrated with other ICT systems. Communication between teachers and key supporters and between

pupil teams happened within workshop events, while bespoke-created blogs and discussion forums were available but not used widely. Pupils used social media widely, however, to maintain contact, including using Facebook and mobile telephone messaging.

How did it offer high quality learning materials, personalised learning opportunity, and real and virtual workspaces? Pupils being immersed in planning and creating, and having direct contact with professionals, offered a way of working many had not previously experienced. This approach was widely welcomed by pupils, and teacher reports indicated that some pupils gained enormously from this aspect alone.

How did it offer encouragement to engage and develop ‘readers, gamers, file-sharers, communicators and newscasters’ including ‘producing and publishing their own content for wider consumption’? In this project almost all pupils involved became ‘readers’ and ‘gamers’, but fewer engaged technically to create new levels. File sharing was not apparent, and communication happened largely in team meetings rather than through online means. Those teams completing levels (about half the number starting the project), were all encouraged to broadcast their games across an international user network for others to access and play.

## **6 Case study 3 – the audience and reality of school work**

An overview: the BBC News School Report project, run since 2006, enables pupil teams to create and broadcast video, audio and text-based news reports. Teams put reports onto school websites at a particular time on a particular day (News Day); the sites are linked to the BBC News School Report website, made accessible to regional and national radio and television broadcasting teams, and to a worldwide audience.

Field procedures: the author and a colleague evaluated the project over 6 months [13], met with project managers on three occasions, gathered evidence using pre- and post-News Day online questionnaires for pupils (591 and 705 responses respectively) and teachers (142 and 135 responses respectively), observed two News Day events, and visited 25 schools to interview pupils and teachers.

How was the project concerned with improving educational provision? Many schools were involved because they felt it extended opportunities for pupils and could widen their experiences. Evidence indicated that the project supported important aspects of learning: authentic learning; understanding through discussion; internal cognitive aspects; and transfer of learning (thinking about how in the future they would use ideas they had learned, and using these at other times and in other contexts). Some schools subsequently considered longer term sustainability of the project, creating permanent teams to gather and report news from the school via the school website or intranet, for parents and the wider community to receive regularly updated news.

In what way did it have a community focus? The requirement of the project was for pupils to create real news stories, gathered from their school or wider community, to broadcast to wider communities and nation-wide. How did it integrate new ICT into structure and practices, using a reliable and usable infrastructure? Some schools used existing ICT facilities to fulfil project needs, while others needed more specialist support and resources (including video cameras, editing software, and advice on integrating items into web-sites). Pupils tended to work independently but not on their

own. They often took responsibility for individual work elements (such as researcher, scriptwriter, or editor), all needing to be completed to a high quality and standard, within a strict time scale, for integration into a wider piece of group work. This was very different from working ‘on their own’, giving work to someone with a different form of responsibility for it. This approach made the project different, but allowed it to work with other school-based activities.

How did it offer high quality learning materials, personalised learning opportunity, and real and virtual workspaces? Pupil perceptions of their own gains were concerned with specific subject skills, and with team working, creativity, attitudes towards work, and social interactions. Differences in responses before and after News Day indicated perceived improvement (endorsed by teacher perceptions) in abilities to write an article for an audience (+10%,  $Z=-2.754$ ,  $p=0.006$ ), create ideas for news stories (+15%,  $Z=-5.262$ ,  $p=0.000$ ), negotiate a point with others (+10%,  $Z=-4.228$ ,  $p=0.000$ ), work hard in contributing to group endeavour (+11%,  $Z=-4.851$ ,  $p=0.000$ ), and meet deadlines (+14%,  $Z=-6.276$ ,  $p=0.000$ ). Although pupils indicated no significant change in abilities to produce a video and an audio story, teachers felt they had improved in these respects, suggesting that pupils’ capabilities exceeded their teachers’ expectations. Pupils indicated they had learned more about news production and jobs, and their understanding of how news was produced and about jobs in news.

How did it offer encouragement to engage and develop ‘readers, gamers, file-sharers, communicators and newscasters’ including ‘producing and publishing their own content for wider consumption’? The project results indicated that more pupils were listening to and watching news media at the end of the project (+5%,  $Z=-2.443$ ,  $p=0.015$  for television, and +4%,  $Z=-5.107$ ,  $p=0.000$  for radio). The project did not focus on developing gamers, and some file sharing did happen, between pupils and between pupils and teachers. Communication, (working in teams), was enhanced greatly, but the major project focus was to develop broadcasters, which it clearly did.

## 7 Community development and educational transformation

These case studies of practice are not universal but were implemented in ways suggesting wider potential adoption – the first involved all 8 primary schools in a geographical area; the second involved 15 secondary and special schools across another area; and the third involved 514 schools from across the United Kingdom.

An important point to recognise in each case is that digital expertise comes from the young people, is extended in the young people, and used in sharing activities and experiences with older people. While there is a parallel with the concept of ‘digital natives’ coined by Prensky [14], it should be noted that in each exemplar, while young people had some knowledge of ICT, this was extended. The extension made the difference - reaching out to others – parents, teachers, and wider community.

The integration of projects in the curriculum is worthy of consideration too. Each project fitted alongside a content-based curriculum; curriculum intentions matched project intentions. Indeed, some enabled important long-term skill developments such as group work, team work and communication skills that would benefit and support employment and training as well as further involvement in school. But projects were in some respects in conflict with the content curriculum and how it was managed, in terms of time and organisation. But schools involved did not see potential challenges



as barriers; these projects worked in ways described in extended schools and extended curricula contexts [15]. Integrated projects and after-school clubs of these forms focus on important aspects of educational transformation – they demand a different form of organisation from that found in classrooms generally, putting the teacher squarely in the role of facilitator (including technological facilitation).

## **8 Social networking and digital technologies**

An important aspect highlighted by these cases is the role of networking through digital technologies. Although it could be argued that digital technologies should provide the medium for networking (and indeed social media were used by pupils in after-school clubs and at home), it is clear that in these cases important networking happened outside but was encouraged by the technological medium. Social interactions, between teachers and pupils, between parents and their children, between specialists in certain uses of technology and pupils, and between managers and teachers, were all fundamentally important in bringing about the transformations captured here.

In these cases, face-to-face interactions often flourished, but not in traditional ‘apprentice-master’ form. In many instances, the young were the ‘masters’ and the older generations (parents, teachers or managers) were the ‘apprentices’. The development of intergenerational learning was important, adding to the need for teachers, parents and managers to take on facilitator roles. The roles of all professionals, those in the video games industry and broadcasters, worked complementarily, across ages. But the presence of open and social technologies in all cases was a vitally important stimulus.

From these cases, educational systems have yet to accommodate current professional and vocational needs of teachers and educationalists - highlighting and considering issues, or understanding ways to effectively integrate open and social technologies into practice. There are management implications, for those in schools, and those concerned with training and future policy. As Kane [16] concluded from four after-school programme evaluation studies in the United States: “After school programs may be unaccustomed to holding center stage in the national education policy debate, but that is unlikely to change anytime soon. Some of the evidence so far is forcing a reconsideration of the magnitude of impacts we might reasonably expect” (p.3).

## **9 Conclusions and ways forward**

To successfully undertake initiatives exemplified here, teachers and schools needed to address management issues; curriculum concerns – projects did not absolutely match a content-based curriculum; guidance issues – projects were not supported by all those producing and inspecting the curriculum; practice concerns – projects were not part of the professional and continuing training practice of teachers; and structural concerns - projects did not fit into classrooms and lessons readily within a traditional timetable.

Vocational practice needs to be rethought; current and future teachers need to assimilate and revisit concepts and practices offered by educational transformation (including those integrating uses of open and social technologies) throughout their careers, exploring potentials that project, after-school and non-formal work can bring.

In the past, the purpose of after-school clubs has been clear (in terms of games, hobbies and interests, for example); how teachers are currently trained in developing and considering these, and how benefits feed into the curriculum, is not so clear (see, for example, Malcolm, Wilson and Davidson [17]). Shurnow [18] suggested a need to review roles and centrality of after-school initiatives. Evidence here suggests a need to identify different forms of practice, so their places in the curriculum and potential impacts on pupils are clear, so those who guide and inspect the curriculum are clear about their legitimacy, so continuing professional development covers management as well as activity training and a focus on how digital technologies can play legitimate roles in after-school and home learning, so that structural concerns about developing skills in lessons alone can be revisited, and young people's involvement can be considered more from an intergenerational learning perspective (not just a learner-centred perspective) particularly with regard to using open and social technologies.

Is this a new scenario or situation? In some respects it is - after-school clubs do not often currently involve uses of ICT in these forms (and traditional computer clubs, for example, are often quite different in nature). Given this evolving scenario, those driving policy and supporting professional development need to review how the nature and practices of after-school clubs and non-formal and out-of-school learning are managed within the wider rather than the narrower curriculum.

If benefits of open and social technologies are to be gained by pupils, policy makers should consider: the importance of the non-formal curriculum; how effective evidence-based projects and home-link activities can be built into the non-formal curriculum; how transformational projects can support real-world community development; endorse such activities as being important; support creation of practice (placing and managing projects); how high quality learning materials are provided by professionals and ICT-based materials; and how a management focus can critically enhance the formal curriculum through longer-term needs of pupils and communities.

Similarly, curriculum developers should consider: how project-based activities can integrate open and social technologies to improve educational provision; encouraging intergenerational learning, through pupil-led and teacher-facilitated activities (allowing extensions of pupils' technical and associated skills); adopting transformational projects with a real-world community development focus; endorsing outcome-evidence-based activities; how technical and professional support can be offered; how high quality learning experiences can be integrated from professionals and from ICT-based materials; supporting non-formal activities to enhance the formal curriculum and influence longer-term needs of pupils and communities at local or regional level.

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