

**Researching mobile learning - Executive summary - Interim
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The pioneering use of technology in these projects has required a significant investment of time, energy, imagination and expertise to address economic, technical, social and pedagogical challenges. This has taken time, and in the second year in the schools under study we are seeing real progress. The leadership and support the projects have provided has been central to the development and integration of the devices in teaching and learning, in and out of school. The degree of risk-taking shown by the project leaders and teachers should not be underestimated.

Our research adds to a growing body of evidence that suggests that mobile devices can make a very positive contribution to teaching and learning. What the projects have discovered, and are still discovering, can usefully inform other 1:1 initiatives.

About implementation

- To achieve meaningful integration of mobile devices in teaching and learning takes time.
- The introduction of 1:1 mobile devices has been more problematic and complex in secondary schools than in primary
- Ways should be found of encouraging teachers starting with mobile devices to take ownership of the initiative. Positive strategies include: consultation beforehand; involvement in decision-making; realistic expectations; curriculum and technical support from a central team; designing effective professional development for teachers.
- A model of effective CPD combines out-of-school sessions for training, information exchange, discussion and sharing with in-school support from project staff and more experienced colleagues. Key features include consideration of the potential of the device related to specific learning contexts and priorities, provision of authentic examples of the device in use, validation by other teachers and external agencies.
- To achieve the most effective integration into teaching and learning teachers must be confident that devices are available and working, and that the supporting infrastructure is robust and can facilitate the desired uses.
- A full and rigorous audit of wireless network capacity is needed to ensure effective access when demand increases.
- A high level of technical support is needed in the early stages for trouble-shooting problems. Without this, impetus is lost, an unacceptable burden is placed on teachers and commitment wanes.
- Loan devices should be available to ensure that learners consistently have personal access to a device.
- The failure of suppliers to meet promised delivery dates has had a negative effect on plans for implementation and sustained development.

- The enthusiasm of learners in both phases is having a perceptible effect, particularly as they suggest to teachers ways in which their devices could be used in class.
- Use of mobile devices can be effective when meshed with traditional pedagogy and teacher controlled. As teachers gain confidence and respond positively to student propositions for using the devices they begin to distinguish between what they perceive as effective and ineffective ways to incorporate mobile handheld devices into their practice. This reflection on the digital dimension often leads to shifts in pedagogy.
- Some attainment-related evidence suggests that particular characteristics of the mobile devices used in these projects are relevant to learning behaviours that contribute positively to attainment. These behaviours include revision, drill and practice, concept development and extended writing.
- In the primary phase, the range and amount of use out-of-school reported may reflect home attitudes, practices and experience in relation to technology. In the secondary phase the students have so far reported little if any family involvement. Their out-of-school uses reflect their personal interests and pre-occupations.

Issues and challenges

- Teachers are very aware of the tensions between the learning processes made possible by the device and those which are perceived as tried and tested in achieving desired outcomes. They perceive that approaches to learning that are more open-ended, learner-centred and autonomous require more time than they feel is available with a crowded curriculum and high stakes end-of-key stage assessments. The potential for iteration, reflection and transformation that the device affords is often not fully exploited
- Evidence is building around the value of mobile devices in the personalised learning agenda. Autonomous use by pupils in and out of school is increasing. Teachers frequently give students the choice to use or not use their devices. Choice of this kind means that some have been making much more use of their devices than others. In and out-of-school there are both very high users and very low users.
- Networks of social practices develop spontaneously around the use of handhelds eg to swap files, share music, share expertise with the device. These operate in and out of school. These networks have the potential to create (and in some cases already are creating) communities of practice around not only technology use but also around learning. Students in different social groupings may not have access to this.

- In both phases an understanding of the potential of the tool, learned from using it informally for music or entertainment media, leads to a realisation of the possibilities for school learning. Alongside this there is frustration at the teachers' apparent inability also to see this potential.
- As predicted in the early stages of the research, assessment is a key challenge. Teachers are increasingly aware of the importance of a robust infrastructure and protocols for managing digital work as an aspect of successful exploitation of the potential of mobile devices for teaching, learning and assessment. Where it is easy to move work between teachers and learners some innovative forms of formative and summative assessment are emerging in both phases.

Issues around sustainability and scalability

- Overall, as both projects develop, positive indications for sustainability within the schools are becoming more evident.
- A mass roll out will benefit from local support teams as a source of information, advice, support for schools, and in assisting schools with developing strategic responses to national and local trends. Such teams can also facilitate the sharing of effective practice
- New schools starting with mobile devices would need support but, if lessons learned are effectively disseminated, probably not to the extent of that needed by the early participants in ground-breaking projects.
- The real costs to schools in terms of hardware and especially software should be assessed as elements of project and school budgets.
- Device acquisition in the research schools has been funded by a combination of contributions from the initiating projects, parents, schools, and the e-learning foundation. Schools strategically committed to sustaining 1:1 ownership of mobile devices are already facing the challenge of balancing budget priorities. The question of which funding models are scalable is urgent.
- Devices are constantly changing. A common specification of core functionality for a device, necessary for effective use and successful integration into teaching and learning, could usefully be developed.
- The attitude of hardware and software designers and suppliers to education as a market is a salient issue in relation to sustainability and scalability. In addition to requirements of functionality, reliability in meeting delivery times is essential to ensure continuity of development within the school and in emerging attitudes to transition. Delivering on time and providing good back-up service are paramount in achieving successful implementation.
- The procurement of broadband wireless services/contracts is central to mobile learning initiatives. Discussions with grid and service providers at

policy level, is a necessary concomitant of any scaling up of mobile technology use in education.

- Considering the transition of pupil users from the primary to the secondary phase is already a feature of thinking in the most mature and forward-looking of the schools. This is important if the full value of the investment of the projects, schools and families in the innovation is to be realised. Communication and collaboration between primary and secondary head teachers is necessary to develop understanding and confident commitment to the positive contribution of handheld technology to learning.