

## MOVING BEYOND A STATE OF STUCK: SCHOOL CULTURE, MOBILE ICT INTEGRATION AND INCLUSION

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### Introduction: the appeal of ‘mobile’ learning technologies

Drawing on research conducted within the context of a *Laptops Initiative* for students with literacy difficulties in Irish post-primary schools, this chapter describes a mobile ICT deployment model (fixed, floating and fostered) that emerged from the project. In doing so it provides a useful visualisation of what an effective ICT organisational arrangement ‘looks like’ in schools that successfully implemented the mainstream application of mobile ICT. It also outlines particular cultural and contextual conditions which enabled those schools to ‘move beyond a state of stuck’ vis-à-vis their practice and conceptualisation of the role of ICT, and to change their routines and methods in order for students with literacy difficulties to achieve the benefits of technology-enhanced inclusive learning.

The global appeal of educational technology and the extensive investment by governments around the world continues to ensure a focus on the integration of digital technologies within school systems worldwide (UNESCO, 2003; Zhao, Lei & Conway, 2006; Plomp et al, 2009). Like other developed countries, the second wave of ICT planning in Ireland had more of an emphasis on the integration of technology into the day-to-day curriculum in schools than the first wave of planning (Conway & Zhao, 2003a). There has been a notable overlap between inclusion and ICT integration in many countries according to Lankshear and Bigum (1999) when literacy and language initiatives became the focus of efforts to integrate technology into the curriculum (e.g. Englert, Wu & Zhao 2003; Lankshear & Bigum, 1999; Larson & Marsh, 2005). In line with other developed countries, Ireland was embarking on its third wave<sup>1</sup> of planning for digital technologies in education between 2000 and 2005 (Conway & Freeman, 2009; Zhao, Lei & Conway, 2006) and this process can, in part, be understood by the outcomes of the *Laptops Initiative*. The initiative which provides insights, raises questions and informs policy and research in the utilisation of ‘mobile’ digital technologies. INt does so, we argue, particularly in relation to school and classroom-level dynamics of technology integration, ICT mobility and their impact on inclusion for students’ learning (Lei, Conway & Zhao, 2008).

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<sup>1</sup> Zhao, Lei and Conway (2006) identified three waves in ICT policies in a 13-country study of ICT policy developments in education: “...the first wave of educational ICT planning focused on getting technology hardware into schools and up-skilling teachers, the second wave concentrated on the integration of ICTs in the daily fabric of teaching and learning, the third wave, typically, emphasizes a more contextual understanding of ICT integration within the confines and supports of particular school cultures (Conway & Zhao, 2003a)” (Zhao, Lei & Conway, 2006, p. 673-674).

### ***The Laptops Initiative project***

The *Laptops Initiative* project was an initiative of the Department of Education and Science and managed by the National Centre for Technology in Education (NCTE). Its main implementation phase took place in 31 Irish post-primary schools over a three-year period from 2002 to 2005 and it essentially aimed to explore the potential of mobile ICT for post-primary students with literacy difficulties in inclusive, mainstream environments (DES, 2000).

The selection of Laptops Initiative schools was on a representational basis (Conway, 2005). Thus, many didn't have that coherence and dynamism which characterises many beacon ICT projects in schools with a significant experience of success in ICT integration (Galvin, 2003). The projects in the schools were generally led by teachers who were not ICT enthusiasts at the project's inception. Most were involved in special educational needs (SEN) or learning support, with little or no ICT experience, and were very daunted by the challenge (Daly, 2008). Therefore, at the outset, many of the schools and teachers could have been described as late adopters in the ICT adoption continuum and, as such, ICTs posed a particular challenge in relation to their practice in schools.

### ***The research***

Two independent research strands were conducted by the chapter authors (Daly, 2008; Conway, 2005) during the three-year implementation phase of the project. Taken together, they present a profile of the project's development and a coherent explanation for some of its outcomes. Data was widely gathered over the three-year period. During the initial year of implementation all the national level coordinating project team was interviewed and all 31 teachers involved as school project coordinators were surveyed and interviewed in focus groups. Case studies were undertaken in four schools in which data was gathered at two six-month intervals. This included interviews with teachers, principals, and students using the laptops. Further qualitative research, primarily focusing on the processes through which this values-related change effort would be mediated by school culture, was undertaken in seven schools over the following two year period (2003-05). This involved 57 interviews with stakeholders, along with extensive observation, documentation analysis and collaboration with key personnel in the schools. A grounded theory approach was adopted in analysing the data (Glaser and Strauss, 1967; Haig, 1995; Strauss and Corbin, 1990) and, for the purposes of this paper, the most relevant findings of the combined studies was threefold.

Firstly, that the 'computer room' conceptualisation of ICT deployment remained dominant in most schools during the early phase of the project – with laptops replacing desktop machines consistent with existing organizational and pedagogical practices – and that some schools remained conceptually and practically 'stuck' in this for the project duration (Conway, 2006). However, in those schools that moved beyond this stasis, a model of laptop deployment began to emerge which was to prove particularly useful to schools to conceptualise and plan their mobile technology organisational arrangements during and beyond the project. Secondly, in the case of the most successful settings, the use of ICT was absorbed into pre-existing networks of teachers who shared particular cultural and professional characteristics. Put succinctly, these could be described as tacit networks of shared understanding, with those understandings being egalitarian and

inclusion-orientated and having somewhat common professional dimensions.<sup>2</sup> Thus, in the case of this particular effort at ICT integration – with a focus in literacy and inclusion – the technology was adopted into particular elements of school culture rather than on a ‘whole-school’ basis and clear links were therefore established between schools’ cultures and contexts and the ways in which ICT was successfully adopted into mainstream teaching (Daly, 2008). And thirdly, the technology adoption process which occurred in this cultural context had characteristics particular to that context, suggesting that ICT adoption occurs in ‘niche’ ways within school.

### ***A mobile ICT deployment framework***

A powerful framework of ICT organisation and deployment emerged from the Laptops Initiative which teachers and school found particularly useful. Characterised as ‘fixed’, ‘floating’ and ‘fostered’ models of deployment, these terms were first used in a project newsletter to schools in Spring 2003 and attributed to a teacher in St. Brendan’s Community College in Birr, Co. Offaly who was describing the emerging process in his own school. This framework gained currency within the project – initial evidence of its descriptive power and usefulness – and subsequently acted as key conceptual tools in shaping participants understanding of effective laptop organisation and deployment (Conway, 2005).

While this chapter does not directly address the concept of ‘inclusion’ per se, nor the role of ICT for students with literacy difficulties, the ‘inclusion-effect’ of the three models can be broadly commented on by loosely referencing them to current policy and strategy with regard to the inclusion of students with special education needs. This can be summarised under the concept of ‘the staged approach to intervention and support’ (DES, 2007) – in effect, the concept of ‘a continuum’. Within this concept, the mainstream classroom is ‘stage 1’ – where inclusion is most effectively achieved through differentiated approaches and which might include the use of ICT where appropriate – followed by the involvement of more specialist support teachers in stage 2 and formal involvement of professionals external to the school in stage 3. Therefore, it can be loosely argued that the inclusion-effect of ICT is most evolved when used independently by the student in mainstream classroom situations, and where the teachers’ differentiated methods are in concert the student’s particular needs and technology. This, of course, is not to suggest the other models may be less inclusive in effect in other particular circumstances and ‘stages’ but, nevertheless, this continuum is a useful inclusion indicator (Table 1).

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<sup>2</sup> Drawing on various established perspectives, such as ‘distributed leadership and cognition theory’ (West, 2005; Mangin, 2005; Spillane and Shearer 2004), ‘moral sensibility’ (Hansen, 2001), and ‘habitus’ as set out by Bourdieu (1998), Daly (2008) characterised this particular school sub-cultural grouping as a *moral sensibilities habitus*.

**Table 1: Pedagogy, Inclusion and ICT Integration Dimensions of ICT Deployment Models**

<b>Deployment Model</b>	<b>Mobility</b>	<b>Inclusion</b>	<b>Personal learning tool</b>	<b>Technology integration</b>
<i>Fixed</i>	Low	Low to Moderate	Low to Moderate	Low to Moderate
<i>Floating</i>	Moderate	Moderate to High	Moderate	Moderate to High
<i>Fostered</i>	High	High	High	High

(Source: Conway, 2006, p. xiii)

### **Fixed model**

The fixed model made laptops available on only one location in the school. In doing so, it transformed the mobile laptop into fixed desktop.

### **Floating model**

The floating model made laptops available in varying locations on a flexible basis. This was most effectively managed through the use of ‘laptop trolleys’ which provided storage, mobility, battery charging facility and some security. Thus, sets of laptops – usually managed by SEN/Learning Support teachers from the ‘fixed’ settings – could be moved to various locations and groupings as the need arose. These settings might be specific to SEN/Learning Support – for example, groups of students with literacy or numeracy difficulties ‘banded’ in various organisational arrangements – or to bring laptops to mainstream classes. This was particularly effective when used in conjunction with co-teaching strategies which allowed differentiated strategies to be applied in mainstream settings for particular students.

### **Fostered model**

In this model a laptop was permanently assigned to a student for use in all teaching and learning situations, including home. This was particularly effective for students with specific learning difficulties such as dyslexia and, in conjunction with appropriate software and teachers’ accommodations, had a powerful inclusion effect by making the curriculum more accessible to students in regular, mainstream settings. While this type of use of a personal learning tool – coinciding with stage one of ‘the staged approach’ – could be considered the summit of inclusionary effect, it also required the most detailed organisation, training and some differentiation by teachers. Therefore, as such, it could be described as a ‘delicate’ system, with the likelihood of long-term success being compromised without such attention to detail.

The adoption of this descriptive framework, with its three deployment models, into the Laptops Initiative project parlance was initial evidence of its usefulness. For example, it was preferred and found ‘neater’ than the Rockman model (Table 2) which emerged from a large-scale US laptop project (Rockman et al, 1997). Furthermore, the successful use of

laptops for this particular purpose demonstrated both the value and feasibility of mobile ICT and, in schools that had the necessary leadership and organisational coherence, it seeded the re-orientation of schools' conceptualisation of ICT organisation in general. Following publication of the deployment mode description (Daly, 2006), many such schools subsequently used it in their ICT planning.

One finding from the research is worth noting as it enabled the emergence of these models. The Laptops Initiative project provided funding for laptops and these models developed most successfully where principals put the technology within the responsibility and control of SEN/Learning Support personnel rather than under the control of established ICT personnel within 'whole-school' ICT systems. Therefore, with little intrinsic interest in technology, uninhibited by pre-conceived notions about ICT use, and independent of established ICT interests and control, they were freer to fashion the alternative forms of deployment and use. This supported a finding by McGarr (2005) which suggested that teachers of established computer subjects strongly influenced ICT school policy, yet most saw ICT primarily as a skill to be developed in isolation and that alternative attempts at integration might be seen as a threat to the established computer subject and specialist knowledge base and interests of those involved. It also contradicts assumptions that early adopters in schools are best placed to provide leadership in ICT integration. In the following section, we explore the contextual and cultural dynamics underpinning laptop the preferred *Laptops Initiative* deployment models.

**Table 2: 'Five Implementation Models'**

<p><b>Concentrated model:</b> <i>dedicated laptops to individual students for school and/or home use</i></p> <p><b>Dispersed model:</b> <i>laptops are scattered among grades or classes, sometimes shared</i></p> <p><b>Class set model:</b> <i>school owns a class set which can be checked out by teachers</i></p> <p><b>Desktop model:</b> <i>laptops are distributed a few to a classroom</i></p> <p><b>Mixed models:</b> <i>variations of above:</i></p>
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Source: Rockman et al, 1999

## Context and culture: Enabling conditions for ICT adoption

The 'technology puzzle' (Cuban, 1999) – the lag in the adoption of ICT and its integration into teaching and learning in the *Laptops Initiative* contrasts with its ubiquitous presence in almost all other facets of life. The need for sound technology infrastructure – such as ratios of computers per student, broadband connectivity and such like – are normally cited as the prerequisites for integration and used to quantify progress, the availability of infrastructure alone does not equate with more use (Ward, 2003). In this regard, the British Educational Communications and Technology Agency (BECTA) made the useful distinction between 'first order barriers' – such as infrastructure and training – and 'second order barriers' which "may require major changes in daily routines and underlying beliefs about effective practice" (BECTA, 2004, p. 17).

In the following section, we describe insights which resulted from the two studies on the Laptops Initiative. It is not intended to provide a full explanation for the conditions which enabled a cohort of teachers to emerge from being ICT 'laggards' to become ICT 'pioneers' and change agents in their own schools – and in many cases to leapfrog

established ICT users in terms of their integration of ICT into core teaching (Daly, 2008) – but, rather, it seeks to illustrate examples of the relationships between the adoption of ICT and particular school cultural and contextual circumstances which enabled *certain* cultural orientations, operating within *certain* school contexts, to ‘move beyond the state of stuck’ in terms of ICT adoption into their teaching.

In summary, as outlined above, this particular form of ICT adoption was absorbed into schools most successfully through pre-existing tacit egalitarian- and inclusion-orientated networks of shared understanding. At the core of these were SEN / Learning Support orientations and school locales, but also extending across mainstream through networks of teachers with similar tacit understandings and orientations.<sup>3</sup> Drawing on Rogers’ model of innovation diffusion and Putnam and Borko’s professional learning community features, three overarching insight gained from the two studies of the *Laptops Initiative* are now summarized. These three inter-related elements are: (i) niche diffusion and adoption phenomenon, (ii) professional learning community features, and (iii) distributed and catalyzing leadership practices.

### **1. Niche ICT diffusion and adoption**

Rogers now classic change model (1962) provided a useful lens through which to understand change in the context of the Laptops Initiative. Rogers’ described the innovation-decision process as comprising five stages/phases, that is, (1) knowledge, (2) persuasion, (3) decision, (4) implementation, and (5) confirmation. As such, any innovation can be described in terms of both spread of ideas (diffusion) and integration into practice (adoption). In Ireland, a study by Gleeson et al (2001) was inconclusive in determining whether the adoption process in Irish schools occurred along the classic patterns outlined by Rogers.

With adoption as our main focus, the most notable feature of ICT integration in the Laptops Initiative was that the initial diffusion of the idea leading the adoption process occurred in SEN/learning-support situations which were somewhat atypical from ‘normal’ or mainstream teaching and learning setting within the participating schools. For example, relationships with students and teaching styles often differed significantly in the more intimate learning support settings. In other words, these were niche locations within the broad school contexts and, moreover as outlined above, the teachers involved also had particular values-related cultural characteristics. Furthermore, two supportive conditions in particular considerably helped the initial adoption process in schools.

Firstly, the ‘comfort-zone’ of the SEN/learning support locations provided initial ‘safe professional space’ where teachers could come to terms with the technology without compromising their professional persona before those students and colleagues. In other words, teachers were able to ‘muddle through’ in a way that would not have been possible in more mainstream settings.

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<sup>3</sup> Drawing on distributed cognition and distributed leadership theories, Daly (2008) proposed the concept of ‘stretched over inclusion’ as a means of understanding how the inclusionary influence of the ‘moral sensibilities habitus’ can be ‘stretched over’ school, thus remediating exclusionary tensions innate in systems.

Secondly, the data strongly suggested that ‘validation’ of the technology usage occurred very early in the process. In other words, teachers quickly identified that students were benefiting significantly – that the technology provided ‘relative advantage’ which Rogers defined as the degree to which an innovation is superior to the methods it supersedes (Rogers, 1962). This was initially strongly expressed in terms of rapid improvements in students’ self-image. This motivated the teachers to persevere with ICT use and this, in turn, was influenced by the strong evidence of a ‘care’ ethos from teachers in the clusters – the affective dimension “which is concerned with relationship of love, care and solidarity” (Lodge & Lynch, 2004, p. 2). Interestingly, this ‘validation’ stage of the adoption process coincided with Rogers’ ‘confirmation’ stage, but in Rogers’ findings the ‘confirmation’ occurred much later in the adoption process.

The technology diffused into mainstream, from the ‘comfort-zone’ of the learning support situation, via the ‘values networks’ along the lines of classic systems theory (Perry, 2006) and with interpersonal connections and understandings (Huberman, 1995; Huijboom, 2007) being central. In other words, the mainstream ‘receptors’ were most likely to share those tacitly-understood values about inclusion and the meaning of education, and to adopt the technology when personally encouraged by respected and trusted colleagues. However, the diffusion process tended to remain confined within these networks. This diffusion and adoption process therefore occurred within a particular, or niche, context of broader school cultural and the understanding of this dynamic strongly illustrates the value of understanding the relationships between culture and ICT adoption.

## **2. A professional learning community**

Putnam and Borko (2000), in their widely influential and comprehensive review of research on teacher learning, draw out the implications of a socio-cultural perspective for teacher learning, focusing on where to situate teacher learning experiences, the nature of discourse communities, and the importance of tools in teachers’ work.

In Ireland as elsewhere, however, the dominant model of change implementation has focused on prescription by central authorities and teachers’ professional development being ‘delivered’ by specialist agencies. In essence, the dominant change and professional development scenario Sugrue argued is poorly conceived due to lack of differentiation vis-à-vis sensitivity to context (Sugrue, 2002).

Nevertheless, the some desirable features of Putnam and Borko (2000) conditions for enhanced teacher professional learning were notably evident in the Laptops Initiative whereby it:

- Anchored staff-development in teachers’ learning experiences in their own practice by conducting it on-site at schools and in the classroom.
- Encouraged teachers to bring experiences from their own classroom to staff development on practice that are extended over a number of weeks or months.
- Incorporated multiple contexts for teacher learning (both site-based, drawing on teachers’ own practice, as well as involving the perspectives of ‘outsiders’ such as in-service providers, inspectors, researchers...etc.).

Almost all the teachers we spoke with commented on the effect of the cellular organisation of schools, which largely left them to their own devices in the classroom. This is reminiscent of what the OECD report (1991) on Irish education, called the ‘legendary autonomy’ of the Irish teacher.

However, the professional learning context provided through the Laptops Initiative was significantly different in that it provided a more collegial professional context for participating teachers, along with space for local negotiation and choice and the exploitation of local serendipitous circumstances. The teachers who most successfully adopted the laptops into their practice availed of multiple professional learning opportunities, in multiple contexts, and had particular attitudes to professional learning. The Laptops Initiative project did provide professional development scaffolding and some direct instruction in software applications which facilitated the absorption of ICT in existing teaching artistry and craft practice. More significantly, however, its three-year duration and professional development approach provided time, space and a community of practice which allowed for the exploration of ‘knowledge-of-practice’ (Cochran-Smith & Lytle, 1999). That is, teachers were supported in questioning and enhancing existing practices and in acting as prospective change agents within their own school situation.

As outlined above, one dimension of the professional learning was the ‘comfort-zone’ of the SEN/learning support situations which provided a safe professional space for ‘pedagogical tinkering’ (Hubermann 1995). Much co-learning with students occurred and informal peer-mentoring from colleagues was also important – a form of ‘just-in-time’ learning which occurred ‘on the job’.

However, the research also revealed particular professional characteristics amongst this cohort of teachers (further delineated below). Many, for example, were aware of their need for regular collaboration and sharing through professional networks (Huberman, 1995) and exploited the opportunities which the project provided in that regard. Many of the teachers also displayed the professional characteristics of the ‘bricoleur’ – the ‘handyman’ prepared to “avail of the means at hand” (O’Sullivan, 2005, p. 35). Therefore, they were less reliant on structure and external ‘training’, took a lot of responsibility for their own learning, did not require the mantle of expertness, and were prepared to exploit the more flexible and somewhat adhocatic SEN context.

In summary, a variety of factors coalesced – both in terms of structure, values and professional characteristics – which created a productive dynamic through which initial uncertainty, ambiguity and experimentation could be safely negotiated in the process of ICT adoption (Harris & Kington, 2002).

### ***3. Distributed and catalysing leadership***

The research identified a particular model of leadership at play in those schools which most successfully adopted the mobile technologies. This was mainly characterised by a particular dynamic between the vertical leadership of the principal and the horizontal leadership of a catalysing teacher. Central to this dynamic was a shared, if often unspoken, ‘moral purpose’ (Fullan, 2005) to the enterprise of education and the concept of inclusion, and a resultant willingness to suspend scepticism and explore the potential value of ICT to enhance inclusion.



In tandem with the commitment to inclusion, such principals were able to conceptually move beyond the 'fixed' usage of ICT and facilitate the transition towards some mobility and integration. This leadership *modus operandi* was less overt and more facilitative and empowering. In practical terms, it manifested itself in areas such as the allocation of budgets, the making of accommodating timetabling arrangements to allow the involvement of sympathetic mainstream teachers, and in space and equipment arrangements. Also, for example, autonomy was negotiated in favour of SEN/learning support personnel in cases where tensions arose with established ICT Coordinators and teachers over the control of equipment provided by the project.

While the initial adoption of the ICT in the 'niche comfort zone' of the SEN/learning support situations is described above – coinciding with Stage 2 of the 'staged approach' to inclusion – the catalysing effect of particular teachers was key to moving beyond this limited context and in leading teachers to utilise the ICTs for the support of students with literacy difficulties at the Stage 1 mainstream level.

As outlined, such 'practitioner catalysts' (Daly, 2008) had tended to be ICT 'laggards' but, through the impetus of the project, were now instrumental in catalysing like-minded teachers, through inter-personal networking, into forms of communities of practice which explored the use of ICT in various ways in mainstream teaching. They were not strongly associated with any particular middle-management role such as SEN Coordinators and the leadership had little to do with formalised bureaucratic-style school planning – it was more organic in nature and can be better understood through an ecological perspective of school as a structure (Zhao & Frank, 2003).

The research identified the following characteristics in these key practitioner leaders who operated under the umbrella of sympathetic principalships:

1. Were professionally mature: were at the 'experimentation/reassessment' stage of professional lifecycle (Hubermann, 1995); could navigate the micro-politics of the school context; were professionally respected by colleagues.
2. Displayed high-level professional activism (Sachs, 2003): made high-level professional decisions; took much responsibility for their own professional development; had a strong internal locus of attention.
3. Were egalitarian and inclusion orientated: viewed SEN more as system-deficit rather than child deficit (Thomas & Loxley, 2001); teaching was constructivist, process-based and child-centered; professionally affirmed by perceived benefits to students
4. Were 'progressive bricoleurs' (Hattam, 1998): willing to 'muddle through' with others without the mantle of 'expertness'; were collaborative, flexible and democratic in this approach.
5. Affective inclination: strong care ethos; disproportionately female (Devine, Nic Ghiolla & Deegan, 2005)
6. Aware of renewal needs and supports (Conway & Clark, 2003): recognised the need for regular professional refreshment; seized the innovation effort as a renewal opportunity.

The implementation of the project was problematic where key aspects of this distributed and catalysing leadership model were weak or absent. For example, the limited inclusion-orientation or ICT conceptualisation of a principal – which sometimes manifested itself through the phenomenon on the trophy ‘laptop room’ – stunted the potential of likely teacher innovators. Similarly, there were cases principals’ aspirations being frustrated by SEN/learning support personnel who were entrenched in ‘remedial’ thinking and practices and with a reluctance to become involved in Stage 1-type activities or the use of ICTs.

## **Conclusion**

In concluding the discussion on the three above insights gained from the two studies of the Laptops Initiative we draw upon three headings in this chapter:

- Inclusive learning
- Laptop deployment and ICT integration
- ICT integration and collegial professionalism

### ***Inclusive learning***

Education is essentially about personal and social growth and development in a variety of manifestations. However, for those with various forms of unique need – perhaps through social marginalisation or with a formally-identified ‘special educational need’ – the school-going experience may have some limitations with regard to this growth (Kenny et al, 2000). Thus, we strive for the slippery concept of the ‘inclusive school’ and the potential role of ICT within this. However, while the potential of ICTs for enhancing the learning of students with SEN is as well established as its potential for enhancing the learning of all students, it equally suffers from a gap between latent possibilities and actual realisation.

Whatever about the slipperiness of the inclusion concept and various interpretations of what constitutes ‘special educational need’ (Thomas & Loxley, 2001), we now have a coherent legislative and policy framework in Ireland to support the inclusion aspiration, and a valuable roadmap in the form of a set of guidelines for the inclusion of students with SEN in post-primary schools (DES, 2007). As described above, this policy envisages a continuum or ‘staged approach’ to SEN intervention, with support occurring at various levels, in various contexts, and with teachers acting in a variety of teaching and support roles.

If ICTs are to realise their potential and play a valuable role in inclusive learning, two key conditions are therefore necessary. Firstly, they need to be flexibly available in these various contexts envisaged in the staged approach. As summarised below, the mobile ICT deployment framework which emerged from the Laptops Initiative does offer schools a powerful way of approaching mobile ICT organisation and deployment so that it is available in such various contexts. Secondly, in parallel with ICT availability and integration, inclusive learning equally requires the professional development and growth of teachers. The learning for the project in that regard is also discussed below.

### ***Laptop deployment and ICT integration***

The deployment model described provides a loose but useful conceptualisation of mobile technology organisation and deployment. Furthermore, the enabling conditions (diffusion model, professional learning community and catalysing leadership) provide key insights into how ICT integration can be fostered. The contradictions evidenced in the ways in which ‘mobile’ learning technologies were implemented as ‘fixed’ in the majority of cases in schools – at least initially – point to the unintended consequences and contradictions that frequently emerge in educational reforms (Conway, 2006; Peruski & Mishra, 2004; Engestrom et al, 1999).

Significantly, the findings from the Laptops Initiative do not envisage a generic adoption model – ICT is adopted in different ways by different ‘subcultures’ of users. Furthermore, our emphasis on niche-drive adoption questions over-generalised uses of the term ‘whole-school approach’, which typically obscures the more subtle internal niches and small networks within schools through which innovations can be established. Interestingly, this study also supports previous tentative findings that established ICT users may not necessarily be the best leaders of ICT integration.

### ***Collegial professionalism and ICT integration***

Hargreaves (2000) has described four different ages of teacher professionalism: pre-professional, autonomous, collegial, and post-professional or post-modern professionalism, although he notes that ‘current experiences and perceptions of teacher professionalism and professionalisation draw, it is argued, on all these stages’ (p. 151).

While post-modern professionalism flourished in some cases in the Laptops Initiative, we tend to think that this had better scope for expression in the sometimes more flexible and adhocratic SEN/learning support contexts of post-primary schools and its generalisation beyond this and other marginal initiatives may be questionable.

We also think that the experiences of teachers involved in the Laptops Initiative were most consistent with autonomous professionalism, but that the autonomous and solo nature of teaching in general may be in the process of slow change and that collegial professionalism may be enhanced through pilot projects such as the Laptops Initiative and broader initiatives such as School Development Planning Initiative (SDPI).

It would seem from this and other studies that change interventions should attempt to focus on fostering conditions for the emergence of collegial professionalism and situative professional learning. The evolution of the more successful Laptops Initiative schools was also consistent with the findings of other studies where, within the context of a project which allowed the space and flexibilities for processes to evolve, ICT adoption and integration was seeded through individual professionalism in a particular school context and then diffused, via collegial professionalism and particular cultural groupings into more mainstream applications.

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