Evaluation of the Training and Development Agency for Schools' funding for ICT in ITT Projects:
Final report

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Contents

Executive Summary

Since 2003 the Training and Development Agency for Schools (TDA) has offered support for Information and Communications Technology (ICT) in Initial Teacher Training (ITT) through annual funding rounds open to all accredited ITT providers, with the aim of directly increasing provision for ICT equipment and new research into ICT in teacher training. The programme was intended to promote experimentation and to help create a culture of innovation and change which the TDA felt was central to developing activity and quality in initial teacher training. The funding rounds were competitive, dependent on the submission of detailed project bids from providers including, but not limited to those that received funding support from the DCSF and its precursors. Where possible, across the board allocations were made to providers based on the number of enrolled trainees.

This report outlines the findings of the evaluation of the TDA's programme for funding ICT in ITT between 2003 and 2008. Analysis of programme documentation indicated that 216 ITT providers received funding during this time. In the last year for which full data was available (2006-07) ITT providers reported that some 13,222 trainees had been directly involved in, or were beneficiaries of, these projects. The highest number of participants in one project was 904 with the mean being 189. Overall, 1,515 schools were said to have been involved in projects in that one year.

The evaluation focused on assessing the programme's impact on trainers and trainees and the organisations and schools in which they were based. This final report builds on and is informed by case studies of six ITT providers undertaken in January 2009 and two previous reports: an analysis of ITT providers' application and evaluation documentation from the programme between 2005 and 2008; and a detailed analysis of a survey of 95 respondents from ITT providers undertaken in November and December 2008.

1. Impacts on trainers, trainees and their organisations

1.1. Engagement with and use of the technology

ITT providers were asked to assess trainees' and organisations' use of a technology before and after the TDA-funded projects. Their assessments were analysed using a five point e-maturity scale derived from Hooper & Reiber (1995). In this model, the five stages of ICT use were identified as: familiarisation; utilisation; integration; reorientation; and evolution.

Level of competency

5   Evolution

4   Reorientation

3   Integration

2   Utilisation

1   Familiarisation
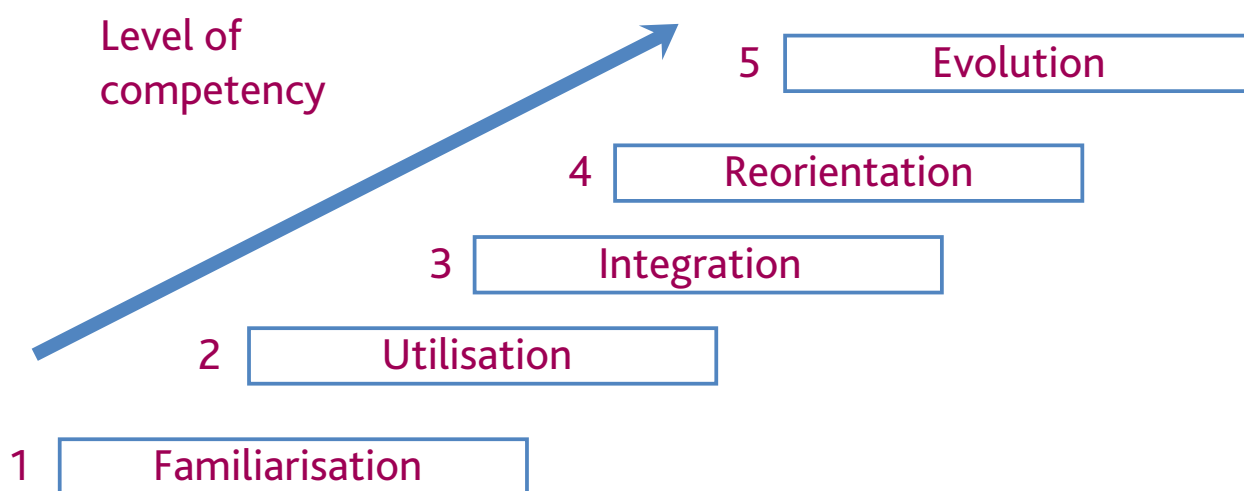
- The overall shift for trainees and organisations brought about by the projects was from utilisation (stage 2) to integration (stage 3). This meant that they had moved from a point at which they had some experience of using the specific ICT to one where they had integrated it into their practice and it had enhanced teaching and learning.

- At the beginning of the projects, 17% of respondents felt that their organisations were at a stage even before 'familiarisation' (stage 1), that is they were unaware of the potential benefits to practice of the ICT project in question before it began.

- After the projects 90% of trainees were thought to have moved into one of the higher three categories – integration, reorientation or evolution.

- The most dramatic shifts in use by both trainees and organisations were associated with projects that focused on laptops in particular, and on interactive whiteboards (IWBs). These shifts were more common in school-centred initial teacher training

providers (SCITTs) than other types of providers. Although this appears to contrast with research that has found that IWBs have had limited and variable impact on classroom practice and pupil learning (see, for example, Moss et al, 2007; Somekh et al, 2007), it should be emphasised that respondents were asked to report on a range of impacts, including attitudinal changes, and that improved use of IWBs may reflect emergent and/or latent expertise in that area that has developed since the earlier evaluations were conducted.

- The fact that overall trainees involved in projects progressed more in their ICT use than ITT organisations did as a whole was indicative of the issues involved in taking such projects to scale across an organisation.

1.2. Impacts on trainees' knowledge and practice

The survey asked providers to assess the impact TDA-funded projects had on trainees and trainers in a number of areas.

- Impact on trainees varied considerably and depended on a range of factors, notably the culture of placement schools and trainees' prior familiarisation with a technology.

- As might be expected, positive responses about impact clustered around trainees' increased awareness of the ICT funded by TDA (where 91% responded positively) and confidence in using it (where 97% responded positively).

- Overall impact on trainees appeared to be less strong in employment-based initial teacher training providers (EBITTs) than in other forms of ITT provider, particularly in relation to trainees having the opportunity to experience new models of teaching using the technology.

- This contrasted with the degree of overall organisational impact where smaller providers, such as EBITTs, were more likely to report dramatic shifts in ICT use.

- An ITT provider's capacity for change as an organisation was more important than its relative size overall in determining the impact funded projects had at different levels.

- Projects involving large numbers of staff consistently reported higher levels of impact on trainees

1.3. Impacts on trainers' knowledge and practice

- Projects had to focus on raising trainers' awareness of ICT before developing their confidence in using it.

- There were widespread variations in the impact projects had on trainers. Certain technologies, such as the use of video and other multimedia approaches, appear to have generated greater initial take-up by tutors, trainers and mentors. Similar impact was brought about through ICT-led enhancements to existing administration and support systems used by staff.

- Variations in impact were accounted for in terms of trainers' willingness (or resistance) to change. In comparison, variations in take-up and use among trainees were more likely to be associated with differences in their prior engagement with a technology or contextual factors in their placement schools.

- Projects involving large numbers of staff were more likely to report higher levels of impact on trainers.

1.4. Impact on schools and pupils

The survey also asked providers to indicate where TDA-funded projects had an impact on schools and pupils.

- There was limited evidence of widespread impact upon pupils and schools, with 23% of providers stating they did not involve schools. Although there were some highly effective practices, many }of the projects' aims in this area of impact remained aspirational.

- Approaches that appeared effective drew on pupils' digital habits and supported their desire to voice their views and create their own content.

- There was only limited evidence of trainees being able to act as significant change agents in schools.

- School contexts and cultures in relation to ICT were more frequently described as moderating factors than as enablers with regard to supporting ICT innovation. They were more likely to be associated with inhibiting the transfer of practice than with supporting trainees to innovate.

- Schools' willingness to accommodate new approaches was a key factor in terms of impact. Where trainees were able to share new ideas and approaches with peers and school colleagues, they appeared to be able not only to develop their own practice but also to change schools' views of ICT.

2. How were these impacts achieved?

An implementation model for ICT in ITT

We identified three generic groups of factors whose interaction determined the success of any implementation. These were: the **status** of the technology being introduced; the ITT organisation's **capacity for innovation**; and the degree of **alignment** between the innovation and the needs and concerns of individuals and teams in the organisation.

2.1. The status of the technology being introduced

Rather than restricting our observations to the technical status of the technology being introduced, we also considered the role played by the social and learning status of a technology.* Successful innovations were characterised by the following:

- movement from consideration of the technical status of the technology in isolation towards recognition of the role played by its social and learning status

- selection of a technology which had a high social status. Technologies that had a high social status with trainees were those they felt contributed to their emerging professional identities, such as laptops and IWBs

- challenging negative perceptions of a specific technology

- recognition of how differences in prior engagement with a technology or with functionally similar social software affect initial take-up and overall training and support needs

- utilisation of those with in-depth understanding of the learning potential of technologies to model to others.

2.2. Building and focusing the capacity for innovation

Capacity was examined at three levels - individual, team and organisational. Successful innovations were characterised by the following:

- recognition of individuals' existing understanding of the technology and encouragement for them to use this to support others

- sequential and focused support for a limited number of individuals who then mentored others

- integration of opportunities to model different uses of the technologies throughout existing provision and across the different contexts in which trainees operate

- encouraging teams to experiment and take risks

- building an ethos of openness and shared learning

A full explanation of these terms is given in the main report below

- developing structures and process to support sharing between project participants

- providing discipline through enquiry and evaluation

- offering leadership support at all levels and creating additional leadership capacity.

- they had to have a degree of congruence with the overall strategic aims of the ITT organisation

- they were underpinned by core educational values.

2.3. Aligning the needs and concerns of individuals and teams

This group of factors appeared to have the greatest influence on whether an implementation was successful or not. The technology being implemented and how it was designed to be used had to meet a significant number of individuals' needs and add substantively to the quality of the core activities of key groups and teams. Specifically it was those factors which were key to the mobilisation of individuals and teams that appeared most important. Successful innovations were characterised by the following:

- they had to meet a range of individuals' specific needs

- in the context in which they were operating, they had to meet these needs more easily, or at less cost, than other existing or potential approaches

- they needed to add substantively to the quality of the core activities of key teams of trainers and groups of trainees

3. Going beyond numbers to deep and lasting change

The TDA funded projects have had a considerable impact upon ITT providers of all forms across the system, with some 216 different providers successfully applying for TDA funding from this programme over its last three years. To address the question of how likely it was that the vast range of projects that have been funded will cumulatively lead to a profound impact upon ITT providers and their trainees, Coburn's (2003) model for scaling up educational initiatives was adopted. This model highlights that for projects to become sustainable sources of change they need to have achieved a broad **scope** of implementation; a certain **depth** of change; and to have **transferred the ownership** of the project from its initial advocates and leaders so that it has become an established way of working.

3.1. Scope of implementation

The analysis of both project documentation and the questionnaire survey indicated that in one year of funding (2006-07) providers reported some 13,222 trainees being directly involved in, or benefitting from, these projects. 56% of projects involved fewer than 100 trainees while 13% involved more than 500. Overall, 1,515 schools were said to have been directly involved in projects in that year. Analysis of providers raised two significant issues with regard to scope of involvement:

- higher education institutions' (HEIs') larger size meant that they faced greater challenges than smaller ITT providers in engaging a critical mass of trainers, and particularly senior staff, within the time span of a single project. This problem was in part ameliorated by larger providers' ability to adopt more strategic and long-term approaches to developing ICT use

- HEI providers benefitted from having trainees who were involved in training over more extended periods of time than was the case for EBITTS and SCITTs. This allowed for the development of a critical mass over the longer term and for support to be offered by more experienced trainees.

3.2. Depth of engagement

If scope is concerned with the numbers of people involved in a project, depth focuses on the extent to which they became engaged. Again, there are two issues of particular relevance to the development of deeper engagement:

- the first of these is the variation between trainers and trainees in the take-up and application to practice of various technologies. A great deal of the variation in take-up can be accounted for by the fact that trainers and mentors were less likely to change or adapt their pedagogy in order to accommodate or make best use of 'new' technologies. Trainees who had not developed a 'habitual pedagogy' were more likely both to engage with 'new' technologies

and to change their pedagogies to incorporate their use.

- the second issue that particularly affected the depth of engagement of trainees was the consistency with which they encountered others using the technology and with which they encountered supportive individuals and contexts. Trainees experienced widespread variations in practice and ethos both across training providers and within schools. A key issue in terms of trainees having an impact on schools and pupils was that ITT providers found it difficult to engineer widespread coordination of ICT developments with schools. This meant many trainees were unable to develop their practice within placement schools.

3.3. Transfer of ownership

The final strand in achieving sustainable change is to progress from a situation where an innovation is perceived as a project which is 'done' by some people 'to others' to a way of working in which it is widely owned in an organisation.

Project leaders were more successful in transferring ownership when they used technology which had a high social status, where trainees saw its use as a key part of becoming a 'teacher' rather than an imposition. Certain technologies, such as laptops and IWBs, have already reached the status of being professionally ubiquitous in that their absence in a professional context is more likely to be noticed than their presence. For pupils, high

social status was associated with technologies that linked out of school learning with learning in school and which provided them with different opportunities to express their views and learning.

One of the key factors in moving ICT development away from being a series of projects to an evolving and more integrated way of working was, in a number of instances, the development of a virtual learning environment (VLE) which could be used by trainees and mentors dispersed across schools. VLEs not only became a crunch point between those developing ICT for teacher trainees and those responsible for overall ICT strategy for their institution, but also provided an alternative ICT infrastructure that supported and enhanced other developments.

4. Future directions for funding

4.1. The importance of external TDA Funding

TDA funding has had a significant impact on the ability of ITT organisations to engage and innovate with ICT. Results from the survey highlighted this with 22% of respondents stating that TDA funding was at least ten times greater than their normal allocation for ICT funding and a further 25% stating that it was twice or five times as big as their overall ICT in ITT budget. 13% of respondents reported that it was at least ten times greater than the overall organisational budget for this area.

Individual differences were largely dependent on the nature and size of the organisation. For SCITTs in particular, the TDA funded projects generally outstripped their ICT budget within ITT by a factor of two or more and were of almost equal importance to their overall ICT development budgets.

4.2. Sustainability of funding

Although many of the funded projects have had sustained impacts, there are questions about how sustainable this level of funding is and which types of organisations and projects should receive funding. As part of the survey ITT providers were asked how they felt funding should be administered, and their responses can be summarised as follows:

- In support of choice and localised solutions (Small is good)
  Respondents were reluctant to give up funding that could easily be matched with local priorities and might be regarded as an entitlement. They were largely not in favour of an 'open competitive process', fewer but bigger projects, and restrictions on

technological choices. This suggests that the recipients of funding liked the degree of control and choice afforded them by the TDA ICT in ITT programme.

- Proving their impact and worth as part of the process of project evaluation (Show and tell)
  Respondents recognised that projects needed to be more focused and disciplined in the future, reflecting a desire to prove their worth and effectiveness: 36% and 53% respectively definitely or possibly agreed that all projects should have impact evaluation built into the project design process. However, they were unsure as to how best to evaluate impact and were keen to be supported in this area.

- Communication and dissemination (Connected is better)
  Respondents came out in favour of increased collaboration between projects and of ring-fencing a percentage of funding for the communication of project outcomes. They were keen to see the use of mechanisms

such as project dissemination events and collaborative wikis that would expand and enhance existing professional networking opportunities.

- **Long rather than short term (Focusing on sustainability)**
  Respondents were in favour of projects being allowed to continue from year to year, provided that further funding was subject to evidence of impact and that future targets were established within the first phase of a project. The cost of more robust and in-depth monitoring and reporting would be balanced by the benefits derived from establishing longer term, strategic aims for ICT development.

5. Implications and recommendations

The following recommendations summarise some of the implications from this evaluation for future funding of ICT projects in ITT. They have been divided into implications and recommendations for the TDA, providers and schools:

5.1. Implications and recommendations for the TDA

Funding and scale

- The size of TDA funding needs to be considered, not in relation to the receiving organisation's overall budget and comparative size but to assessments of their existing capacity and the issues they face in making an impact on trainers, trainees and schools.

- The TDA will need to consider the degree to which the programme sets out to meet each of the following aims:

  i. Inclusion - trying to ensure equality of access to professionally ubiquitous technology for all trainees in their ITT. This would require funding to be focused on a limited number of technologies but across both ITT organisations and schools.

  ii. Embedding – focusing on the development of pedagogies among trainees so that they can make full use of the affordances of ubiquitous technologies. This would require funding to be targeted at the professional development of trainers, tutors and mentors in particular.

  iii. Innovation – supporting the introduction and take-up of new and emergent technologies so that their full learning potential is modelled to those in the ITT system. This would require a greater focus upon the dissemination of innovative and leading edge practice.

Flexibility and discipline

- The funding model needs to allow a high degree of flexibility for ITT providers in order to meet local needs, match providers' current stage of ICT use and promote development.

- Flexible and responsive funding for projects needs to be balanced with a robust impact reporting framework that allows the costs of such reporting to be set against a longer project life cycle and opportunities to focus on more strategic outcomes.

- Project impact should be discussed at various levels - the ITT providers' organisation, trainers, trainees, schools and pupils. Project plans and associated budgets should address these different levels of impact.

Sustainability and going to scale

- Meeting specific localised needs is the key to sustaining projects. These needs should be identified both by those within ITT organisations and in schools if the problems of transferring practice into classrooms are to be tackled. Encouraging providers to build closer relationships with schools is key to ensuring impact on pupils.

- More emphasis should be placed on training school-based mentors to support trainees in using technology. There are a number of possible approaches to this task including: requiring that school-based mentors have a minimum level of competence in the use of ICT in the curriculum; supporting the training of mentors through these projects and supporting the broader professional development offer from HEI providers so that their M level provision gives more consideration to ICT innovation and pedagogy.

5.2. Implications and recommendations for ITT providers
Institutional lag
In specific projects trainees were seen to be developing their use of ICT at a much faster rate than in the organisation as a whole. This particularly affected providers that only had trainees for short periods of time and found it more difficult to harness their capacity to innovate. There are a number of recommendations related to knowledge transfer and achieving sustained change:

- specific teams of trainers should be involved in innovations so that sufficient individual and team capacity is built up during the project

- trainees' innovative practice should be captured before they complete their study, for example through contributing to a VLE

- innovative trainees should present to and share practice with subsequent cohorts

- trainees should be encouraged to develop 'fresh' pedagogical approaches in order to inform and renew training strategies.

Trainers
Trainers are often not aware of the learning potential of key technologies or are not confident in their use. The following actions are recommended to address this:

- high leverage professional development approaches, such as mentoring and coaching, should be targeted at trainers

- emphasis should be placed on the use of certain technologies, such as video and other multimedia approaches, which appear to generate high levels of take-up and enthusiasm among trainers and trainees

- providers should audit the digital habits of both trainees and trainers to ascertain the match or fit between current skill sets and those required by any ICT implementation. This would inform professional development and alert providers to the potential quick wins available by using certain technologies.

5.3. Implications and recommendations for ITT providers and schools

Further implications and recommendations for providers and schools have been addressed together to reflect the necessity for interdependent and joint approaches to achieve change.

Trainees for change

The relative lack of success of trainees in acting as change agents in schools was associated with unsupportive school cultures. There are a number of recommendations about supporting trainees and school based mentors:

- where possible, trainees should collaborate with each other on ICT projects while on placement in real or virtual teams

- school-based mentors should be supported and engaged through the wider professional development offer of ITT providers. For example, one organisation had developed a Master's module around ICT implementation

- school ICT co-ordinators should be more involved in supporting trainees

- opportunities should be created for trainees to share ideas and curriculum innovations in ICT with colleagues in school

- ICT projects should be developed jointly with schools in order that innovation can be shared and to ensure that both schools' and ITT providers' cultures are supportive of trainees.

EBITTs

Overall impact on trainees in EBITTs needs to be increased. Recommendations here are mainly related to offering access to a range of new models of teaching using technology:

- curriculum development projects should be initiated which use ubiquitous and easily adopted technologies, such as digital cameras, which allow trainees to experiment with ICT in schools that have very different levels of ICT maturity

- greater emphasis should be placed on sharing practice between trainees using readily available technology.

Professional status and identity

Choice of technologies should be based on an understanding of which of them have high social status for trainees and reflect and support their developing professional identity. It will be vital to ensure that the technologies to which trainees are introduced at least match those which are available and in use in schools.

Engaging pupils

Providers and schools should be aware of the digital habits and skills of their pupils. ICT interventions should build on these skills to engage pupils and motivate them to voice their views and create their own content.

FULL REPORT

Introduction

Since 2003 the Training and Development Agency for Schools (TDA) has offered support for Information and Communications Technology (ICT) in Initial Teacher Training (ITT) through annual funding rounds open to all accredited ITT providers, with the aim of directly increasing provision for ICT equipment and new research into ICT in teacher training. The programme was intended to promote experimentation and to help create a culture of innovation and change which the TDA felt was central to developing activity and quality in initial teacher training. The funding rounds were competitive, dependent on the submission of detailed project bids from providers including, but not limited to, those that received funding support from the DCSF and its precursors. Where possible, across the board allocations were made to providers based on the number of enrolled trainees.

This report outlines the findings of the evaluation of the TDA's programme for funding ICT in ITT between 2003 and 2008. Analysis of programme documentation indicated that 216 ITT providers received funding during this time. There were three categories of provider: employment-based teacher training providers (EBITTs), higher education institutions (HEIs) and school-centred initial teacher training providers (SCITTs). The report is divided into four sections followed by an outline of its implications and a set of recommendations:

1. Impacts on trainers, trainees and their organisations

2. How were these impacts achieved?

3. Going beyond numbers to deep and lasting change.

4. Future directions for funding

It builds on and is informed by six case studies of ITT providers undertaken in January 2009 and on previous reports: an analysis of ITT providers' application and evaluation documentation from the programme between 2005 and 2008; and a detailed analysis of a survey of 95 respondents from ITT providers undertaken in November and December 2008. These reports describe the overall evaluation methodology.

1. Impacts on trainers, trainees and their organisations

This section of the report looks at four levels of impact of the TDA projects, based on Kirkpatrick's (1994) overarching evaluation framework:

- **Engagement** - how trainers and trainees involved in the project engaged with and used the technology being introduced

- **Learning** - the resulting increase in knowledge and capability of trainers and trainees

- **Behaviour** - Changes to the practice of trainers and trainees

- **Organisational impact** - effects on the organisations and stakeholders involved, including ITT providers, employers and schools, as well as the impact on pupils in the short and longer term.

Parts of the framework were supplemented by Hooper and Reiber's (1995) framework for examining e-maturity and Fisher et al's (2006)

adaptation of Shulman & Shulman's (2004) model of teacher learning to explore impact on trainers' and trainees' learning and professional practices.

1.1. Engagement with and use of the technology

Project leaders were asked in the online survey to assess trainees' and organisations' use of the particular technology they were introducing before its introduction and afterwards. Their assessment was organised around a five point scale derived from Hooper & Reiber (1995), *see Figure 1*. This was done to take into account differences in the initial levels of familiarity and expertise of those involved with the project ICT, as well as gauging progress in its use.
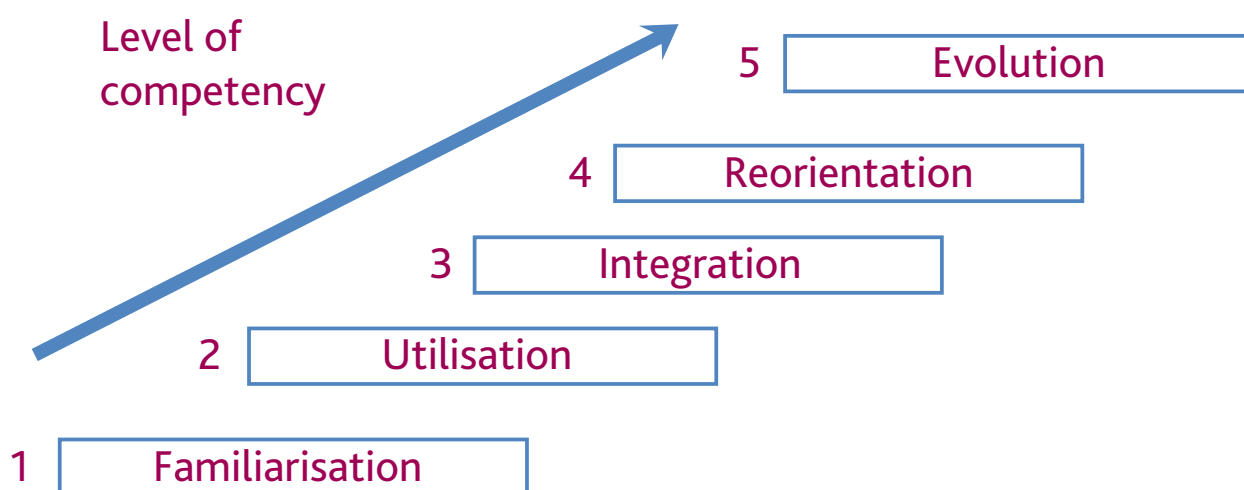
Level of competency

5 | Evolution |

4 | Reorientation |

3 | Integration |

2 | Utilisation |

1 | Familiarisation |

Figure 1. Five stage integration model for ICT (adapted from Hooper and Reiber, 1995)

Shifts in trainees' ICT use

All the respondents felt that trainees had moved forward by at least one level of the model. The most common shift was from utilisation to integration (stage 2-3; 25%), followed by shifts from utilisation to reorientation (2-4; 23%) and familiarisation to integration (1-3; 16%), although it should be noted that 12% of respondents did not select a 'before project' stage at all. Only, 8% thought trainees had moved from familiarisation all the way to evolution (1-6). These results were fairly consistent across the different types of provider.

Before the projects began only 14% of trainees were considered to be in the 'integration' phase and none were higher; after the project 90% of trainees were felt to have moved into the higher three categories. The open responses to the questionnaire emphasised the difficulty of generalising across what were often considerable variations among large numbers of trainees:

This is work in progress – the trainees' capacity and understanding to move as a unit – into the 'evolution' phase is an area that we are starting to see evidence of this year (the second year of the project). However, there are still considerable individual variations with individual trainees, an area which we are continuing to support. (SCITT)

A number of respondents highlighted the importance of school contexts on trainees' use of ICT:

Reorientation is difficult in a classroom where the class teacher/school has not had the same training and does not have the same expertise
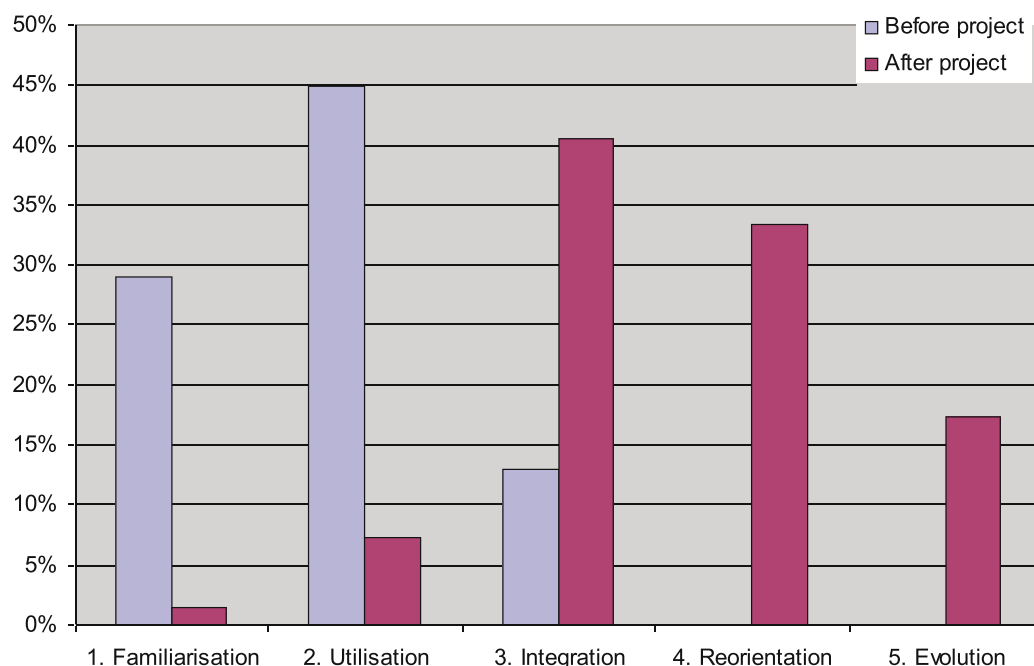

Figure 2. Shifts in trainees' use of ICT before and after the project

in ICT as trainees. Trainees are creative in the use of ICT in college but find it difficult to put it into practice in school. (HEI)

Variations in impact by technology and type of provider

Of those projects that reported trainees being at the most advanced stage of 'evolution' by their end, nearly three quarters focused on the use of laptops and tablet PCs. 'It enabled us to make using laptops in teaching sessions and using IWBs in teaching sessions the norm because we had a critical amount of them' (HEIs). It should also be noted that of these laptop-based projects the majority were located in SCITTs. The next most significant group were IWB projects where there was considerable overlap with the laptop projects. Four of the five projects regarded as having moved trainees from familiarisation (stage 1) to evolution (5) were laptop projects, all in SCITTs. Although this appears to contrast with research that has found that IWBs have had limited and variable impact on classroom practice and pupil learning (see, for example, Moss et al, 2007; Somekh et al, 2007), it should be emphasised that respondents were asked to report on a range of impacts, including attitudinal changes, and that improved use of IWBs may reflect emergent and/or latent expertise in that area that has developed since the earlier evaluations were conducted.

Organisational shifts in ITT providers' overall ICT use

Asked to assess the overall level of change in their organisation 17% of respondents felt that their ITT provider organisation started at a stage even before 'familiarisation', and felt that they were unaware of the potential benefits to practice of the ICT that was the focus of their project. This reflects the innovative and developmental nature of many of the projects as trainers grasped the opportunity to increase staff engagement with 'new' technology. Figure 3 indicates that 56% of respondents placed their organisations in the familiarisation and utilisation categories at the beginning of the project. However, only one organisation was felt to be in the familiarisation stage after the project (having begun at unawareness), with 61% placed in integration (3) or reorientation (4), and a further 15% in the evolution (5) category. Again, 13% of respondents did not select a 'before project' stage.

Examining the shifts identified by respondents, the largest category was the same as for trainees – organisations moving from utilisation to integration (2-3; 32%). However, the difference between this and other groups was much greater than was the case with trainees. The utilisation to integration group was almost three times as large as the next largest group – utilisation to reorientation (2-4; 12%), followed by familiarisation to integration (1-3; 10%). In general, the shifts were less dramatic than was the case for trainees, only 7% of respondents felt their organisations had moved from one of the

lower categories all the way to evolution. Again, respondents were keen to emphasise the variation in engagement and take-up of ICT across their organisation:

Evolution is the right category. However, the beauty of the uses of ICT is in knowing when the 'traditional' methods are balanced with the creative use of ICT and both work together. (SCITT)

This varies considerably between individuals/ phases/subjects. Some tutors are at the evolution stage, other still at familiarisation (one or two extreme cases still at 'unawareness'!). (HEI)

This variation appeared to be related both to the organisational contexts in which tutors and trainers were operating and to the technologies that were being implemented. They led to

project leaders experiencing difficulties in aligning individuals' and organisations' needs. This is discussed in detail in the following section on how impact was achieved.

Asked to assess the extent to which the TDA project had been key to improvement, 53% of respondents stated the TDA project had been 'highly significant' in relation to the improvements they had made and a further 37% thought it had been 'significant'. No respondents thought the project had been insignificant and only 10% were not sure.

Variations in impact by technology and type of provider

There were no major differences between types of provider. Extreme shifts in use were less
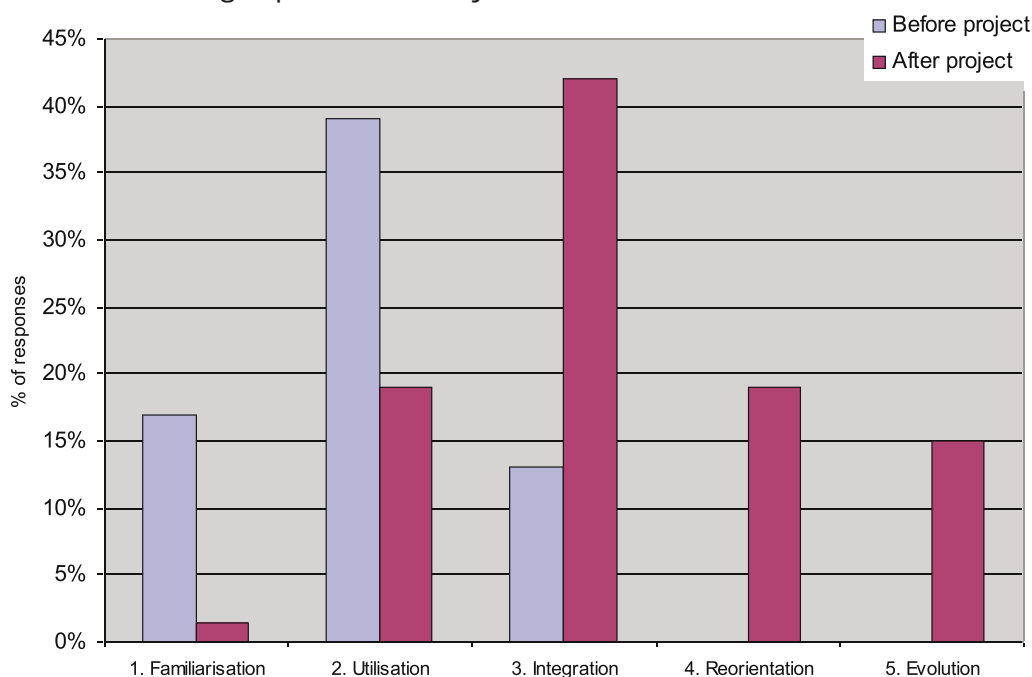

Figure 3. Organisation's use of ICT

common than had been the case with trainees and tended to be associated with SCITTs. Only one respondent reported a shift from unawareness to evolution (stage 0 to 5) and another reported their organisation moving from familiarisation to evolution (1-5); both came from SCITTs. In addition, two respondents, from a SCITT and an EBITT, reported an overall movement from utilisation to evolution (2-5). All of these larger shifts were associated with laptops/tablets and IWB projects.

Summary: What does this say about the projects' impact on technology use?

- The overall shift for individuals and organisations was from utilisation to integration.

- The most dramatic shifts in use by both trainees and organisations were associated with projects that focused particularly on laptops, and on IWBs. These were more common in SCITTs than in other types of provider.

- Trainees involved in projects progressed more in their overall ICT use than did organisations as a whole. This is indicative of problems in transferring practice and taking projects to scale across organisations.

1.2. Impacts on trainees' knowledge and practice

The survey looked at the impact of projects on trainees' knowledge about the technology and on changes to their practice. As might be expected, positive responses about impact clustered around increased awareness and confidence in using the project ICT *(see Figure 4)*. 91% of respondents agreed or strongly agreed that awareness had increased and 97% agreed or strongly agreed that trainees' confidence had increased.

Overall, respondents felt that impacts on trainees had been faster and deeper than on trainers: 'I think that trainees have been quicker to see the benefits and adopt practices than

their tutors' (HEI). There appeared to have been a number of reasons for this, notably the status of the technology in question, which is discussed in the next section. Again, impact was seen as in part dependent on the schools in which trainees were placed, both in terms of the ICT available in them and of their cultural attitudes and expectations with regard to its use:

The experimentation with different approaches to teaching depends on the resources available in the school, the open-mindedness of the departments in which trainees are placed and the colleagues with whom our student-teachers did their placements. There was variability in the outcomes because these are context-dependent. (HEI)
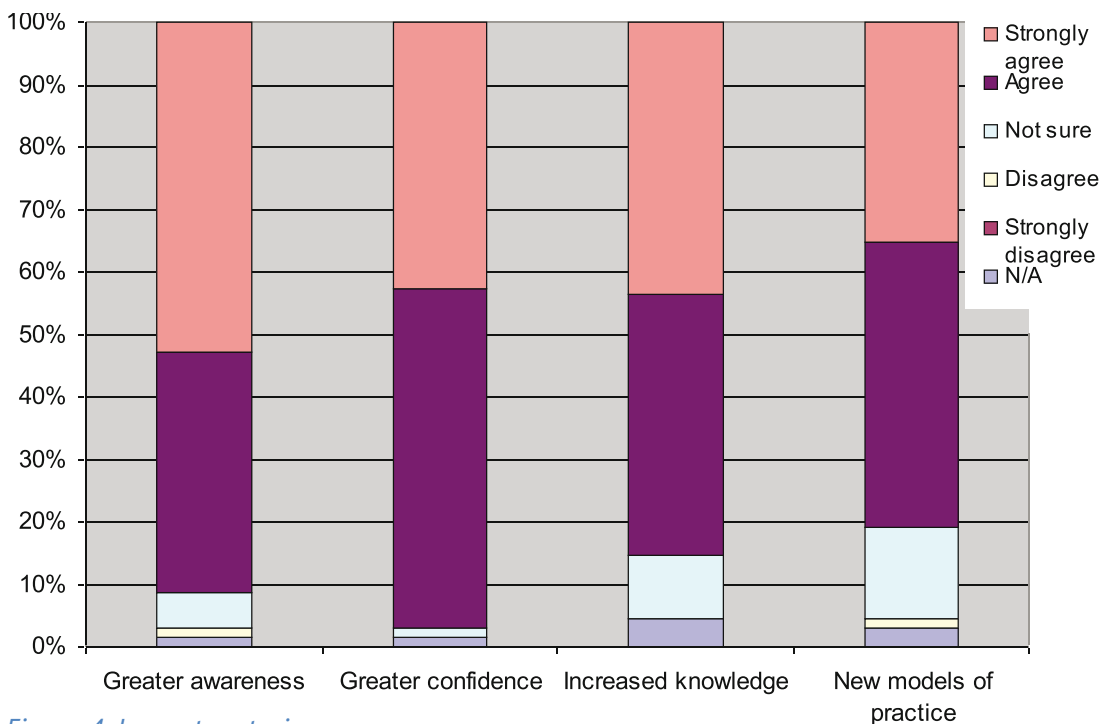

Figure 4. Impact on trainees

Respondents also stressed the diverse and highly differentiated needs and skills of trainees at the beginning of their training, which affected the impact achieved by projects:

Although the evidence that I have indicates a very positive move overall, it is still important to remember that individual trainees' progress in this area is very strongly influenced by their starting point. We have enjoyed recruiting cohorts over previous years where the level of ICT literacy has increased incrementally each year. Having said that, we still recruit individuals whose personal ICT literacy is limited at the start of the course and so, inevitably, their progress curve has a lower gradient than some of their peers. (SCITT)

Variations in impact by technology and type of provider

A project's ability to meet trainees' needs and to support them in adopting new teaching approaches in the classroom was affected differentially by trainees having very different starting points and by the degree to which the schools in which they were placed could offer a supportive context. While, overall, 82% reported that trainees had the opportunity to experience new models of classroom practice involving the use of ICT, this figure fell to only 58% in EBITTs, with 33% remaining unsure. This raises questions about how some providers gave trainees access to new models of practice which came from a range of sources, primarily trainers and school-based colleagues. Similarly while, overall, 64% of respondents stated that impacts had been made in all the four areas illustrated in Figure 4, within this figure there

was considerable variation between types of provider with 82% of SCITTs reporting impact in all four areas but only 42% of EBITTs.

In terms of the technology focus, 78% of respondents identified projects involving the use of laptops or tablets as having had significant impact. After this, came IWBs (44%) and subject-specific software (42%), although almost all of these projects also involved laptops/tablets as having significant impact. Projects focused on innovative work with ICT attracted 31% of responses, followed by video-conferencing and video capture (22%).

High-impact projects involved slightly higher numbers of staff than other projects. The mean number of trainees involved in them was 138, along with 11 trainers and 14 school-based mentors or tutors.

Summary: What does this say about the projects' impact on trainees' knowledge and practice?

- Impacts on trainees varied considerably and depended on a range of factors, notably the culture of placement schools and trainees' prior familiarisation with a technology.

- Overall impacts on trainees appeared to be less strong in EBITTs, particularly in relation to them having the opportunity to experience new models of teaching using the technology.

- Projects involving large numbers of staff were more likely to report higher levels

of impact on trainees.

- An organisation's overall capacity for change was more important than its relative size in determining the impact funded projects had at different levels, from the individual to the organisation as a whole.

1.3. Impacts on trainers' knowledge and practice

The survey asked respondents about their project's impact on their own knowledge and practice and also that of the other staff (including school-based tutors and mentors) working directly with trainees.

Taking impact on respondents first, *Figure 5* indicates that, as in the case of trainees, they

were positive about the project having increased their awareness (85%) and confidence (89%) in using ICT – these responses were fairly evenly spread among different types of provider. 84% were positive that they had increased their knowledge of how to use the project ICT for teaching and learning and 82% were positive about modelling new methods of classroom practice. However, there was less evidence that the technology had an impact on the content of teaching; only 54% of respondents said it had and 42% of respondents did not address this area at all.

In terms of impact on other staff there was a similar direction of travel with no strong disagreements with any of the statements
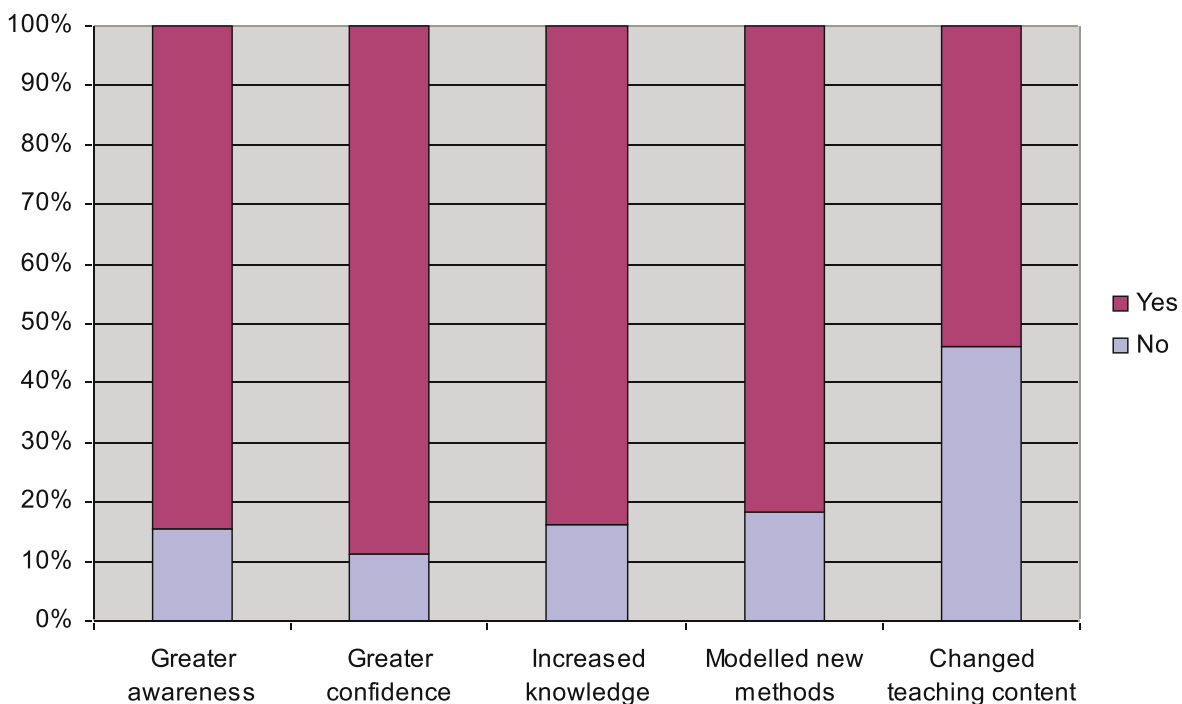

Figure 5. Impact on respondents

about impact in the questionnaire *(Figure 6)*. In fact, the most positive responses clustered around an issue not explored with trainees: improvement in the quality of ITT which attracted 91% 'agree' or 'strongly agree' responses. There were no significant differences between types of provider.

Responses related to trainers and mentors exhibit some significant differences in comparison with other groups. Unlike trainees and respondents, awareness of ICT was felt to have increased more than confidence in using it, which may reflect the limited reach of some projects in terms of impact on certain trainers and mentors. Open responses indicated a considerable amount of variation of impact across staff:

As already said, this project did not impact on all teaching staff. Each project tended to develop a different group. Overall a fair number have used the technology of one of the projects but to say this has had a significant impact on their practice would be an ambitious claim. I'd need to do further research to find out. (HEI)

It should be emphasised though that other open responses indicated profound impact on certain groups of trainees and mentors:

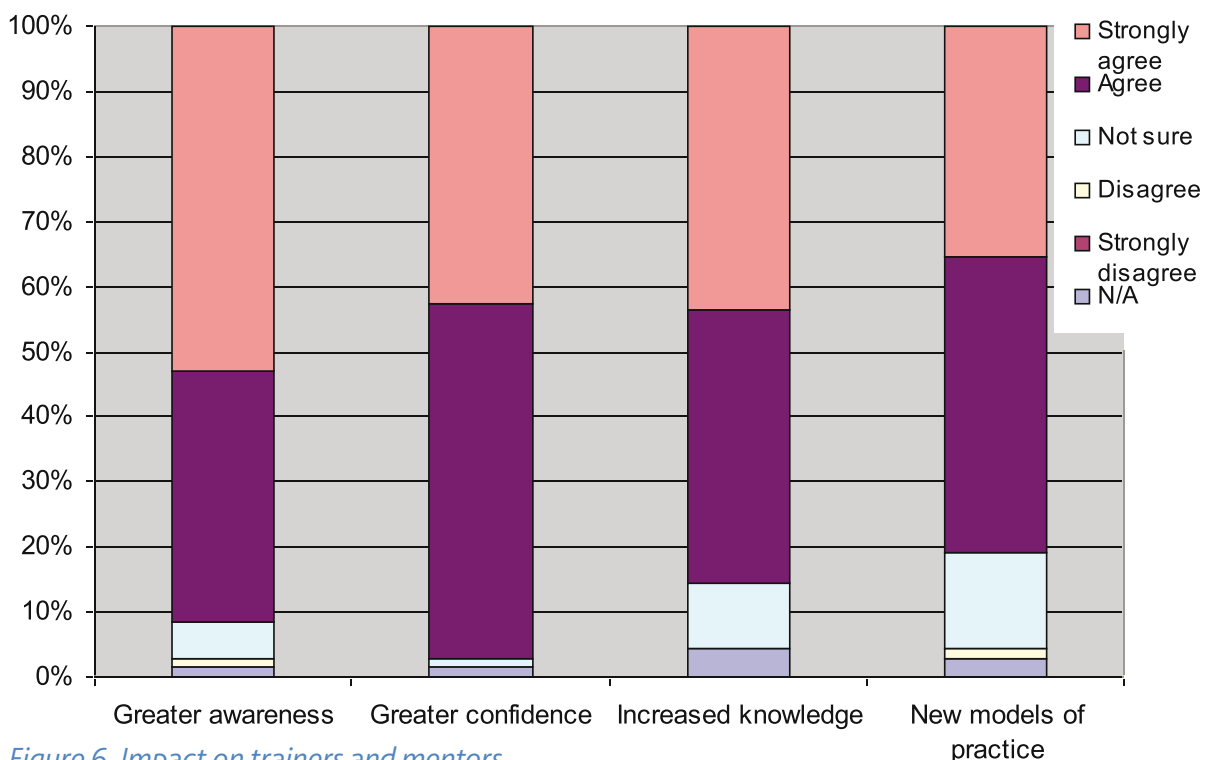*This particular project covered a variety of subjects and teaching methods and, particularly,*

Figure 6. Impact on trainers and mentors

has enthused trainees and tutors alike to explore other aspects of the creative use of ICT. (SCITT)

The use of online video and (later) online tasks which can be used by mentors to inform their practice has been a major benefit. This has led to changes in the way we train mentors and keep them informed. We are hoping to develop the online resources further should further funding become available. (HEI)

Whereas respondents tended to regard variations in impact on trainees as arising from differences in their familiarity with technology and school contexts, in the case of other staff they associated them with reluctance to engage with ICT.

Variations in impact by technology and type of provider

Again there were some significant differences in the impact achieved by different types of providers. Although 69% of respondents agreed that knowledge had increased (56% in SCITTs) and 66% agreed that they had been able to model new models of practice, this masked considerable variations with 81% of responses from SCITTs agreeing compared to only 45% of those from EBITTs (55% were not sure).

The use of video and other multimedia approaches appears to have represented a fast and effective 'hook' with which providers won over tutors, trainees and mentors. ICT-led enhancements to existing systems that staff had to use were similarly effective, for example in making trainees' lesson plans available to trainers through a

virtual learning environment (VLE).

Again, of the 50% of projects which were said to have achieved impact across all four of the areas illustrated in Figure 6, 28 (82%) focused on the use of laptops and tablet PCs. Sixteen of them were IWB projects (of which 15 overlapped with laptops) and a further 16 were subject-specific software projects (of which 14 overlapped with laptops).

The staffing levels of those projects which claimed high levels of impact on staff were also higher than in other projects, with a similar ratio to those which reported an impact on trainees across all four areas. These projects had mean figures of 150 trainees, 12 trainers and 16 school-based mentors or trainers.

Summary: What does this say about the projects' impact on trainers' knowledge and practice?

- Projects still had to place considerable emphasis upon raising trainers' awareness of ICT use before developing their confidence in using it.

- Variations in the impact on trainers were more likely to be described in terms of resistance to change than associated with differences in prior engagement with a technology or contextual factors.

- Projects involving large numbers of staff were more likely to report higher levels of impact on trainers.

- Certain technologies, such as the use of

video and other forms of multimedia, appear to have generated greater initial take-up by tutors, trainers and mentors.

1.4. Impact on schools and pupils

School impacts
Impact on schools was mainly discussed in terms of changing cultures through sharing practice, and promoting innovation and experimentation. As projects could supply only limited evidence of impact in schools it should be noted that it is impossible to establish the degree to which some of this impact remained merely aspirational.

Changing cultures by sharing practice
As discussed in Section 2, there was some evidence of schools operating as moderating factors on trainees, effectively slowing down changes to their practice. Although technical issues such as technological incompatibility or broken equipment were relatively common, it was the willingness of schools to accommodate new approaches that appeared to be the key factor. Where trainees were able to share new ideas and approaches with peers and school colleagues they appeared to be able not only to develop their own practice but also to change schools' views of ICT:

The trainees were mostly extremely enthusiastic about the new technologies, but their impact on the schools initially depended on how clued up the schools were. Where the schools were receptive the trainees did exceptionally good work, and they were instrumental in raising the profile of ICT in nearly all the schools they worked in. (SCITT)

This led in some cases to a reversal of traditional training hierarchies, allowing trainees to share innovative practice and influence the culture of their placement schools:

The confidence and competence of trainees in using IWB technology, developed through use of their laptops helped those tutors/teachers working with trainees who lacked confidence in using ICT and in some cases the teachers certainly learnt from the trainees' practice (SCITT)

There is some evidence that the practices of trainees were shared innovatively with established colleagues and mentors and that this has had a 'cascade' effect. (EBITT)

As well as raising the profile of ICT, TDA funding also enabled some training providers and schools to raise standards and expectations:

Raising expectations re ICT use for management and for teaching. It is now the norm to communicate and present info electronically on this course. This is a culture change. (EBITT)

Promoting innovation and experimentation
Schools were more likely to accommodate technological innovations and experimentation when they could see their learning potential and see how they could be integrated into existing pedagogical approaches. It must be emphasised, however, that trainees often felt they had limited scope for experimentation because they were restricted by assessment requirements and the need to fit in with their placement schools' way of working. Some providers adopted flexible

approaches and a range of technologies in order to address these restrictions:

I believe we have benefited through focusing on a flexible innovation diffusion model. This has meant using funding to purchase a wide range of technologies rather than large investments in single technologies. We have used the funding as "innovation seed" funding which has impacted and enthused staff beyond those named in the project. (HEI)

Impacts on pupils

Overall there were few responses about impact on pupils (39) and those respondents who did answer this question often stated that it was too early to judge impact on pupils or did not differentiate clearly between impact on trainees and impact on pupils in schools.

Effective strategies for generating impact on pupils included consciously introducing technologies which built on pupils' digital habits and behaviours outside school. This approach was effective even in the case of quite young children, for example by using digital cameras and video:

Each trainee had a camera, a video camera SD card and card reader. Having the tools available to them at any time allowed for 'play' and developing ideas and confidence beyond the lecture room, giving confidence to try out ideas in a classroom that may not use ICT. In some cases use of cameras by children and students was innovative and allowed them to engage in 21st century literacies. Having an ICT tool

enables early engagement with ICT in the classroom and recognition that ICT was more than computers. (SCITT)

As well as drawing on pupils' digital habits, technologies that supported pupils' desire to express their views or discuss their learning were also associated with significant impact:

Students have been able to use ICT to support a project on Assessment for Learning through voice recorders, videos, digital images and use of microphones in conjunction with laptops. (HEI)

Summary: What does this say about the projects' impact on pupils and schools knowledge?

- There was limited evidence of impact upon pupils and schools which suggests that much of this work remains aspirational.

- Approaches that appeared effective drew on pupils' digital habits and supported their desire to voice their views.

- There was only limited evidence of trainees being able to act as significant change agents in schools.

- School contexts and cultures were described more frequently as moderating factors than as enablers with regard to supporting ICT innovation.

- Schools' willingness to accommodate new approaches was a key factor. Where trainees were able to share new ideas and approaches with peers and school

colleagues, they appeared to be able not only to develop their own practice but also to change schools' views of ICT.

2. How were these impacts achieved?

In this section of the report, we address how the impact upon trainees, trainers and organisations described in the previous section came about. The analysis of project documentation, questionnaire survey and case studies highlighted both generic and specific factors that contributed to achieving this impact. Factors were characterised as specific when they were deemed particularly important with regard to the introduction of a specific piece of ICT, achievement of a particular impact, or were relevant to only some types of contexts. Our overall analysis indicated that it was the interplay between groups of generic factors that determined the nature and scope of any impact. We therefore believe it is important not to set out our findings simply as a list of mediating factors that support the implementation of ICT that has an impact, or of moderating factors that hinder its impact. Rather we present here three groups of generic factors whose interaction needs to be understood by those leading any ICT innovation within ITT.

An implementation model for ICT in ITT

We identified three generic groups of factors whose interaction determined the success of any implementation. These were:

- The status of the technology being introduced

- Building and focusing the capacity for innovation

- The degree of alignment between the innovation and the needs and concerns of individuals and teams.

In each of the case studies the relative importance of these groups of factors varied considerably but each was needed, like a series of gears, to drive forward the innovation. If any of these three gears failed to mesh or was 'under geared' and could not exert sufficient pressure on the other two areas, then the innovation was likely to stall and not make a substantive impact.

2.1. The status of the technology being introduced

It is neither surprising nor original to observe that the nature of the technology being introduced affected the likelihood that its
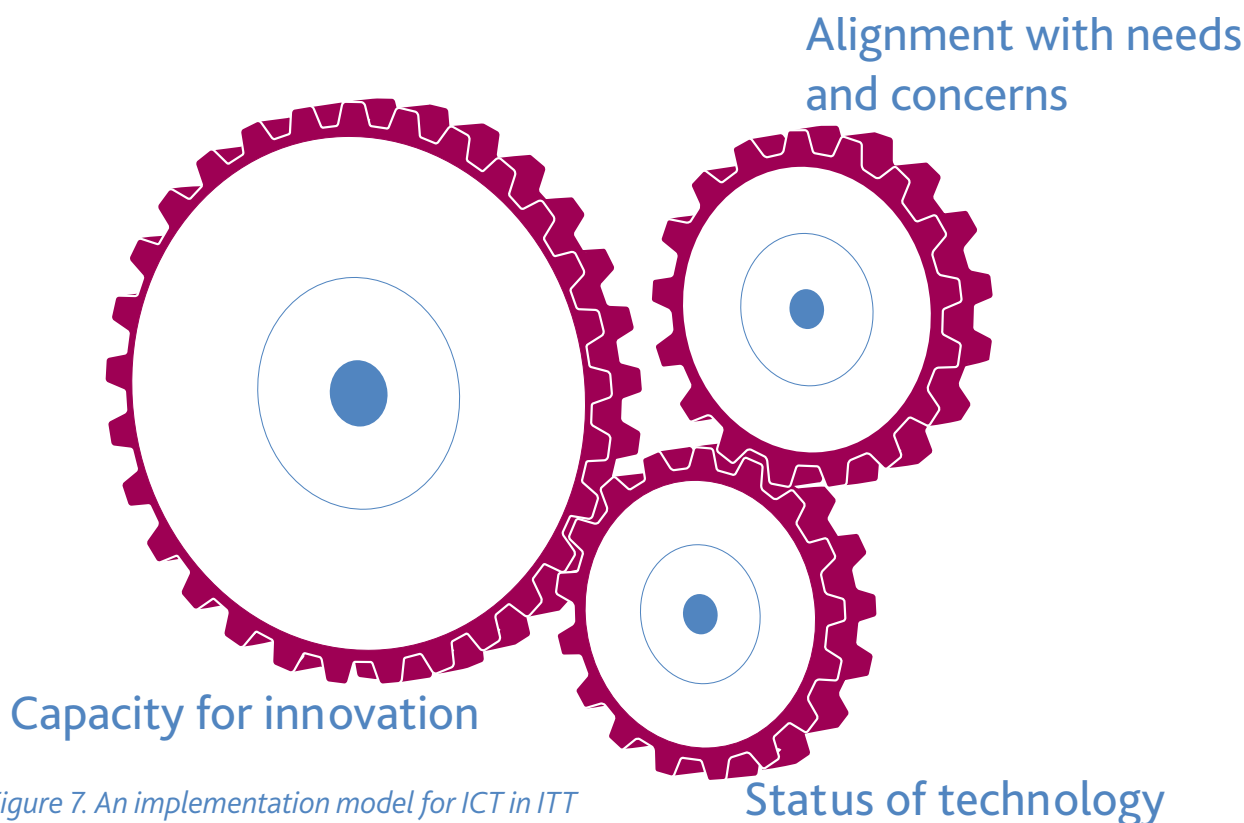

Alignment with needs and concerns

Capacity for innovation

Status of technology

Figure 7. An implementation model for ICT in ITT

implementation would be successful, and therefore its chances of achieving the desired impact. This would certainly be the case if we restricted our observations to the **technical** status of the technology being introduced. In this evaluation, we go on to consider the role played by the **social** and **learning** status of a technology.

The **technical** status of a technology refers to its ease of use; its degree of compatibility with other forms of technology and existing ICT infrastructure; and its overall reliability and functionality. In the survey and case studies, instances of technical issues preventing an effective implementation were relatively few. This reflected the extent to which staff and teams with existing expertise in ICT training and support were involved in leading projects. Where technical issues were encountered, the extent to which they hampered implementation reflected the degree to which they were central to the stated project aims and the extent of technical support on offer within the organisation. Technical issues tended to be identified only when they acted as moderating factors, limiting the extent of implementation, rather than being directly cited as mediating factors, that supported the implementation process.

It's about being willing and working with people. Yes, there are technical issues but I think if you find people willing then things can be overcome.

The **social** status of a technology relates to its popular image and the extent to which it has been taken up in wider society. This determines the initial acceptability of a technology and the degree to which individuals are familiar with it, factors which were often key in the initiation stages of a project. Certain technologies vary widely in their levels of take up across different professional and social groups. Different groups can hold very divergent perspectives on whether certain technologies are 'good' or 'bad', useful or not useful innovations. Such differences in perceived social status are particularly important in the implementation of ubiquitous technologies, rather than those with more specialised educational uses such as visualisers. For example, the differentiated engagement of teachers and pupils with the video facilities of their mobile phones, and the moral panics that have surrounded the sharing of 'happy slapping' incidents amongst pupils, indicate how the problematic status of a particular technology can limit its uptake in schools. In contrast, a positive perception could make a piece of technology 'aspirant' in the mind of potential users and so encourage uptake. The evidence from this evaluation was that trainees have increasingly come to regard having a laptop and using it in their everyday activities as part of their emergent professional identity.

It's like having a pen nowadays, anyone who does any sort of work really especially those in a managerial position (like teaching) where you are paid to get the job done rather than for the hours that you work, needs a laptop to do it. Otherwise you're stuck to one place and one desk. (EBITT trainee)

Selecting technology which was 'aspirant' or perceived positively was particularly important

in engaging individuals who were generally reluctant to engage with new technologies:

This is the way it's going. Having a taste of how these learning platforms can work – it's quite good for us

Individuals' existing levels of familiarity had an impact on the degree of development and training required during any implementation. Although some providers have had VLEs for some time, it is hard to imagine, for example, that the current rapid take-up and enhanced use of VLEs by students and staff within ITT would have been possible without the widespread use of instant messaging and social networking sites that make the uploading and downloading of documents and participation in online discussion forums commonplace. The informal learning about ICT that individuals had acquired outside their professional lives changed the ways they used ubiquitous technologies in educational settings. However, one of the biggest issues faced by those implementing ICT in ITT programmes was the difference in levels of familiarity with certain technologies that they encountered across and between groups. This was not insurmountable. 75% of survey respondents felt that familiarity had been an issue (less so in SCITTs). In the majority of cases (60%) this had been resolved by the project team and only affected project outcomes in 12% of projects. Similar outcomes were also apparent in relation to levels of confidence with project technologies:

We train in four subjects MFL, D&T, SC and ICT. It is clear that the ICT trainees have accepted and welcomed new technologies more so than other subject areas. We have tried to overcome this potential barrier through the use of an ICT "buddy scheme.

Such barriers affected the ease with which certain functionalities, within say a VLE, were taken up and the degree of support and preparation trainers and trainees required. The following trainee, who did not utilise any social networking sites and worked with a school mentor and tutor who were also unfamiliar with VLEs, is a good example:

My mentor doesn't look at them [Individual training plans via VLE] very often and he doesn't look at them independently – he'll only look at them with me basically. My tutor looks at them periodically – he dips into them.

They found the task of engaging with the VLE a 'chore' and 'tiresome'. However, for trainees who engaged with Facebook and other networking sites, regularly posting materials on the VLE was synonymous with increased tutor/trainee interaction:

My university tutor reads them every week without fail and if I'm late uploading it she's like 'is everything ok?'

The fact that you know that someone is going to look at it almost immediately really focuses you on it. I'd normally do it later but because I know my tutor's going to check and my mentor's going to check I make sure it's up there. If I put something up I normally get feedback by the following day.

The **learning** status of a particular technology relates to its perceived utility and applicability to individuals' own learning and its potential to support the learning of others. The learning status of a technology is based on an individual's views of what constitutes 'learning' and effective teaching and learning processes. These views have to be attuned to the potential, or affordances, of each specific technology to support learning. For trainers the starting point for this process of attunement was their initial perception of how well a certain technology 'fitted' with their existing pedagogical approach and curricula, before going on to a consideration of how it might support changes and improvements. Here, one teacher trainer describes initial misgivings around the potential of video conferencing because its perceived passivity clashed with views of effective learning and teaching.

As primary scientists we are very aware that science should be as hands-on and interactive as possible. We weren't sure if we could use [videoconferencing] to enhance or enrich sessions and we weren't going to use it if it wasn't. My first impression knowing nothing about it was that you got a person quite distant at the end of a screen and a whole classroom of excited kids.' (Initial teacher trainer)

51% of survey respondents (69% of SCITT respondents) felt that trainers had been willing to change established, successful pedagogies without explicit support and another 30% felt that any such problems were overcome by the project team, a figure which was lower in SCITTs

but higher in HEIs. This would appear to reflect trainers' relative openness to new, technology-led approaches. Only 2% of respondents (all in SCITTs) felt the issue was a deal breaker or required higher level intervention.

Those innovating within ICT had to cope with widely different perceptions of the learning potential of certain of the technologies presented to them. For example, trainees' closeness to pupils often gave them insights into their digital habits and a strong recognition of the role these played in their out of school learning. This helped many in recognising the role that technology could play in supporting their pupils' learning and how, by using this technology, they could improve the relevance of their curriculum to pupils.

I try out new software like a storyboarding programme that lets kids upload their own pictures and text so it would be great for teaching poetry or war poetry or Shakespeare. You can narrate and put in text boxes and then the kids can show their creations to each other.

At the same time many trainees felt frustrated by others' failure to recognise the leaning potential of new technologies which undermined their attempts to develop it in their own practice.

At first I thought it was going to be fantastic but then I just found myself duplicating everything, one copy for the VLE then one for mentor and assessor. My trainer prefers to have a hard copy that he can mark - he's not completely computer literate.

At the moment I'm doing everything twice for those who like paper and for those who can look at it online.

Responding to the status of the technology

Successful innovations were characterised by the following:

- movement from consideration of the technical status of the technology in isolation to recognition of the role played by its social and learning status

- selection of technology which had a high social status

- challenging negative perceptions of a specific technology

- recognition of how differential prior engagement with a technology affects initial take-up and overall training and support needs

- utilisation of those with in-depth understanding of the learning potential of technologies to model to others.

2.2. Capacity for innovation

An ITT organisation's capacity for innovation depends on the levels of skills and understanding of individual staff and trainees, the dispositions and norms in teams and groups and the commitment of leaders across the organisation. During a project it was important to have sufficient capacity that was either present at each of these levels or could be developed during the lifetime of the project, and that it

was effectively co-ordinated across all three levels.

Individual Capacity

Developing individual skills and understanding within the relatively short time span of these projects and within the busy schedules of trainers, trainees and school-based mentors was highly problematic. Despite this, only 3% of survey respondents (none in EBITTs but most of the ICT enthusiasts) felt that time available for the project had been an irresolvable issue. 77% of respondents (50% of SCITTs) felt that it had been an issue, although 40% of them had been able to overcome the problem within the project team, a figure that was higher in HEIs (55%). 33% of respondents stated that project outcomes had been affected (58% in EBITTs).

Three broad strategies were adopted to overcome this problem. Firstly, as has already been discussed, a technology was chosen which was already relatively familiar to at least some of the key stakeholders involved. This allowed them to provide a great deal of informal learning and support to those who were less familiar with it..

Doing it for a number of years [developing a VLE], it's interesting how over the last couple of years it has taken off a lot more. Part of it is the Facebook culture - a lot of trainees now are used to doing that sort of online interaction. They'll get on to the VLE and talk to their friends about going out and they'll upload a few lesson plans and moan about a certain class as well on the VLE.

Secondly, support was focused on relatively small numbers of individuals, creating a group

of internal 'experts' who could then mentor and coach others informally through the use of the technology.

We have been flexible in project implementation seeking to apply the technology purchased in ways which encourage innovation and risk taking. We have targeted technology at "champions" - highly enthusiastic and visible staff and students. In many ways the outcomes have exceeded our expectations in terms of generating enthusiasm for the use of technology and attitudes to technological innovation. These longer term benefits may well provide greater returns than those originally specified for the component parts of the programme. (HEI)

Finally, the technology was embedded within existing practices and made available in the range of contexts within which trainees would develop their practice. This allowed its use to be modelled and encouraged those with limited experience to experiment with it.

The funding for IWBs allowed us to place them in participating schools as well as the course centre. Using them with trainees kickstarted their use in the borough and within 18 months all borough schools were equipped with them. Our trainees provided the training for teachers in the use of the boards in schools. Trainees quickly realised the potential of the IWBs and they used them in a variety of innovative ways, often with generic software. (SCITT)

The fact that opportunities to develop individual capacities were quite restricted meant that a great deal of reliance had to be placed upon existing expertise and the enthusiasm of key individuals. This did not appear to be a moderating factor when there had been the opportunity to build up such capacity, even if with only a few trainers, or even trainees, before the start of the project. Support from 'knowledgeable others' was a key success factor for 34% of survey respondents (45% of EBITTs) with nearly half of all the project teams being able to overcome support issues themselves. This left project outcomes affected by a lack of support in only 8% of cases. However, higher level intervention had had to be sought in 11% of cases (21% of SCITTs) and 2% of respondents found lack of support a 'deal breaker' which stopped an innovation.

Team Capacity

Innovations in ICT were often based in specific teams. In HEI providers, these were often those responsible for ICT across the curriculum, but other subject and non-subject based teams were represented. Similarly, in SCITTs and EBITTs management teams and groups of trainers and mentors were involved. Development of these teams' capacity was based on establishing key dispositions and norms that supported innovation. Some of these team norms and dispositions were particularly significant.

- ### Willingness to experiment and take risks
  These were important dispositions in terms of allowing individuals to explore, and so attune themselves to, the potential of the technology to support learning. Modelling

risk-taking behaviour and discussing how it impacted upon them and their practice encouraged others to take up the technology.

I thought, "This was a huge can of worms we've just opened. This is actually quite special. Where else can we go with this? We could hook up with universities across the world. How big could we make this in size of people sitting in front of this?" With that in mind, we are now looking at a project to put VC in a 325 seat auditorium.

The survey responses indicated that trainees' willingness to take risks was not a highly problematic area. Around two thirds of respondents, slightly more in HEIs and slightly fewer in EBITTs, stated that it was not an issue at all. Where there had been a problem around risk-taking, project teams had largely been able to resolve them themselves, consequently project outcomes were only affected in 9% of cases, although this figure rose to 17% in EBITTs.

- **An openness around sharing practice and insights amongst the team**
Developing supportive norms around sharing practice was not just a question of encouraging staff 'to share' but also setting up processes and structures to facilitate sharing. For example, the lead developer of one VLE adopted a strategy of giving staff 'enrolment keys' that controlled access to the materials they had developed and placed in their areas on the VLE. They

could then decide which colleagues they would give these keys to. This gave them a degree of control and security over what they disclosed while at the same time creating an expectation that they would eventually share their emergent practice.

Successful projects also encouraged trainees to share their materials with other trainees. The technology itself was used to facilitate this process:

We gave each other permissions. Everyone was saying. "Where are you putting your individual training programme?" We negotiated over the network so we could look at each other's plans. It's been great.

- **Developing an evaluative culture amongst the team**
A commitment to evaluating amongst the project team helped them discipline the implementation and ensure that it achieved its intended impacts.

It is just as informative to find out what militates against successful use as what supports it. Why not ask the pupils?

Relatively few respondents (51%) chose to answer the survey questions on evaluating their project. This reflected the findings of the content analysis of provider documentation which revealed that providers offeredrelatively little detail as to how they were evaluating impact and auditing their provision. Some of the open responses to the questionnaire indicated

that trainers wanted more specific advice on how to evaluate ICT innovations.

I would have found it immensely helpful to have the measurement tools available in this questionnaire at the start of the project to build in an evaluation tool more aligned to what is needed in this (project).

One approach to evaluation was to develop an enquiry-based approach to these projects and this had the added advantage that it increased the status of the innovation as it fed individuals' and organisations' broader aspirations to develop their research profiles.

Organisational Capacity

At the organisational level, sufficient leadership capacity and commitment from leadership at all levels were key in driving forward a successful innovation. Where additional leadership capacity was required it was often provided by those outside formal leadership and management structures.

We have a growing core of staff and are soon to formally approve the role of ICT Champions in all of our departments though they have existed in part in both Primary and Secondary Education for a little while.

In a number of cases the leadership of technicians and support staff was key to the rollout of a new technology.

Project leaders recognised the need for additional leadership capacity at various points where they felt their innovation was most likely to falter. Particularly problematic was the point at which it transferred into the school setting, and here many aspired for their trainees to take on a leadership role, acting as 'champions' or even 'ambassadors'.

One of the things that makes student teachers popular in schools is often that they're able to work the technology. And I think there's a possibility there to really build on that and make the students into ICT ambassadors and have the mentors support them in that.

Although such aspirations were common there was little evidence that trainees were offered specific training or support to take on these roles. Beyond the odd exceptional case, the impact of trainees upon their placement schools was relatively minor and was generally constrained by a school's existing approach to innovation within ICT and its failure to recognise the additional capacity for change represented by trainees.

Building and focusing the capacity for innovation

Successful innovations were characterised by the following:

- recognition of individuals' existing understanding of the technology and encouragement for them to use this to support others

- sequential and focused support for a limited number of individuals who then mentored others

- integration of opportunities to model different uses of the technologies

throughout existing provision and across the different contexts in which trainees operate

- encouraging teams to experiment and take risks

- building an ethos of openness and shared learning

- developing structures and process to support sharing between project participants

- providing discipline through enquiry and evaluation

- offering leadership support at all levels and creating additional leadership capacity.

2.3. Aligning the needs and concerns of individuals and teams

This group of factors appeared to have the greatest influence on whether an implementation was successful or not. Specifically, it was those factors which were key to the mobilisation of individuals and teams that appeared most important. Mobilising individuals and teams was more than a question of engineering some form of engagement with a technology. The technology being implemented and how it was designed to be used had to meet a significant number of individuals' needs and add substantively to the quality of the core activities of key groups and teams.

In order to generate this mobilisation the technology being implemented had to:

- meet individuals' key needs

- add to the core activities of groups and teams

- be congruent with the overall strategic aims of the organisations involved

- be underpinned by core educational values.

If the implementation of the technology was designed to fulfil these requirements, it helped to ensure that the innovation not only achieved a basic level of participation, but also developed a critical mass of committed individuals with the possibility of its becoming an established way working in the ITT organisation.

Major stumbling blocks occurred when projects were designed to meet needs which were already being met quite adequately by non-technological means or when the benefits of using a technology were so marginal that only those disposed to this type of 'solution' became engaged. Mobilising the efforts of individuals and the resources of teams meant designing an implementation process around clearly defined needs and specific enhancements to key activities and interactions between trainers and trainees.

In terms of meeting trainees' needs, the potential of a technology to help them manage, connect and transfer their learning across different places and at various times was particularly powerful. Various technologies offered this potential across a range of contexts and different forms of learning, from their formal learning as ITT students through to their experiential learning on school placement and their self-directed learning at home.

In some cases, a single innovation might target different sets of needs and attempt to enhance very different processes. In order to illustrate how this targeting might affected the implementation of a specific technology it is useful to compare the introduction of VLEs in two very different contexts - one an HEI provider in the North and the other an EBITT in the South West.

Two contrasting approaches to introducing a VLE

The HEI-based VLE contained a wide range of teaching and course materials, but, although online discussions and communities had started, at this point e-portfolios and e-assessment were not highly developed areas. This VLE's development had been driven forward by different subject teams of trainers who had adopted an increasingly blended approach to learning over a number of years. The HEI-based VLE had developed to the stage where it was being used across the university not just by the School of Education. In contrast, the EBITT-based VLE was at an earlier stage of its development and was based around trainees using it to develop their teaching portfolios. In this case, it was the trainees' engagement with the VLE which was the driving force, based on the institution's requirement to monitor their progress.

In the EBITT-based VLE the main trainee need being met was assistance with the task of creating the portfolio of evidence that demonstrated achievement of the QTS standards:

In the first term (not using VLE) I was working really hard but didn't really know what I was working towards, there was just so much stuff to do I was really confused the whole time, I found it really stressful. Now (with the VLE) it's helped me to sort out just what my priorities are and when to do things. Obtaining all 33 of those QTS standards is such a massive thing that I wasn't sure how to break it down.

[The QTS standards evidence base] is absolutely the most important part of the VLE.

The construction of a section of VLE that helped trainees organise their evidence drove forward its use not only because it was easier to use than a traditional hard copy portfolio: 'It's much more accessible on the VLE than in the booklet because it breaks it down more', but also because it meant that trainees could coordinate the support of tutors and school-based mentors.

It helps me to stay organised, I can mark my own progress and my mentor can check on that.

I got an email asking me about my progress as it wasn't recorded in the VLE, why I hadn't been using the VLE. So now my tutor and I use the VLE for our tutorials and email conversations.

This VLE therefore also met the individual needs of trainers, who were operating over quite large distances, by supporting them to monitor the progress of students remotely. They could assess

and validate the evidence trainees uploaded on to the VLE and provide feedback and support at a distance.

I can get anything I need from that one website. I can input stuff on to my trainees' file. I can contact people. I can download forms. I can check trainees' evidence and where they are at.

In contrast, the HEI-based VLE was not so focused on meeting a generally held trainee need. Even though it could potentially support a wide range of students as a basic repository of teaching materials, in this closely-knit HEI institution most of their needs were already being met by supportive teams of trainers and by other trainees. However, it did make a significant difference to key groups of trainees whose needs differed significantly to the majority. For example, mature students with families discussed how the loan of a laptop and access to the VLE from home allowed them to work on course materials during the evening when their children had gone to bed. Similarly, when trainees were on placement and no longer able to draw directly on trainers and other trainees, the VLE provided access to alternative forms of support. This might be an email contact with trainers who would direct them to materials on the VLE or an online discussion with other trainees on placement about the issues they were facing.

The main driver for tutors' engagement in the HEI VLE was based on their commitment to their subject areas. Tutors in subject areas who were given relatively little time on a crowded timetable needed to make a wide range of materials and resources accessible to students. When it was used in their sessions, tutors found the VLE could expand the amount of time trainees engaged with their subject area.

When I started it was very much documents, links, useful resources. Over the last two years I've been able to extend and it really is a much more integral part of my module for geography. Last week I gave them a web-based task that was linked to the VLE but also an environmental quiz on there to get them thinking about things and then actually making use of that for the session as well and feeding into things I want them to do outside of the session.

In both instances the introduction of a VLE would not have been as successful if, in addition to meeting individuals' specific needs, it had not also made significant improvements to the core activities of teams of trainers and groups of students. In the EBITT, the VLE was seen as means of turning the creation of a portfolio from an administrative task to a truly educational one:

The process of articulating your thoughts is part of the reflection process - an essential part of learning. The VLE foregrounds articulation and reflection at the expense of churning out paper. It says that this task or that task has purpose.

It makes you more reflective, and organises you because you can put evidence on after an assessment and it's there.

For tutors in the HEI institution the VLE allowed them to develop their pedagogy in ways that they perceived as being more closely aligned

with how trainees' learned. In doing so they believed they increased the inclusivity and accessibility of their courses.

I can introduce things through a podcast so that I can point them to resources and they can be opening them up as I am talking about them. It's new to me how these students work - it very different to how I studied. I'm trying to make these things more accessible for them. (HEI trainee)

As the more advanced innovation, the HEI-based VLE had reached a critical mass of engagement over time by a gradual process of 'osmosis' and by demonstrating how it could meet a range of needs and enhance different activities:

We did it a bit like osmosis. We didn't force it on people but in our own minds we were clear we were not going to say, "Do this because it's good for you", but rather, "This is what it can do for you" and then people came to us.

Aligning with the needs and concerns of individuals and teams

Successful innovations were characterised by the following:

- they had to meet a range of individuals' specific needs

- in the context in which they were operating, they had to meet these needs more easily, or at less cost, than other existing or potential approaches

- they needed to add substantively to the quality of the core activities of key teams

of trainers and groups of trainees

- they had to have a degree of congruence with the overall strategic aims of the ITT organisation.

3. Going beyond numbers to deep and lasting change

In determining the sustainability of any projects arising from an externally funded programme there are three broad sets of factors that need to be considered:

- The nature of the funding programme itself, particularly how its funds are allocated and administered

- The internal conditions of the organisation that are in receipt of funding

- The external contexts in which these organisations operate, from policy frameworks to broad social and economic influences.

In this section of the report we consider the internal conditions of the various ITT organisations by using a framework drawn from Coburn's (2003) analysis of the key factors of successful large scale educational reform projects in the USA. This framework is based on assessing the extent to which the current set of projects achieved a broad scope of implementation, depth of impact and overall transfer of ownership.

Section 4 of the report considers the nature of the funding programme itself by reporting on previous project leaders' views as to how the TDA should allocate and administer any future ICT in ITT funding. Consideration of the broader contextual factors that are likely to affect the sustainability of current and future projects funded by the TDA lies outside of the remit of this particular evaluation.

Sustainability of current project – the conditions within ITT providers

The TDA-funded projects have had a considerable impact upon ITT providers of all types across the system with some 216 different providers successfully applying for TDA funding from this programme over its last three years. But what is the likelihood that the vast range of projects that have been funded will cumulatively lead to a profound impact upon ITT providers and their trainees? To answer this question we have adopted Coburn's (2003) model for scaling up educational initiatives. This model highlights that for projects to become sustainable sources of change they need to have achieved a broad scope, or spread, of implementation that is reaching a critical mass of people. They also need to achieve a certain depth of change, exemplified by individual participants having to move from superficial engagement to changes in their practice. Finally, they need to transfer the ownership of the project from its initial advocates and leaders to a much broader number of staff so that it becomes an established way of working.

3.1 Scope of implementation

The scope of an innovation is important in terms of sustainability in that it provides an indication of whether the innovation has reached a critical mass of engagement that would support it becoming an established way of working.

The analysis of both project documentation and the questionnaire survey looked at the total number of individuals who had been part of TDA-funded projects. The content analysis showed that in one year of funding (2006-07) providers reported some 13,222 trainees being directly involved in, or beneficiaries of, these projects. 56% of projects involved fewer than 100 trainees while 13% involved more than 500. The highest number of participants was 904 and the mean number of trainees involved was 189.

Overall, 1,515 schools were said to have been directly involved in projects in that one year. However, 23% of providers did not involve schools at all while one stated that it had involved 300. 69% of providers involved fewer than 20 schools.

The questionnaire survey indicated a similar range of engagement. *Figure 8* indicates respondents' approximations of the number of people directly involved in the projects they saw as having had the most impact in their organisation. It shows, as expected, that trainees were the single largest category of person involved, although the scale of HEIs' operations significantly increased the average: 203 trainees were involved per HEI provider whereas the figure was 43 for EBITTs and 48
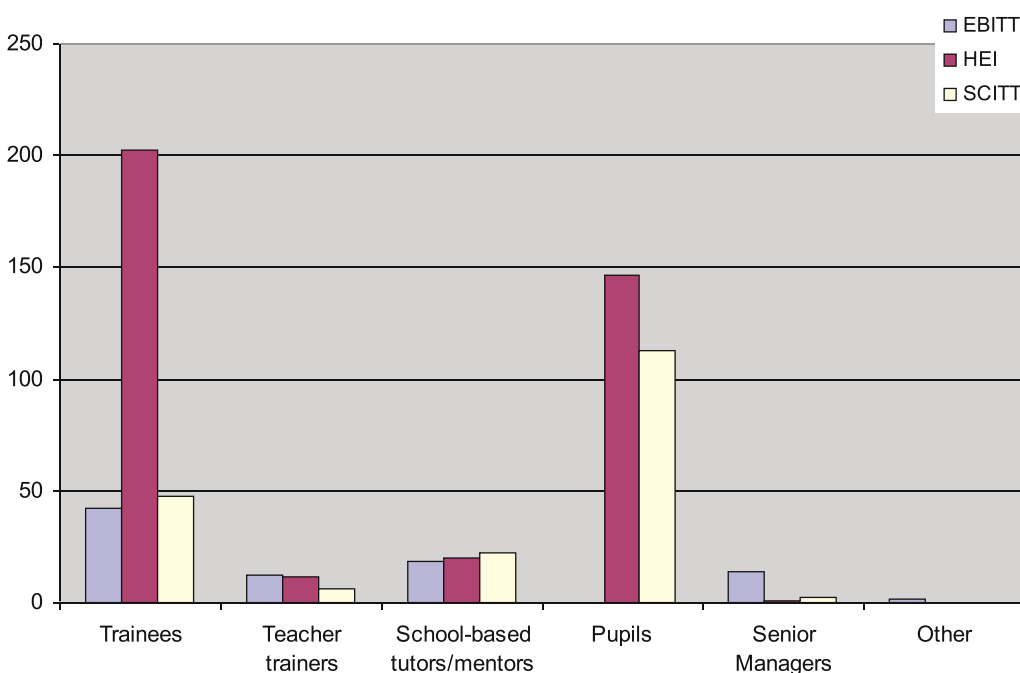

Figure 8. Average numbers of people directly involved in the project by type of provider

for SCITTs. However, there was much less variation in the numbers for teacher trainers or school-based tutors/mentors. Senior managers were more involved in EBITTs (14 on average as opposed to between one and two in the other provider types). The average number of pupils directly involved in SCITTs (113) outnumbered trainees in SCITTS by a factor of almost 2.5 and came close to the average numbers of pupils claimed by HEIs (146). This may suggest that the project focus or evaluation of project outcomes often did not have a direct impact on schools or pupils. However, it should also be noted that the majority of respondents (57%) did not answer this question.

This raises two significant issues with regard to scope of involvement. Firstly, the apparent size difference between HEIs and other providers needs to be related to broader differences between them. HEIs are generally larger organisations in terms of trainee and trainer numbers. This means that within a specific project or year of funding, involvement in an HEI would more probably be restricted to a specific team or group of trainers rather than stretching across the organisation as a whole, whereas, within smaller EBITTS and SCITTS, there appeared to be more likelihood of achieving broader engagement by trainers, and particularly by senior staff in schools, in a specific project. In terms of building a critical mass of engagement, HEI providers faced greater challenges in a programme based on annual funding rounds because of the greater numbers of staff with whom they needed to engage. This was in part ameliorated by the fact that HEIs

were more likely than EBITTs or SCITTs to have received year on year funding and by many of them being able to adopt a more strategic approach to ICT innovation as they could draw upon a backdrop of broader investment in ICT in their organisations.

Secondly, in terms of trainee engagement, the analysis of project evaluations revealed that in HEIs there were often two very different categories of trainee 'involvement' in projects. Sustained engagement amongst a small number of trainees, who developed in-depth knowledge and use of a specific piece of technology, was often contrasted with a very light touch involvement of larger numbers of trainees who might be shown a product from the project or use a piece of technology for a very limited part of a teaching session. Again, HEIs benefitted from having trainees who were involved in training over more extended periods than was the case in EBITTS and SCITTs. In the longer term this could allow for the development of a critical mass. For example, in one case study students in the third year of their courses held online discussions via their VLE with students on placement in their second year.

Different types of ITT provider therefore faced very different issues around reaching a critical mass of engagement by trainers and trainees. In general, the evidence broadly supports the assertion that this has been achieved in many instances. The one area where projects were less effective was in engaging a critical mass of staff in schools who could support trainees in transferring new practices into classrooms.

3.2. Depth of engagement

If the discussion of scope was concerned with the broad numbers of people involved in projects, this analysis focuses on the extent to which they became engaged. It is an assessment of the extent to which individuals moved on from basic participation and reached a point at which involvement in the project affected their practice. Section 1 of this report raised two issues of particular relevance to sustainability.

Variation

The first of these is the variation between trainers and trainees in the take-up and application to practice of various technologies. In part these might be described in terms of a 'digital divide' (in the broadest sense) between the two groups, brought about by general patterns of take-up of Web 2.0 technologies based on age and socio-economic status. What the evaluation has also highlighted is the role played by existing pedagogies in establishing the learning status of a technology and affecting the degree to which it is incorporated into an individual's teaching repertoire. A great deal of the variation in take-up can be accounted for by the fact that trainers and mentors were less likely to change or adapt their pedagogy in order to accommodate or make best use of 'new' technologies. Trainees, who were less likely to have developed well-defined pedagogical approaches at this point in their careers, were not only more likely to engage with 'new' technologies but also to change their pedagogies to incorporate their use as part of their 'habitual pedagogy':

You're far better off starting small scale, getting people used to using things for a particular purpose and making that their habitual pedagogy (Trainer discussing engaging other staff)

Such variations in take-up and accommodation accounted in part for the fact that the technologies most likely to move individuals and organisations from basic utilisation to integration and reorientation - that is to achieve a more profound impact on practice - were those that we might classify as 'professionally ubiquitous.' In the case of the TDA-funded projects this would be technologies such as laptops and IWBs, which are common enough in both ITT providers and schools to allow them to be regarded as ubiquitous. In part, a key impact of TDA funding has been to help make certain technologies professionally ubiquitous.

We had this critical mass of kit suddenly which made using ICT in teaching sessions a possibility when you weren't in an ICT room. (Trainer)

With technologies that were less professionally ubiquitous, such as VLEs and video-conferencing, in order to reach similar depth of impact it was necessary to support their development over time, target groups of trainers and trainees and design implementation processes with the needs of trainees and trainers in mind. Providers using less ubiquitous technology (although in many cases they used both) wanted more of the funding to be spent upon professional development and training:

I would prefer to support people in learning to use more of the functionality and understanding more

about how to use it in teaching and learning than to have more money to buy more [kit].

ICT use in schools

The second issue that particularly affected the depth of engagement of trainees was the nature and status of ICT use in schools. Here the issue was that for certain ITT providers it was relatively difficult to engineer widespread coordination of ICT developments with schools. This affected trainees in a number of ways. For HEI students it affected their ability to transfer what they learned at an ITT institution into their school placements. Even relatively minor differences in technology and software could undermine the confidence of the less assured trainees in attempting to use technology within the classroom. For EBITT and SCITT trainees, the issue was the coordination of advice and support around the use of technology from school-based mentors and tutors, and also from their peers. For both sets of trainees the overarching issue was the connection and coordination of their learning across different contexts and the support on offer from a range of individuals. Where the technology supported this connectivity and coordination, for example in the use of video conferencing in one of the case studies, the mutual learning and support that was engendered greatly increased the depth of engagement and transfer of practice into, and out of, the classroom.

If you are watching something which is live, we could say, "Did you notice what happened when?" Or "What I really found interesting was when the teacher did this". It was the idea it was live and we

didn't quite know what was going to happen. It allowed us to draw on real examples.

We decided we wanted to get full advantage of the fact that we could communicate with these children who were remote and off-site. Time with kids is at a premium within the ITT timetable.

Ensuring an adequate depth of engagement with a technology so that it resulted in changes to practice was problematic as soon as projects moved beyond the more professionally ubiquitous technologies. If a particular technology did not support trainees in connecting and coordinating their learning across different contexts or in accessing and managing the available external support, it was far less likely to result in changes to practice.

3.3. Transfer of ownership

The final strand in achieving sustainable change is to progress from a situation where an innovation is perceived as a project which is 'done' by some people 'to others' to a way of working in which it is widely owned in an organisation, so it becomes part of 'the way we do things round here'. This shift in thinking is unlikely to be achieved within a single year. Therefore, with regard to TDA funding, it raises the issue of how organisations dealt with 'projects' after their completion and how they approach the annual funding applications that have been the norm up until now.

To understand the approaches adopted by ITT providers we need to set them within the overall development of the TDA ICT programme. The content analysis of project documentation

highlighted that providers initially focused on using funding to 'even out' development and overcoming fragmentation. This was important in that schools in some areas were ahead of ITT providers' practice and in others they were lagging behind.

ITT providers, particularly those working with a wide range of trainees who entered training from a variety of points, initially set out to ensure equity and a consistent offer in terms of the currency and appropriateness of the hardware and software available to trainees. These providers were more concerned with improving comparability among partners (particularly in SCITTs) than with consciously monitoring and developing their e-maturity. In Year 3 in particular, providers tended to focus on the provision of equipment as an end in itself and this was related to rather vague claims about improving facilities.

In the development of a more strategic approach to ICT use in ITT the VLE has been critical for a number of providers. By Year 5 of the programme many providers referred to the impact of having access to more up to date and higher quality learning materials and to how VLEs allowed such materials to be shared more extensively and in new ways. The development of some form of VLE was key for all types of providers in that it allowed them to meet the needs of a wide range of stakeholders, including trainees, trainers and school-based mentors.

It was the catalyst - it enabled us to make a start in getting things moving […] I think you could say in retrospect that we needed to do the earlier spadework in getting the VLE up and running in order to meaningfully use the kit that came several years later.

For HEI providers, in a number of instances, the development of a VLE, and particularly making it available to trainees and mentors dispersed across schools, has been the crunch point between the specific needs of teacher trainees and the overall ICT strategy for their institution. Respondents in HEI providers highlighted this in their responses to the questionnaire and in the case studies.

There has been some difficulty in the University recognising the differences in ITT and therefore the different needs of staff and students. The team has invested many hours of time to find solutions and in so doing bypass obstacles within the university system.

IT Services in HEIs tend to be conservative in nature, particularly where working with external partners.

In fact it would appear that in a number of cases TDA funding was used to create alternative ICT infrastructures and to support developments that were not catered for by central ICT systems within HEIs. A lack of alignment between the perceived needs of ICT trainers and trainees and others working and learning within HEIs has created a barrier to the transfer of TDA-funded developments from projects to accepted norms of working. However, this has been counterbalanced by the development in ITT departments of teams that focus on the use of ICT.

The existence within the school of a team tasked with enhancing learning and teaching with technology is facilitating more sustainable approaches to using technology beyond the initial funded phase

For some providers, where there was no widely shared strategic vision for the development of ICT within their organisation, the availability of research grants alongside equipment grants in some funding rounds was supportive. This strategy not only raised the profile, particularly in HEIs concerned with levels of research activity amongst ITT trainers, but also supported broader reflections on and evaluations of the potential of ICT. In some cases this resulted in a more integrated development and research approach, for example through introducing e-portfolios and supporting technology while simultaneously evaluating their impact. In the Year 5 applications there was more emphasis on discussing the broader impact on trainees of greater ICT integration and use, such as developing evidence-based and reflective practice, rather than simply discussing the uptake of new technologies or specific subject based gains. Similarly, more consideration was given in Year 5 to impact in schools, not only by trainees but also in terms of greater pupil engagement. This was achieved by extending e-portfolio use to pupils in schools, using ICT for enrichment activities and even engaging pupils as co-researchers.

In general ITT providers have found the TDA's flexibility around the foci of their projects extremely helpful. It helped ensure that project aims were congruent with their organisation's larger priorities, its existing level of e-maturity and its overall stage of development. Being more established and more stable organisations, HEIs have generally been able to take a more strategic approach to ICT development, but many have experienced difficulties in realising this because of internal clashes with the broader development of ICT within their organisation. This has affected their ability to establish accepted ways of working. On the other hand SCITTs and EBITTS, which in many cases were still establishing themselves during the TDA programme, had to adopt more instrumental and reactive approaches to the development of ICT. They were helped by the fact that ICT use was part of their modus operandi from the beginning. However, their heavy reliance on school-based developments made it difficult to ensure trainee entitlement, beyond a minimal access to hardware and software.

4. Future direction/implications for the TDA

This section looks at the impact of TDA funding, its future direction and sustainability and suggestions for the future format and focus of ICT in ITT projects.

4.1. Funding

TDA funding had a significant impact on the ability of initial teacher training organisations to engage with ICT. Results from the survey highlight this with 22% of respondents stating that TDA funding was at least ten times greater than their normal allocation for ICT funding and a further 25% stating that it was twice or five times as big as the overall ICT in ITT budget. Furthermore, when asked whether TDA funding was significant at an organisational level, 13% of respondents reported that it was at least ten times greater than the overall organisational budget for this area.

Individual differences were largely dependent on the nature and size of the organisation. For SCITTs in particular, TDA-funded projects generally outstripped their ICT budget within ITT by a factor of two or more and were almost equally important with regard to their overall ICT development budgets. In 26% of SCITTs TDA funding was at least ten times greater than their overall ICT budget. In EBITTs, TDA funding tended to represent a lower proportion of spending on ICT but this may in part be explained by the relatively small number of EBITT respondents. The picture in HEIs was somewhat different again, in part reflecting differences in organisational size as well as levels of investment in ICT. TDA funding was substantial compared to ITT budgets but far less so in comparison to overall ICT investment. This raises the issue, particularly in HEIs, as to the extent to which TDA-funded projects need to be aligned with current ICT investment strategies or treated as innovative and cutting edge, in which case emphasis would need to be placed on dissemination and knowledge transfer. Even in larger organisations, TDA funding was regarded as significant in developing ICT in ITT.

Our total provision is reliant upon the TDA training grant which also has to finance staffing costs to a large extent. Therefore the TDA ICT funding is vital in securing ICT improvement. (EBITT)

We have always tried to match fund the TDA ICT funding and this commitment will need to develop as the partnership is constantly reviewing and planning the most appropriate and creative use of all resources. (EBITT)

Normal budget for 18 PGCE secondary trainees is £350 - the TDA funding enables new things to happen. (HEI)

Equally, the range of projects eligible for funding from the TDA was significant in allowing local needs and conditions to drive project development.

Figure 9 illustrates the range of high impact project foci selected by survey respondents:

The range of eligible projects not only led to increased use of conventional ICT solutions but also allowed for innovation to occur, and in some cases to trainees and trainers reconceptualising their notions of what ICT in education might mean. For example, the use of digital cameras was effective in engaging trainees, trainers and pupils in an Early Years setting. This ubiquitous technology was immediately effective once legitimised for school use and made trainees realise that digital ICT was more than 'just computers'.

Responses to the survey question about the most significant aspects of all funded projects were extremely varied, as the following examples demonstrate:

The equipment, webcams, digital cameras, roamers, bee-bots and subject-specific software has given the trainee teachers hands on, practical experience. Their evaluations of lectures have improved, indicating success. (SCITT)

Looking at the kinds of software which can be used to support Literacy (word processors, presentation software, desk top publishing, blogs, wikis, email, texting, digital photography, photo sharing sites like Flickr, podcasts) Mathematics (spreadsheets), Science (spreadsheets, data bases, digital microscopes, sensors) Geography (Google maps, Google Earth, Flickr as a tool for geo-tagging photographs) etc (HEI)

Design, development and deployment of an e-portfolio to support trainee teachers to collate evidence to be used for the standards folder and to assist them in becoming reflective practitioners (HEI)
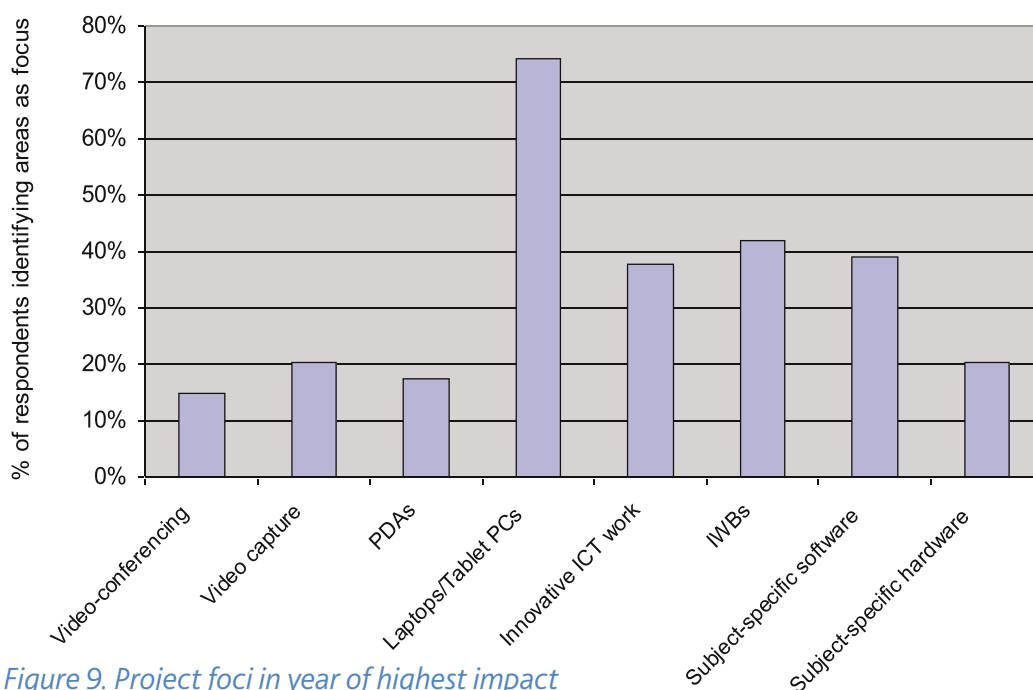

Figure 9. Project foci in year of highest impact

Starting a VLE which has had a major impact on the way we work. It has improved communication, helped the trainees with resources and we are still exploring ways in which it improves what we do. (EBITT)

As the case studies illustrate, there was significant variation across providers in the VLE projects with regard to focus and impact. The purposes of implementation ranged from organisational development, subject matter exchange, developing communities of practice, e-portfolio functions and monitoring trainee performance.

The importance of continuing funding was also highlighted with initial funding for laptops being seen as a fundamental building block for later developments.

The purchase through matched funding of laptops for all our trainees over the last four years or so has raised IT capability and expectations in our trainees and trainers enormously. This has been an excellent resource. But, the £5000 to help us get on to a VLE has had an enormous effect on our work. We could not have taken on the VLE without the previous laptop work and experience. The VLE itself is changing our training, monitoring and assessment procedures enormously and encouraging a more useful dialogue in the collection of evidence and in the trainees mapping their own progress. (EBITT)

4.2. Sustainability of funding

Although the funded projects have had sustained impact, there are questions about how sustainable this level of funding is and which types of organisations and projects should receive funding. The high degree of TDA funding as a proportion of organisations' budgets merits further enquiry. The question arises as to whether the TDA should fund large scale adoptions of technology or focus on smaller scale innovative uses within robust impact evaluation and knowledge transfer strategies. Furthermore, as technologies become ubiquitous and pervasive, it will perhaps be more important to focus on pedagogic impacts afforded by technology rather than the provision of technology itself which can be financed through mechanisms like laptop loan schemes:

Ubiquitous mobile technology is new and is completely different from older, static and less personal information technologies such as desktop computers and TVs. It is a quantitatively different phenomenon and the statistics are commonplace: MP3 downloads outnumber CD sales, camera phones outnumber cameras, smartphones outnumber laptops, mobile phone ownership is reaching saturation and the British send over a billion text messages a week. (Traxler, 2008)

There was also a perceived need to establish more robust evaluation frameworks for projects, so that the impact of interventions could be tracked at the levels of the organisation, trainers, trainees, schools and pupils. This would then inform the funding of future projects and enable stakeholders to make judgements as to the sustainability of interventions with regard to factors of depth, scope and transfer of ownership, as described in Section 3.

Survey respondents gave their views on a number of possible strategies aimed to ensure that future projects funded by TDA led to sustainable improvement in practice and ITT quality. Areas to which respondents answered positively and negatively are illustrated in *Figures 10 and 11.*
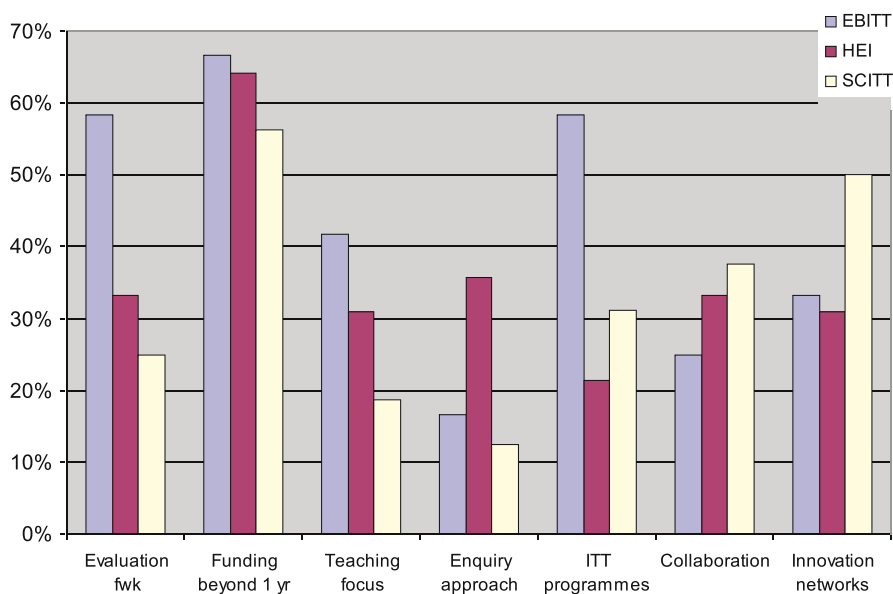

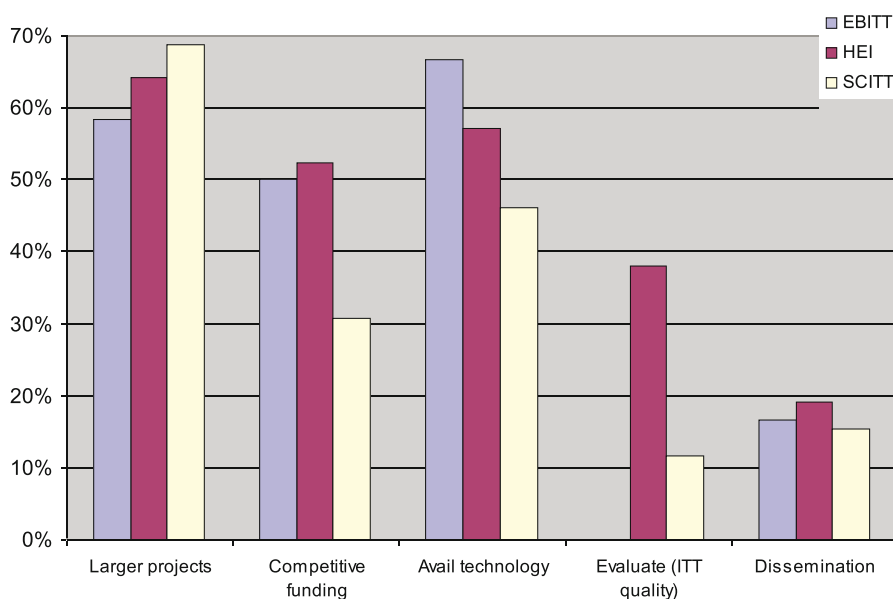*Figure 10. Sustainability: 'Definitely' responses*

Figure 11. Sustainability: 'I think that's a bad idea' responses

53

These responses can be summarised as follows:

In support of choice and localised solutions (Small is good)

The areas with most negative responses illustrate to some extent that respondents were reluctant to give up funding that could be used for local priorities and might be regarded as an entitlement. Respondents were largely not in favour of an 'open competitive process', fewer larger projects or restrictions on technological choices. The latter point is illustrated by the response to the idea of limiting projects to available technology. This should not be read as an aversion to using ubiquitous technology as there is evidence to the contrary amongst the range of project foci but as a reaction to a restriction on choice. This illustrates that the recipients of funding like the degree of control and choice afforded them by the TDA ICT in ITT programme. This does not, however, mean that the respondents want carte blanche to do whatever they wish.

Proving their worth through an iterative process of evaluation (Show and tell)

Respondents also recognised that projects would need to be more focused, reflecting a desire to prove their worth and effectiveness: 36% and 53% respectively definitely or possibly agreed that all projects should have impact evaluation built into the project design. Support was also strong for linking project outcomes to trainee performance, improving ITT programmes rather than ICT performance and adopting an enquiry-based approach.

Communication and dissemination (Connected is better)

Respondents also came out in favour of increased collaboration and a percentage of funding being used to communicate project outcomes. This involved such strategies as project dissemination events and collaborative wikis, the grouping of providers carrying out similar projects into clusters for innovation networks and knowledge transfer and continuing professional development activities. Equally, an enquiry based approach, if adopted, should lead to greater dissemination through practice-based research projects.

Long rather than short term (Focusing on sustainability)

Respondents were also in favour of projects being allowed to continue from year to year. It would be good for TDA or future funders to adopt this idea provided that further funding is subject to evidence of impact and that future targets are established within the first phase of a project. This would require closer monitoring and more in depth and robust reporting.

5. Implications and recommendations

The following recommendations summarise some of the implications from this evaluation for future funding of ICT projects in ITT. They are divided into implications and recommendations for the TDA, providers and schools.

5.1 Implications and recommendations for the TDA
Funding and scale

- The size of TDA funding needs to be considered not in relation to the receiving organisation's overall budget and comparative size but following assessment of its existing capacity and the issues it faces in achieving impact on trainers, trainees and schools.

- The TDA will need to consider to what extent the programme sets out to meet the following aims:

  - Inclusion - trying to ensure equality of access to professionally ubiquitous technology for all trainees in their ITT. This would require funding to be focused on a limited number of technologies but across both ITT organisations and schools.

  - Embedding - focusing on the development of pedagogies among trainees so they can make full use of the affordances of ubiquitous technologies. This would require funding to be targeted at the professional development of trainers, tutors and mentors in particular.

  - Innovation - supporting the introduction and uptake of new and emergent technologies so their full learning potential is modelled to those in the ITT system. This would require more focus upon the dissemination of innovative and leading edge practice.

Flexibility and discipline

- The funding model needs to allow a high degree of flexibility for ITT providers so that it can meet local needs, match providers' current stage of ICT use and promote development.

- Funding projects flexibly and responsively needs to balanced with a robust impact reporting framework that allows the costs of such reporting to be set against a longer project life cycle and the opportunity to focus on more strategic outcomes.

- Project impacts should be discussed at the levels of the ITT providers' organisation, trainers, trainees, schools and pupils. Project plans and associated budgets should reflect these different levels of impact.

Sustainability and going to scale

- Meeting specific localised needs is the key to sustaining projects but these needs should be identified by both those within the ITT organisations and those in schools if

problems in transferring practice into classrooms are to be tackled. Encouraging providers to building closer relationships with schools is the key to ensuring impact on pupils.

- More emphasis should to be placed on training school-based mentors to support trainees in using technology. This could be approached in a number of ways including: requiring that school-based mentors have a minimum level of competence in the use of ICT in the curriculum; supporting the training of mentors through these projects and supporting the broader professional development offer from HEI providers so that their M-level provision gives more consideration to ICT innovation and pedagogy.

- Current trainers in ITT organisations need to become more aware of the learning potential of key technologies and more confident in their use. Specific high leverage professional development approaches, such as mentoring and coaching, targeted at particular groups in ITT organisations, should be incorporated into future projects. Similarly, emphasis should be placed on the use of certain technologies, such as video and other multimedia approaches, which appeared to generate high levels of initial take-up by tutors, trainers and mentors.

5.2 Implications and recommendations for ITT providers

Institutional lag
In specific projects trainees were seen to be developing their use of ICT at a much faster rate than in the organisation as a whole. This particularly affected providers which only have trainees for short periods of time and find it more difficult to harness their capacity to innovate.

There are a number of recommendations here related to knowledge transfer and sustained change:

- specific teams of trainers should be involved in innovations so that sufficient individual and team capacity is built up during the project

- trainees' innovative practice should be captured before they complete their study, for example through contributing to a VLE

- innovative trainees should present to and share practice with subsequent cohorts

- trainees should be encouraged to develop 'fresh' pedagogical approaches in order to inform and renew training strategies.

Trainers
Trainers are often not aware of the learning potential of key technologies or confident in their use. The following actions are recommended to address this:

- high leverage professional development approaches, such as mentoring and coaching, should be targeted at trainers

- emphasis should be placed on the use of certain technologies, such as video and other multimedia approaches, which appear to generate high levels of take-up and enthusiasm among trainers and trainees

- providers should audit the digital habits of both trainees and trainers to ascertain the match or fit between current skill sets and those required by any ICT implementation. This would inform professional development and alert providers to the potential quick wins available through using certain technologies.

5.3 Implications and recommendations for ITT providers and schools

Further implications and recommendations for providers and schools have been addressed together to reflect the necessity for interdependent and joint approaches in order to achieve change.

Trainees for change

The relative lack of success of trainees in acting as change agents in schools was associated with unsupportive school cultures. There are a number of recommendations about supporting trainees and school based mentors:

- where possible, trainees should collaborate with each other on ICT projects while on placement in real or virtual teams

- school-based mentors should be supported and engaged through the wider professional development offer of ITT providers. For example, one organisation had developed a Master's module around ICT implementation

- school ICT co-ordinators should be more involved in supporting trainees

- opportunities should be created for trainees to share ideas and curriculum innovations in ICT with colleagues in school

- ICT projects should be developed jointly with schools in order that innovation can be shared and to ensure that both school and ITT organisation cultures are supportive of trainees.

EBITTs

Overall impact on trainees in EBITTs needs to be increased. Recommendations here are mainly related to offering access to a range of new models of teaching using technology:

- curriculum development projects should be initiated which use ubiquitous and easily adopted technologies, such as digital cameras, that allow trainees to experiment with ICT in schools with very different levels of ICT maturity

- greater emphasis should be placed on sharing practice between trainees, using readily available technology.

Professional status and identity

Technologies should be selected which have high social status for trainees and reflect and support their developing professional identity. It will be vital to ensure that technologies to which trainees are introduced at least match those which are available and in use in schools.

Engaging pupils

Providers and schools should be aware of the digital habits and skills of their pupils. ICT interventions should build on these skills to engage pupils and motivate them to voice their views and create their own content.

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