



# The **MIICE** project - initial report



## Measures of quality in learning with ICT



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## Summary

- 1 **MIICE** stands for **M**easurement of the **I**mpact of **I**CT on **C**hildren's **E**ducation. Eleven Scottish education authorities and 3 teacher education institutes are active as **MIICE** partners [Page 4 and pages 54 to 56]
- 2 **MIICE** grew out of case study work undertaken in preparation of the planning document *Scottish Schools: Using the Superhighways* (August 1998) and the lack of qualitative studies on the use of ICT in learning [Pages 5 and 6]
- 3 A series of 'measures of quality in the use of ICT for learning and teaching' was refined by the **MIICE** partners from an initial set of 12 outcomes associated with quality learning and the components of these outcomes. A total of 274 measures was drafted. The structure parallels that in *How Good Is Our School?* [Pages 7 and 8]
- 4 Partner EAs were asked to identify a representative cross-section of schools (primary, secondary and special) and a range of teachers within them to professionally validate the draft **MIICE** measures. Interviews with 242 teachers were completed between October 2000 and May 2001 [Pages 8 and 9]
- 5 There was widespread welcome among teachers interviewed for most of the draft **MIICE** measures of quality, not least because these were derived from within the profession rather than being imposed as a set of hurdles from central agencies [Pages 10 and 11 and 23 to 25]
- 6 **MIICE**'s initial aim has been to produce practical materials for schools, in the form of a toolbox of measures, which will help teachers and managers to plan for quality of learning when using ICT, and to include the creative as well as the routine use of ICT tools [Page 12 and pages 27 to 52]
- 7 The focus of **MIICE** embodies both pragmatic outcomes and an academic research approach involving interpretation of the statistics derived from interviews with a representative cross-section of Scottish teachers. The results have produced an interesting array of responses which have implications for policy makers and practitioners in schools, EAs and in the Scottish education service as a whole [Pages 13 to 21]
- 8 The **MIICE** project has identified a number of consequent areas for further research by the partners [Page 22]

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## Introduction

**MIICE** stands for Measurement of the Impact of ICT on Children's Education. The mission is in the name

The **MIICE** partners usually pronounce it just like the plural of 'mouse'

**MIICE**'s aim is to contribute to the debate about the ends of more widespread use of ICT for learning and teaching. Use of ICT makes real demands - in money and time - on education authorities, schools, teachers and learners. Those involved need to be clear about the **qualitative** benefits which they can anticipate

The aim of the project is to articulate what 'better' means when advocates of the use of ICT argue that it has the potential to be an exciting and rich learning medium and to lead to "better" learning

The resulting material - on paper and through the use of supporting evidence (case studies, including video and other multimedia material) on the Web - will help managers, teachers, parents and children themselves to generate appropriate success criteria for their use of ICT for the planning of learning in its broadest sense

As such, the aims of **MIICE** go beyond those of the various curriculum planning guidelines, which are aiming to provide useful and practicable progressions in the learning of ICT skills or in the use of ICT skills to improve the learning of other elements of the established curriculum between the ages of 5 and 18

In this it reflects one of the conclusions of *The Use of ICT in Learning and*

*Teaching*, published by the Scottish Executive Education Department in October 2000 that "our thinking on the nature of the curriculum itself is likely to be challenged as the use of ICT becomes more effective and widespread"

The partners who have contributed to the first stages of the **MIICE** project are as follows

### Education authorities

Aberdeen City Council  
Angus Council  
Dundee City Council  
East Ayrshire Council  
East Lothian Council  
City of Edinburgh Council  
Falkirk Council  
Highland Council  
Midlothian Council  
North Lanarkshire Council  
Perth and Kinross Council

### Teacher education institutions

University of Edinburgh: Moray House Campus (the lead agency)  
Northern College: Aberdeen Campus  
University of Strathclyde: Jordanhill Campus

The 11 education authority partners represent a third of Scotland's 32 education authorities and 40% of the population of Scotland. They also represent a cross-section of urban/rural/mixed, remote/central belt, east/west, large/medium/small EAs

Tony van der Kuyl  
April 2001

## Background

Between 1987 and 1999 Tony van der Kuyl of the University of Edinburgh's Faculty of Education (formerly Moray House Institute of Education) was a consultant to the Scottish Office and then Scottish Executive and, with a small team of national officers, was involved with the implementation of what, since early 1998, has been called the National Grid for Learning in Scotland

In the course of visits to every education authority in Scotland to review their reactions to *Connecting the Learning Society: National Grid for Learning* (October 1997) and reviewing international research on educational ICT, in preparation of the planning document *Scottish Schools: Using the Superhighways* (August 1998), he became convinced of the need for qualitative studies on the use of ICT in learning. Although there were multiple (small) studies of the development of ICT skills, there was no overwhelming evidence about the improved quality of learning which appropriate and effective use of ICT can bring. Qualitative studies of the impact and effective use of ICT on learning were not abundant and made it difficult for protagonists to progress beyond anecdotal evidence and their visceral beliefs in the value of ICT in learning

The Scottish Interactive Technology Centre, of which Tony van der Kuyl is director, decided - in the course of other commissions - to try to pull together some further evidence of the quality of learning through ICT

- to establish a corpus of qualitative evidence to go beyond both the

anecdotal and the quantitative

- to view ICT as part of the learning process and not a complete learning process by itself
- to articulate what 'better' means when advocates of the use of ICT argue that it has the potential to be a better, more exciting and rich learning medium
- to be clear about the anticipated benefits of using ICT
- to contribute to the debate about more widespread use of ICT for learning and teaching

The resulting case studies - based on a carefully refined selection of 16 schools from all over Scotland and from all sectors which gave a range of studies of effective practice - can be seen on

[http://sitc.education.ac.uk/case\\_studies](http://sitc.education.ac.uk/case_studies)

Each classroom case study is presented within the same overall design covering 3 interconnected contexts

- managers explaining ICT in the wider school setting
- teachers describing their classroom context
- learners discussing their learning

The case studies show what can be achieved in different circumstances, offering deeper understanding of the learning and teaching process

The **MIICE** project grew out of the attempt to identify a set of common learning outcomes resulting from the use of ICT for learning and teaching in these case studies. These 12 outcomes -

listed on the menu page of the SITC site  
- are not evident in every case study, but  
the outcomes were consistently in  
evidence across the age range, across  
different subjects and at different levels  
of learner attainment

- 1 Learner reflection
- 2 Skills development
- 3 Managing and manipulating digital information
- 4 Shared planning/Organisation
- 5 Investigatory learning
- 6 Shared learning
- 7 Motivation
- 8 Refinement of learner outcomes  
(subsequently subsumed within 1)
- 9 Enhancing learning outcomes
- 10 Self-esteem/confidence
- 11 Quality of outcomes
- 12 Procedural learning strategies  
(subsequently subsumed within 10)

While the first 8 relate directly to the  
development of learners' skills, insights  
and attitudes, outcomes 9 to 12 relate to  
the management of the learning process

## Developing the model

In March 2000, the **MIICE** project team generated a starter set of 'narrative' illustrations of good practice under a number of headings (what we termed components) for each of these 12 outcomes. These were based on the team's collective - and lengthy - experience in educational ICT and a range of familiar curricular documents, including the national guidelines on curriculum and assessment between the ages of 5 and 14 and the Higher Still initiative for those aged 16 and over

In the course of the Spring of 2000, the project attracted the interest of 10 Scottish education authorities and 2 more teacher education institutions. These were as listed above, except

- Aberdeenshire Council initially expressed interest, but subsequently withdrew from active involvement because of a change of personnel
- Falkirk Council was added in October 2000
- City of Edinburgh Council was added in May 2001 in the light of the need for validation from a wider range of secondary teachers (see below)

The **MIICE** project partners decided to follow the approach of the guidance being widely used for school self-evaluation in Scotland - *How Good Is Our School?* - with its 33 performance indicators, further refined into themes and illustrations. The **MIICE** structure has outcomes,

components and measures. After much discussion, the project partners decided to retain this parallel but separate nomenclature, because **MIICE** is a much finer grained analysis than the broad sweep of *How Good Is Our School?*

Like *How Good Is Our School?* **MIICE** articulated quality at level 2 (representing 'Fair' performance) and at level 4 (representing 'Very good' performance)

These draft narratives were circulated for reaction and from May to September, a series of meetings of **MIICE** partners refined the narratives into a 'grid' of draft measures of quality at levels 2 and 4

The general reactions to the publication of the summary of outcomes and components among education authority partners was itself heartening and proof of the desire for an articulation of what 'quality' in the use of ICT looks like. A further trio of outcomes - related to teachers' continuing professional development in ICT - were added as a result of discussions. Two of the original outcomes were subsumed within others which were similar

The **MIICE** project therefore went to the stage of professional validation with this structure

- 1 Learner reflection
- 2 Skills development
- 3 Managing and manipulating digital information
- 4 Shared planning/Organisation
- 5 Investigatory learning

- 6 Shared learning
- 7 Motivation
- 9 Enhancing learning outcomes
- 10 Quality of outcomes
- 11 Self-esteem/confidence
- 13 Teacher use of computers as productivity tools
- 14 Teacher facilitating the learning of ICT principles and good habits
- 15 Teacher use of ICT as a rich and effective means of learning

Outcomes 1 through 7 relate to the abilities and attitudes of learners. Although they include practical skills associated with ICT (eg *Managing and manipulating digital information*), the **MIICE** project is more concerned with general cognitive skills (eg *Investigatory learning*) and attitudinal development (eg *Learner reflection*), partly because other Scottish initiatives (with significant public funding) are attempting quantitative research about ICT skills themselves

Outcomes 9 through 11 relate to the management of learning on the part of teachers, schools and education authorities

Outcomes 13 through 15 relate to teachers' continuing professional development in ICT

The resulting panorama of measures was daunting - some 274 draft measures, although there was some duplication where 4 components (including 10 measures at level 2 and 14 measures at level 4) were each present in 2 relevant outcomes

**MIICE** needed to get professional validation for the draft measures - to

get a feel for what would be immediately useful and professionally meaningful. It was evident that what any individual teacher had to respond to, normally in face-to-face interviews, needed to be limited to a third of the total. This meant that, to ensure that 100 Scottish teachers from across the range of partner education authorities commented on each measure, we needed to target over 300 teachers

Based on the 11 collaborating education authorities at that time (June 2000), **MIICE** developed a model involving 96 schools (49 primary schools, 32 secondary schools and 15 special schools or units)

Number of schools and teachers involved					
EA	Prim	Sec	SEN	Schools	Teachers
Aberdeen	5	3	2	10	37
Aberdeenshire	6	4	2	12	46
Angus	4	2	1	7	26
Dundee	4	3	1	8	32
East Ayrshire	4	2	1	7	26
East Lothian	3	2	1	6	23
Falkirk	4	3	1	8	32
Highland	5	4	2	11	43
Midlothian	3	2	1	6	23
North Lanarkshire	7	5	2	14	55
Perth and Kinross	4	2	1	7	26
<b>Totals</b>	49	32	15	96	369

We invited the **MIICE** partners to identify the schools according to a range of criteria - including size, location (urban, rural, suburban), degree of endowment and leadership in ICT. In each primary school, we invited 3 teachers - one each in the

ICT experience categories of *novice*, *user* and *mover* - to help. Each secondary school was asked to find 2 teachers from each of these ICT experience categories, across a range of subjects. Each special school or unit was asked to nominate a 'novice' and a 'user/mover'. All schools were asked to find teachers reflecting a range of ages and genders. This gave a potential cohort of 369 teachers which was broadly representative of all Scottish teachers. Notions about wider consultation, involving parents and others, were excluded at this stage on practical grounds. Nonetheless these made big demands on support staff in education authorities already under pressure from a welter of government initiatives in the area of educational ICT

## Validating the measures

The first result was a huge level of cooperation from busy teachers. Many commented on the value of the exercise, beyond what is well established about the culture of teachers telling you what you want to hear. Few who were invited to be interviewed withdrew, other than on grounds of illness. There was widespread approval of the fact that this was an initiative about quality of learning which was arising from **within** the profession rather than being imposed as a set of targets by the government

Aberdeenshire Council withdrew in October 2000 due to a change of personnel. But Falkirk Council was added to the partners. Highland Council, which was the subject of an EA inspection by HM Inspectors of Schools, was unable to cooperate fully but invited voluntary participation by individual schools. Unfortunately the schools and EAs which (partially) withdrew meant that the original balance between primary and secondary teachers was upset. This meant that some of the teacher categories in secondary schools (eg size of school, location of school, subject categories) were rather smaller than could be relied on to articulate hypotheses about response tendencies. In March 2001 City of Edinburgh Council agreed to conduct validation in up to 3 secondary schools (with up to 18 teachers) to provide a balance closer to the original plan

The total number of teachers interviewed - almost all in the course of face-to-face interviews (mainly on a one-to-one basis), but with some telephone interviews with single teachers in remote schools in Highland -

was in excess of 240

Teachers were asked 2 questions

- 1 How **valid** is the measure as a 'test' of quality of learning? There were 4 possible responses: *Excellent*, *Valid*, *Marginal*, *Unhelpful*
- 2 Is the measure an **important** measure of success for more widespread use of ICT for learning and teaching?

It soon became evident that, with some exceptions, teachers were distinguishing between *Valid* and *Excellent*, where they were generally favourable to a measure as an articulation of quality in learning, on grounds of importance - generally speaking, *Excellent* means valid plus important. This element of the original validation process has not been immediately statistically explored

The statistical processing was undertaken using *SPSS*

The overwhelming majority of draft measures were thought to be valid (or better) by most respondents. Appendix 1 contains a summary of the average responses for each outcome and each component. This is based on the following coding (reflecting the grids which interviewees used)

- 1=Excellent
- 2=Valid
- 3=Marginal
- 4=Unhelpful

An average of 2.00 would mean that most people thought the measure *Valid* with roughly the same number indicating *Excellent* (code 1) and

*Marginal* (code 3). Aware that an average of 2 can conceal quite different patterns - there is a world of difference between a measure where 10 thought it *Excellent* and 10 thought it *Marginal*, giving an overall average of 2.00 and one where most of the 20 thought it *Valid* - the project explored some measures of clustering (including Kurtosis and standard deviations). Wide deviations in the response patterns were not in evidence

Averages of below 2.00 were very much the norm

We also learned that plain English is a must for busy teachers who are unfamiliar with the possible impact of ICT on learning and sometimes uncertain about pedagogical issues beyond their immediate professional experience. Terms such as collaborative learning or learner reflection may not be immediately understood by some teachers

## The MIICE toolbox

Teachers are looking for improvements and are interested in quality. Those involved in the interviews reported on the degree of interest and animation on the part of most teachers involved - itself useful feedback, and proof that teachers are looking for stepping stones in the flood plain of curricular inundation

The **MIICE** toolbox which resulted from this phase and the discussions following from it reflects a range of the benefits which good ICT use can bring to learning and teaching. Teachers and school managers can use these tools in a variety of ways

- to determine a target
- to articulate success criteria for a teaching project, or for the establishment's overall development plan
- in school and departmental handbooks
- to define appropriate next steps in a report to parents
- to form the basis of a SMART target (Specific Measurable Achievable Realistic or Relevant and Timed) for an individualised educational programme

In all cases, the toolbox will empower teachers and school managers. The measures are not designed to be a further set of demotivating hurdles over which demoralised teachers must jump yet higher. The emphasis of the immediate set of purposes - endorsed by the 11 Scottish education authorities who are **MIICE** partners - is to provide measures for self-evaluation

The resulting **MIICE** toolbox is contained in full in Appendix 2

Additionally there is a brief overview and table at the end of this appendix which indicates the overlaps and permeations which run through the **MIICE** quality framework

Case studies of the ways in which the **MIICE** toolbox could be useful, and other guidance, will be published at the same time the toolbox

## Interpretation of the results

In addition to the primary task of validating draft measures of quality in learning and teaching, the **MIICE** project was able to get the views of a broad cross-section of Scottish teachers on a range of issues associated with the (widespread) use of ICT for learning and teaching

A number of preliminary analyses was undertaken by identifying 6 to 8 appropriate draft measures (relating to the abilities and attitudes of learners) and carrying out a comparative means analysis according to various characteristics of the responding teachers

The 4 thematic analyses related to

- 1 Higher expectations on the part of learners
- 2 Routine activity on the part of learners
- 3 Creative activity on the part of learners
- 4 Attitudinal development on the part of learners

An analysis was also undertaken of teachers' responses to the measures of quality associated with teachers' continuing professional development in ICT

### *Higher expectations on the part of learners*

#### *Analysis*

The profile of high expectations included the following draft measures

- Can speculate on 'what if' questions about alternatives
- Systematic evaluation of efficiency of ways of achieving agreed ends
- Ability to phrase - orally and in writing - value/drawbacks of alternatives
- Synergy between developing ICT skills and use of ICT for wider skills
- Ability to derive patterns from a wide array of stimuli
- Adopt systematic approaches to putting things right when they go wrong
- Relish chance to suggest new approaches, worthwhile strategies

#### *Observations and interpretations*

- 1 The overall average for this group of measures (1.96) is in line with the overall average for all group 1 measures (1.93)
- 2 Teachers classified as 'novices' (average of 1.83) and those classified as 'movers' (average of 1.92) are apparently more ambitious than those classified as 'users' (average of 2.00)
- 3 Some evidence of higher expectations from teachers in the early primary stages than overall - an average of 1.75 for those in P1-P3 stages against an overall primary schools average of 1.88

- 4 Apparently higher expectations from secondary teachers of social subjects/RE than overall - average of 1.79 - and apparently lower expectations from secondary teachers of maths, science and technology - average of 2.10 - compared with an overall secondary teachers average of 1.95
- 5 Higher expectations from teachers in smaller secondary schools than in others - an average of 1.67 for teachers in schools with a roll under 600 against an average of 2.04 for teachers in secondary schools with a roll between 601 and 1200
- 6 Higher expectations from teachers in urban areas (average of 1.83) than those in suburban areas (average of 1.96) and rural areas (average of 1.99)
- 7 Higher expectations on the part of female teachers than male teachers: average of 1.82 for female against 2.18 for male teachers

### *Implications*

#### 1 For EAs and school managers

- continued commitment to quality to ensure that teachers' individually and collectively remain ambitious for their pupils
- commitment to ongoing opportunities for staff development - in a wide variety of forms - to develop pedagogical skills in the use of ICT for learning and teaching; those who have seen but done little about use of ICT and those who have done a lot using ICT have higher expectations than those who have done just a little
- proper technical support for ICT

resources so that teachers can rely on the potential to be realised through resources which work properly

#### 2 For teachers

- build ambitious targets for learning into curriculum planning through more flexible and imaginative use of ICT throughout the age range
- remain responsive to the opportunities for spontaneous learning which ICT can offer
- continue to explore better uses of ICT for learning and teaching, including new forms of (collaborative) learning

#### 3 For the education service as a whole

- find ways to validate a wider definition of learning than has been possible with the traditional testing approaches, perhaps through greater use of self-evaluation by (secondary) pupils based on recording their practical achievements
- the relatively clear difference between the overall responses of male and female teachers may imply that there is a problem within the service of under-ambition on the part of male teachers

## ***Routine activity on the part of learners***

### *Analysis*

The profile of routine activity included the following draft measures

- Able to resume work from previous activity on their own initiative
- ICT use well related to pedagogical purpose
- Usually able to use ICT to focus on the task in hand
- Regard paid to criteria for success laid down by teacher
- Able to work with others in roles outlined by teacher
- Little time spent in each session in getting under way with tasks in hand
- Keep focus on tasks in hand, with reducing tendency to be distracted
- Care to produce work which meets success criteria set by teacher

### *Observations and interpretations*

- 1 More support from teachers for routine activity than for creative activity - an overall average of 1.76 for routine activity against an overall average of 1.99 for creative activity; also higher approval than for group 1 measures as a whole (average of 1.93)
- 2 As with the analysis of higher expectations, teachers classified as 'novices' (average of 1.68) and teachers classified as 'movers' (average of 1.73) are more sympathetic to routine activity than teachers classified as 'users' (average of 1.83)
- 3 A hint of relatively higher approval for routine activity among secondary creative and aesthetic subjects

teachers than secondary teachers as a whole - an average of 1.65 for creative and aesthetic teachers against an overall secondary teacher average of 1.84. Also secondary teachers as a whole (average of 1.84) are less supportive of routine activity than primary teachers as a whole (average of 1.66)

- 4 Teachers in urban areas (average of 1.68) seem more favourably disposed than those in suburban areas (average of 1.75) and those in rural areas (average of 1.85)
- 5 Female teachers (average of 1.67) appear to be clearly more supportive of routine activity than male teachers (average of 1.94)

### *Implications*

- 1 For EAs and school managers
  - the need to keep offering opportunities for 'everyday' activity to be undertaken using ICT, and within the teacher's normal classroom (as in most primary schools) rather than mainly in specialist facilities (as in many secondary schools)
  - the development of targets which validate and emphasise the creative rather than the routine
- 2 For teachers
  - overt planning of opportunities for creative activity to complement the wholly valid routine elements of learning
  - exploring ways in which imaginative activity witnessed in case studies of high achievement can be transposed to one's own professional domain

### 3 For the education system as a whole

- audit professional development strategies to ensure that experimenting with new ways to learn is encouraged
- ensure that curriculum and assessment guidelines do not squeeze out opportunities for new ways of learning and teaching
- the clear sex difference again implies a worrying pattern of low expectation on the part of male teachers which needs a closer look

### *Creative activity on the part of learners*

#### *Analysis*

The profile of creative activity included the following draft measures

- Can use self-assessment results to decide on next steps
- Able to contribute to project from own interests
- Interest in comparing ways in which ICT can be applied (eg shortcuts, creation of templates, use of stylesheets or equivalent)
- Appreciation of when ICT is not optimal means of advancing project
- ICT used imaginatively to prepare and present material
- Development of compatible further criteria for success
- Imagination in the solution of problems
- Increasingly able to negotiate the criteria for success

#### *Observations and interpretations*

- 1 The overall average for creative activity (1.99) is only slightly higher than the overall average for all group 1 measures (1.93); but it is significantly higher than the average for routine activity (1.76)
- 2 A slight tendency for younger teachers to be less favourable to creative activity than those with more experience - eg average for teachers under 30 of 1.99 against average for teachers aged 50 or more of 1.89
- 3 Slightly more support for creative activity from secondary teachers of creative and aesthetic subjects than overall; average of 1.77 for creative & aesthetic teachers against an

overall secondary average of 1.98; no significant difference between secondary teachers (average of 1.98) and primary teachers (average of 1.91)

- 4 Evidently higher support for creative activity in smaller secondary schools: an average of 1.78 for teachers in secondary schools with a roll under 600 against an average of 2.05 for teachers in secondary schools with a roll of 601 to 1200
- 5 Once again, urban teachers (average of 1.86) appear more favourable than suburban teachers (average of 1.96) and rural teachers (average of 2.08)
- 6 More support for creative activity on the part of female teachers (average of 1.89) than on the part of male teachers (average of 2.11)

### *Implications*

#### 1 For EAs and school managers

- integration of more imaginative approaches to learning and teaching by senior staff, with time for exploration of potentially creative tangents built in
- help for probationer and other teachers from senior staff to sustain their interest in adopting a wider range of learning and teaching strategies into their use of ICT

#### 2 For teachers

- build time into curriculum planning for exploratory activity using the ICT tools which transcend the basic remit for the task in hand
- make use of help systems and other forms of assistance to deepen their understanding of the options which imaginative computer software can

offer beyond its immediate purposes

#### 3 For the education system as a whole

- find ways in which young learners can define at least some of the criteria for success in their learning to a greater degree than is currently possible
- the sex difference again implies that there may be issues about creative activity which need to be further researched

## *Attitudinal development on the part of learners*

### *Analysis*

The profile of attitudinal development included the following draft measures

- Able to relate use of ICT to activities in wider world
  - Able to sustain a point of view in (formal) debate about such issues
  - Evidence of planning and audience awareness in exploratory activity
  - Growing awareness of criteria by which digital information is assessed (inc currency, bias, fitness for purpose, technicalities)
  - Heightened sense of awareness of diverse needs of varied audiences
  - Empathy for feelings of some audience members, esp when using electronic means of communication
- teachers with more than 20 years teaching experience (average of 2.00) were slightly more favourable than most (overall average of 2.07)
  - secondary teachers of creative & aesthetic subjects (average of 1.86) were more favourable while secondary teachers of social subjects and RE (average of 2.42) were, perhaps paradoxically, distinctly less favourable than overall (average of 2.11)
  - teachers in secondary schools with a roll under 600 (average of 1.89) were more favourable than those in schools with a roll of 601 to 1200 (average of 2.18)
  - teachers in urban areas (average of 1.88) were more favourable than those in suburban areas (average of 2.17) and those in rural areas (average of 2.18)

### *Observations and interpretations*

- 1 Generally teachers are less happy with skills associated with attitudinal development than with others - average overall of 2.13 for the set of 6 measures against overall average of 1.93 for all group 1 measures
- 2 There were few really telling differences in the reception to draft measures related to attitudinal development between different categories of teachers. The interesting possible exceptions included the following
  - teachers classified as ‘movers’ (average of 1.98) are a bit more sympathetic than teachers classified as ‘users’ (average of 2.08) and those classified as ‘novices’ (average of 2.21)

### *Implications*

- 1 For EAs and school managers
  - promote a climate where the development of attitudes to issues associated with the use of ICT are given equal prominence with the practical skills which are an established priority
  - sustain a climate where opportunities for presentation of pupils’ work to a range of audiences, within and beyond the school, reinforce growing understanding of the needs of different audiences
- 2 For teachers
  - include an audit of ways in which attitude formation opportunities are planned as an integral rather than ‘optional extra’ element of

curriculum planning

- where possible, add 'extension' activities to project work which permit young learners to explore variations to suit the needs of a different audience

### 3 For the education system as a whole

- try to avoid always putting attitudinal development elements of curricular guidelines at the bottom of frameworks

### ***Teachers' continuous professional development in ICT***

The measures were generally welcome, with only 10 draft measures (out of 45) attracting an average of 2.00 or above. The other 35 were below 2.00 (and 12 were below 1.60)

There were few conclusive trends

#### 1 Those draft measures which appeared to attract especial favour (average of 1.52 or lower) were the following

- Teachers can produce straightforward print documents for learning and teaching purposes with a limited range of media
- Teachers are able to make straightforward adaptations to templates or standard materials to customise it for their own purposes
- Teachers know how to access appropriate sites on the Web
- Teachers can produce a flexible range of print documents, embodying an appropriate range of media, for differentiated learning and teaching
- Teachers can efficiently search for known and unknown sites on the Web
- Able to make learning more responsible to individual needs and interests through effective use of ICT

#### 2 Those draft measures which attracted distinctly less favour (average higher than 2.20) were the following

- Teachers are able to prepare a slide show or equivalent presentation related to their professional needs (and not just for interviews)
- Teachers can cope with standard

school/EA systems for educational MIS

- Teachers are comfortable with the use of movies, animations, sound and other elements for a slide show or other multimedia presentation
- Teachers can prepare a Web page for use on intranet or Internet
- Teachers demonstrate some imagination in their use of standard school/EA educational MIS
- Teachers show imagination in their use of generic software tools to keep record of progress in their own programmes of work
- Understanding of appropriate configuration of computer environment

3 Divergence from the norm can be clearly discerned in the following instances

- Teachers classified as ICT 'movers' (average of 1.79) and those classified as 'novices' (average of 1.73) appears more favourably disposed than those classified as 'users' (average of 1.87)
- Older and younger teachers appear to rate CPD measures higher than those in the middle - identical averages of 1.66 for teachers aged under 30 and for teachers aged 50 or more, compared with an average of 1.85 for teachers in their 30s and an average of 1.92 for teachers in their 40s
- Primary teachers in the middle stages show less enthusiasm than others: average of 1.89 for teachers in P4/P5 against an average of 1.79 for all primary teachers (and 1.73

for teachers in P6/P7)

- Some differences between secondary subject teachers: average of 1.68 for secondary language teachers; average of 1.92 for teachers of maths, science, technology; average of 1.93 for teachers of social subjects or RE; average of 1.75 for teachers of creative and aesthetic subjects
- More support from teachers in smaller secondary schools than in larger ones: average of 1.62 for teachers in secondary schools with a roll under 600 against an average of 1.90 for teachers in secondary schools with a roll between 601 and 1200
- More support among urban teachers than elsewhere: average of 1.71 for teachers in urban areas, average of 1.80 for teachers in suburban areas, and average of 1.92 for teachers in rural areas
- For once male and female teachers were virtually identical in their responses (1.81 for males and 1.80 for females)

### *Implications*

1 For EAs and school managers

- some, but by no means all, of the skills, insights and ability to make judgements will be addressed, wholly or partially, by the current NOF teacher training in ICT; but the integration into both routine and creative use is one which all experience indicates is done in stages and will take time and will demand continued priority
- the chance to practise, without fear of criticism of the failures which

inevitably accompany learning new skills, is vital

CD-Rom, video and other multimedia presentation)

## 2 For teachers

- opportunities to practise, especially to risk the big step of learning with the children 'on the job' in the classroom, needs to be taken
- less formal means of staff development will have a major role in practice and exploration of new ways to build both routine and creative activity into normal classroom practice; teachers need to get away from the 'go on a course' paradigm (which nonetheless still play a part)
- a huge shift in attitudes away from the entirely worthy Scottish tradition of 'mastery' by teachers before they dare to go near a learner; no-one ever 'masters' ICT
- an equal transformation will be needed in the diversity of approaches which (different) computer solutions offer - "dare to be different" does not always feature highly in teachers' collective view of the world

## 3 For the education service as a whole

- the magnitude of the attitudinal change needed for teachers - from a tradition of mastery to 'just in time' learning - should not be overlooked; consistent perfection and no mistakes are not a feature of learning 'as you go' and expectations need to be adjusted accordingly
- better ways in which good practice in classrooms can be spread, perhaps making better use of the new learning technologies (online,

## Next steps for MIICE

The **MIICE** partners do not have significant research budgets. Some or all of the following are valid but will need to attract significant additional funding

- 1 Case studies of how schools and EAs are using the **MIICE** toolbox for self-evaluation of their policies. The toolbox looks beyond the development of ICT skills within the 5-14 and Higher Still curriculum. It relates to the quality of the overall learning experience, to the process use of ICT for learning as well as to learning about ICT. How useful in practice is this ambitious approach to schools working hard to meet the practical challenges of 5-14 ICT guidelines, Higher Still core skills in ICT, NGfL implementation, NOF teacher training in ICT - as well as a few other curricular initiatives?
- 2 Development of a toolbox which is more overtly geared towards the needs of those who work with learners with special educational needs
- 3 Exemplification of some of the evidential statements in the **MIICE** toolbox using video material and references to other curricular documentation, much of both already in existence and including curricular guidelines and guides for teachers and managers
- 4 Longitudinal studies about the impact of ICT using **MIICE**'s refined measures as a basis for judgement
- 5 Further research on the various hypotheses articulated in the interpretation of the results section, including the important link between ICT experience and high expectations and the intriguing differences in response between male and female teachers
- 6 Exploration of the impacts on learning of home uses of ICT, using **MIICE**'s refined measures as a basis of judgement

# Appendix 1

## Summary of average responses by outcome and component

Outcome and component	Level 2 average	Level 4 average
<b>Group 1 - relating to abilities and attitudes of learners</b>		
1 <i>Learner reflection</i> .....	<b>2.04</b> .....	<b>2.03</b>
Taking personal responsibility for learning.....	2.03.....	1.84
Realistic but improving culture.....	2.04.....	2.21
Ability to articulate evaluations of actions taken, those which were considered but rejected and those which were not initially considered.....	1.91.....	1.91
Developing informed attitudes in relation to ICT in society.....	2.18.....	2.32
2 <i>Skills development</i> .....	<b>1.84</b> .....	<b>1.82</b>
Effective and responsible use of information and communications technology.....	1.98.....	1.89
Creation and presentation of their own material.....	1.88.....	1.88
Collection and analysis of information.....	1.70.....	1.74
3 <i>Managing and manipulating digital information</i> .....	<b>1.89</b> .....	<b>1.87</b>
Ability to modify information in a variety of forms, including text, graphical objects, moving images, sounds and web pages.....	1.91.....	1.68
A problem-solving approach.....	1.65.....	1.71
Controlling and modelling within the digital environment.....	1.98.....	2.10
4 <i>Shared planning/Organisation</i> .....	<b>1.99</b> .....	<b>1.84</b>
Working in groups.....	1.94.....	1.77
Working with the teacher.....	2.17.....	1.95
Making the most of learning resources.....	1.82.....	1.80
A problem-solving approach.....	1.85.....	1.79
5 <i>Investigatory learning</i> .....	<b>1.89</b> .....	<b>1.90</b>
Searching and researching.....	1.89.....	1.89
Task analysis skills.....	2.08.....	2.09
Collection and analysis of information.....	1.74.....	1.79

6	<i>Shared learning</i> .....	<b>1.96</b> .....	<b>1.89</b>
	Communicating and collaborating.....	2.10.....	1.95
	Willingness to communicate with others.....	1.97.....	1.93
	Working in groups.....	1.75.....	1.75
7	<i>Motivation</i> .....	<b>1.97</b> .....	<b>2.04</b>
	Extension of concentration span.....	1.70.....	1.79
	Pride in work.....	1.88.....	2.03
	Enterprise and taking risks.....	1.93.....	2.08
	Attendance and participation.....	2.27.....	2.20

## **Group 2 - relating to the management of learning**

9	<i>Enhancing learning outcomes</i> .....	<b>1.82</b> .....	<b>1.83</b>
	Progression in learning.....	1.81.....	1.62
	Development of new teaching styles.....	1.81.....	1.75
	Enable learners to modify information in a variety of forms, including text, graphical objects, moving images, sounds and web pages.....	1.74.....	1.76
	Encourage development of informed attitudes in relation to ICT in society.....	1.90.....	2.17
10	<i>Quality of outcomes</i> .....	<b>1.75</b> .....	<b>1.67</b>
	Assessment policies.....	1.91.....	1.74
	Relationship to development planning priorities.....	1.78.....	1.59
	Planning of resources.....	1.70.....	1.66
	Breadth of experience of ICT use in context.....	1.55.....	1.67
11	<i>Self esteem /confidence</i> .....	<b>1.96</b> .....	<b>1.89</b>
	Use of ICT to enhance school ethos.....	2.08.....	1.90
	Encourage pride in work.....	1.69.....	1.89
	Encourage enterprise and taking risks.....	2.01.....	1.86

## **Group 3 - relating to teachers' continuing professional development in ICT**

13	<i>Teacher use of computers as productivity tools</i> .....	<b>1.78</b> .....	<b>1.93</b>
	Skills in the use of general purpose software for production/modification of learning and teaching materials.....	1.80.....	1.96
	Skills in the use of computer tools for recording, reporting, registration, course planning and other aspects of the processes of management of learning.....	2.03.....	2.42
	Skills in the use of communications tools such as		

	electronic mail and the World Wide Web to communicate appropriate information and gather resources relevant to professional activities.....	1.49.....	1.57
14	<i>Teacher facilitating the learning of ICT principles and good habits</i> .....	<b>1.79</b> .....	<b>1.68</b>
	Developing confidence in the role of guide in a situation of less than perfect mastery (and contrary to the worthy Scottish tradition of thoroughness of knowledge.....	1.69.....	1.60
	Balancing the established traditions of professional discretion and holistic planning for the benefit of learners through an appropriately coordinated whole school approach to the progressive acquisition of knowledge, skills and attitudes.....	1.95.....	1.80
15	<i>Teacher use of ICT as a rich and effective means of learning</i> .....	<b>1.90</b> .....	<b>1.78</b>
	Skills in selection, customisation or configuration and best use of appropriate software tools (generic software, communications facilities like the Web, reference CD-Roms) and ready-made software appropriate to subject/theme.....	1.84.....	1.71
	Development of new teaching styles.....	1.83.....	1.87
	Sufficient technical understanding to correct errors, restore system settings and overcome everyday operational problems.....	2.01.....	1.83

## Appendix 2

### MIICE toolbox

This is the final representation of the **MIICE** toolbox resulting from consideration by the project team of the following

- 1 The relative popularity of the draft measures. All those which scored above 2.00 on average (indicating more saying *Marginal* or *Unhelpful* than *Excellent*) were closely examined by the project team. In some cases, where the relatively unfavourable response was thought to be because of inelegant phrasing or where those with ICT experience (designated *Movers*) were significantly more receptive than others, relatively 'unpopular' measures were retained (although often re-phrased)
- 2 The need for plain English
- 3 A desire to present the measures in as widely useful a way as possible. The format which was adopted, and which follows, was based on the following major debate

Whether the measures are of **collective** or **individual** achievement. The decision was to incorporate measures in the form of questions which could be useful for collective (self) evaluation plus evidence - from 5-14 stages and from 12-18 stages - in the form of statements which would relate to individual achievement

The resulting toolbox is detailed on the following 26 pages

This relates to learners' ability to think about what they are doing, and their ability to put it into a number of contexts

1 *Taking personal responsibility for learning*

- 1 Can learners use self-assessment reliably and use the results to decide on their next steps?
- 2 Are learners able to resume work from previous activity on their own initiative?
- 3 Is learners' use of ICT usually closely related to the purpose of the exercise?
- 4 Are learners able to contribute to a project from their own interests?

2 *Realistic but improving culture*

- 1 Do learners show an interest in going beyond the minimum standards for the task in hand?
- 2 Do learners show an interest in comparing different ways in which ICT can be applied?

3 *Ability to articulate evaluations of actions taken*

- 1 Are learners able to respond to evaluative questions by the teacher?
- 2 Can learners speculate on 'what if' questions about alternative courses of action?
- 3 Are learners able to articulate ways in which a project could be improved - orally, in groups or in writing?

4 *Developing informed attitudes in relation to ICT in society*

- 1 Are learners able to relate their use of ICT to activities in the wider world appropriate to their age?
- 2 Are learners able to relate their ICT activities in school to the world of work and/or to wider society?
- 3 Are learners aware of issues, such as privacy, in the context of new ways of processing information?

**Evidence at ages 5 to 14:** Learners

- 1.1 can check their program against simple criteria before deciding what to do next
- 1.2 get on with their work from a previous session without fuss
- 1.3 stick to the point most of the time
- 1.4 are often keen to bring things from home which relate to the class project
- 2.1 often want to improve things in their work with the computer
- 2.2 explore refinements like shortcuts or use of stylesheets
- 3.1 are able to say why they chose a particular course of action
- 3.2 can say what might be the result of a different stratagem
- 3.3 are able to say how their work using the computer could be improved
- 4.1 can explain how what they are doing relates to equivalent phenomena in the real world
- 4.2 are able to explain some of the ways in which the computer is changing the world of work
- 4.3 are able to exemplify how computers can invade privacy

**Evidence at ages 12 to 18:** Learners

- 1.1 are able to use a log to assess their progress through a scheme of work using the computer
- 1.2 get on with their work from a previous session without fuss
- 1.3 stick to the point most of the time
- 1.4 can relate their other interests to a class project on occasion
- 2.1 often want to improve things in their computer work
- 2.2 explore refinements like shortcuts or use of stylesheets
- 3.1 are able to say why they opted for a particular course of action
- 3.2 can say what the result of a particular stratagem might be
- 3.3 are able to say how their work using the computer could be improved
- 4.1 can explain how what they are doing relates to the equivalent phenomena in the real world
- 4.2 are able to explain some of the ways in which the computer is changing the world of work
- 4.3 are able to explain how computers can invade privacy

This relates to learners' ability to think about what they are doing, and their ability to put it into a number of contexts

1 *Taking personal responsibility for learning*

- 1 Are learners able to use self-assessment when working with ICT to decide on subsequent activities and to remedy shortfalls in their understanding?
- 2 Are learners able to carry on a project over a period of time with a high degree of retention of the information and learning gained in earlier phases of the project?
- 3 Do learners keep to the point of a project adding refinements on their own initiative?
- 4 Are learners seen to contribute to projects in school from their own interests and experience?

2 *Realistic but improving culture*

- 1 Are learners seen to explore and share innovations in their approach to tackling school projects?
- 2 Do learners demonstrate systematic evaluation of the means used to meet project aims?
- 3 Do learners show a growing awareness of the balance between improvement and the time devoted to a task in school when they are using ICT?

3 *Ability to articulate evaluations of actions taken*

- 1 Do learners adopt an on-going critical approach to their own progress through a school project?
- 2 Can learners phrase the value and drawbacks of alternative approaches both orally in writing?
- 3 Can learners undertake evaluation both when working by themselves and as a member of a group?
- 4 Do learners show an appreciation of when ICT is not the optimal means of completing a project?

4 *Developing informed attitudes in relation to ICT in society*

- 1 Can learners articulate ways in which school activity relates to wider world activities?
- 2 Are learners aware of and able to sustain a point of view about issues such as privacy, misuse of information, de-skilling and new demands at work and the growing synergy between technologies?

**Evidence at ages 5 to 14:** Learners

- 1.1 check their work, identify mistakes, seek help to rectify
- 1.2 are, on prompting, able to review previous related work and progress with the task
- 1.3 can apply themselves, with few distractions, and on prompting, suggest refinements to the project
- 1.4 through dialogue, make connections to external learning experiences and apply them to their school work
- 2.1 experiment and show each other new ways of doing things on the computer
- 2.2 can use a checklist to assess their own performance
- 2.3 are aware that they have limited time at the computer and use this time productively
- 3.1 tell teacher about successes/problems they experience
- 3.2 are able to evaluate and describe pros and cons of how they carried out their work
- 3.4 can judge when the computer is not the best solution to the task in hand (for example freehand art work)
- 4.1 can talk about a limited range of real world applications of classroom ICT (for example, robots in factories)
- 4.2 have developed points of view about some social implications of the application of ICT

**Evidence at ages 12 to 18:** Learners

- 1.1 check their work, identify mistakes and engage in unsupported remediation
- 1.2 are, without prompting, are able to continue working and progress with the task
- 1.3 show a focussed approach and suggest refinements to the project
- 1.4 as a matter of course, use learning experiences from outside the classroom to enhance their school work
- 2.1 experiment and show each other new ways of doing things on the computer
- 2.2 can design and use a checklist to assess their own performance
- 2.3 can manage their time at the computer effectively whilst bearing in mind the need to achieve appropriate progress
- 3.1 note possible improvements/problems as they proceed
- 3.2 are able to evaluate and record pros and cons of the strategies adopted, clearly justifying decisions taken
- 3.4 routinely judge when the computer is not the best solution to the task in hand (eg freehand art work)
- 4.1 can discuss a broad range of real world applications of classroom ICT
- 4.2 have refined their points of view about a wide range of social implications regarding applications of ICT

This relates to learners' development of systematic skills in using ICT tools for purpose

1 *Effective and responsible use of information and communications technology*

- 1 Are learners using ICT usually focused on the task in hand?
- 2 Are learners with limited ICT skills occasionally able to make progress on the task in hand when using ICT?
- 3 Do learners simultaneously develop their ICT skills and their skills in the learning activity for which they are using ICT?

2 *Creation and presentation of their own material*

- 1 Do learners use ICT efficiently to prepare and present their own material?
- 2 Do learners pay due regard to the criteria for success set down for a project?
- 3 Do learners show progress in their use of ICT tools to create presentations?

3 *Collection and analysis of information*

- 1 Do learners develop their enquiry skills - asking the appropriate questions - by using ICT?
- 2 Does the use of ICT help learners to derive relevant information from a mass of data?
- 3 Do learners develop their search skills - how to look for what they need - by using ICT?
- 4 Does learners' use of ICT for searching help to improve their search skills when using non-ICT sources (transferable skills)?

**Evidence at ages 5 to 14:** Learners

- 1.1 require some teacher support to carry out and complete tasks
- 1.2 can use a word bank/grid to draft written work
- 1.3 ability to draft and re-draft written work is improved by the use of cut and paste functions
- 2.1 use clip art to illustrate project work
- 2.2 can produce a promotional poster (containing all relevant information) for an event
- 2.3 can import graphs and images to a linked multimedia presentation
- 3.1 can search a database using simple criteria
- 3.2 can interrogate a database, eg *Ourselves*, to find how many have brown hair
- 3.3 can use key words within a simple search engine
- 3.4 understanding of keyword searches enhances their use of contents pages and indexes

**Evidence at ages 12 to 18:** Learners

- 1.1 require some teacher input to carry out and complete a task
- 1.2 can use previously unseen facilities to enrich or advance their work, eg browsing a CD-Rom during investigative work
- 1.3 enhance collaborative skills whilst using ICT to investigate and solve a problem
- 2.1 can use some aspects of multimedia to prepare material
- 2.2 successfully fulfil all stages of a project
- 2.3 can confidently produce and deliver a *PowerPoint* presentation
- 3.1 carry out research using encyclopaedias and Internet and develop and refine redrafting skills
- 3.2 refine searches to focus on relevant data
- 3.3 gain time from the ability to refine searches in the final production of a piece of work
- 3.4 use search refinement techniques practised using ICT when they are working on other pieces of work

This relates to learners' development of systematic skills in using ICT tools for purpose

1 *Effective and responsible use of information and communications technology*

- 1 Are learners using ICT always focused on the task in hand?
- 2 Does ICT expertise enhance learners' ability to make progress on the task in hand?
- 3 Does the development of ICT skills accelerate the development of learners' wider skills?

2 *Creation and presentation of their own material*

- 1 Do learners use ICT imaginatively to prepare and present their own material?
- 2 Do learners often exceed the laid down criteria for success for a school project using ICT?
- 3 Are learners able to articulate additional criteria for success in school projects involving ICT?
- 4 Do learners show progress in their use of ICT tools to create presentations to meet the needs of a range of audiences?

3 *Collection and analysis of information*

- 1 Do learners continue to refine their enquiry skills - asking the appropriate questions - by using ICT?
- 2 Are learners able to derive relevant information and patterns of occurrence from a mass of data when using ICT?
- 3 Do learners continue to refine their search skills - how to look for what they need - by using ICT?
- 4 Does learners' use of ICT for searching help them to refine their search skills and evaluative skills - even when using a non-ICT source (transferable skills)?

**Evidence at ages 5 to 14:** Learners

- 1.1 require minimal teacher support to carry out and complete tasks
- 1.2 can use a broad range of ICT skills, eg hyperlinks in a presentation, to take their work forward
- 1.3 collaborative skills are enhanced whilst using ICT to investigate and solve problems
- 2.1 create their own images to illustrate project work
- 2.2 compare and contrast different graphs to best illustrate their findings
- 2.3 can identify how to improve the investigation process eg adding more specific fields to a database, vary times of data sampling traffic survey at different times of the day
- 2.4 use of application shows audience awareness, eg talking book for infants or *PowerPoint* presentation for parents
- 3.1 can search a database using multiple criteria
- 3.2 can interrogate a database, eg *Ourselves*, to investigate the relationship between height and weight
- 3.3 show more efficient use of search engines by using advanced search techniques
- 3.4 use a more critical approach of media, eg appropriateness, relevance, bias

**Evidence at ages 12 to 18:** Learners

- 1.1 require minimal teacher support to carry out and complete a task
- 1.2 can use a wide range of ICT skills, eg searching web sites and using the information gained properly, to make good progress in their work
- 1.3 enhance collaboration skills using ICT to investigate and solve a problem
- 2.1 can confidently use many aspects of multimedia to prepare material
- 2.2 carry out research using the Internet which leads them to produce work of a higher than expected standard
- 2.3 develop understanding of the task which allows them to suggest progression routes during group work
- 2.4 can produce a *PowerPoint* presentation with appropriate animation, hyperlinks and hidden slides
- 3.1 use search engines to target specific responses
- 3.2 refine searches which allows them to draw conclusions from the data obtained
- 3.3 refine searches which allows them to make decisions as to the appropriateness of using ICT as their research tool [also appropriate for 3.4]

This relates to learners' ability to modify a variety of digital data types using a problem-solving approach, the ability to use the tools to model and speculate and apply the resultant information

- 1 *Ability to modify information in a variety of forms, including text, graphical objects, moving images, sounds and web pages*
  - 1 Are learners able to draft and redraft working with text, graphics and multimedia forms?
  - 2 Are learners able to learn and use a growing range of software tools in a systematic way?
  - 3 Do learners pay due regard to the rules for file management (eg where to save or print their work) and to the purposes of the exercise for which they are using the digital information?
- 2 *A problem-solving approach*
  - 1 Do learners adopt systematic strategies to cope with mistakes when they are working with ICT?
  - 2 Do learners seek appropriate help from fellow learners and the teacher when working with ICT?
- 3 *Controlling, modelling and exploring within the digital environment*
  - 1 Are learners able to use a control technology device?
  - 2 Do learners have experience of programming steps in an operation into a correct sequence using ICT?
  - 3 Do learners have experience of simple (single condition) searches using a database?
  - 4 Do learners explore alternative ways in which multimedia information can be presented using ICT?

**Evidence at ages 5 to 14:** Learners

- 1.1 can change font size, type, colour etc to achieve desired effect
- 1.2 can use menu and icon bars to explore software
- 1.3 can organise files by saving to a specific folder
- 2.1 can use the Undo function on the icon bar
- 2.2 are more likely to ask the teacher for support with a problem
- 3.1 can use a programmable toy, eg Roamer
- 3.2 can write a short program within *Logo*, eg draw a square or a triangle
- 3.3 can search a database, eg *Musical Instruments*, to find out which instruments are hit
- 3.4 use speech function or recorded voice to read the text of a presentation

**Evidence at ages 12 to 18:** Learners

- 1.1 are confidently able to use various features within an application to enhance a piece of work eg text layout, editing tools, copy and paste functions
- 1.2 are confident in using on line help and tutorials in various applications
- 1.3 are able to select, create and rename folders as appropriate to the specific school subject
- 2.1 are able to edit, spell check and grammar check as appropriate
- 2.2 are comfortable with seeking help from appropriate sources eg teacher, peers, on-line or texts
- 3.1 can use a variety of control devices eg simulations and sensors
- 3.2 can use a variety of programming languages
- 3.3 can search a number of different databases
- 3.4 can insert pre-recorded files into presentation packages eg sound from CD-Roms or other sources

This relates to learners' ability to modify a variety of digital data types using a problem-solving approach, the ability to use the tools to model and speculate and apply the resultant information

- 1 *Ability to modify information in a variety of forms, including text, graphical objects, moving images, sounds and web pages*
  - 1 Do learners have a wide experience of working with text, graphics, numeric data and multimedia data forms?
  - 2 Are learners able to use a variety of software tools, and options available within these tools, to create and modify information?
  - 3 Do learners demonstrate understanding for the need for rules for file management (eg where to save or print their work) and for the purposes of the exercise for which they are using the digital information?
- 2 *A problem-solving approach*
  - 1 Do learners adopt systematic approaches to putting things right when they go wrong using ICT?
  - 2 Do learners involve fellow learners and the teacher sensibly in the rectification of problems?
  - 3 Are learners able to apply a range of strategies in the solution of any problems they meet and are they able to articulate to the teacher and others how they did it?
- 3 *Controlling, modelling and exploring within the digital environment*
  - 1 Can learners use computers and other devices such as sensors to monitor and/or control the environment?
  - 2 Do learners have wide experience of programming activities sequencing steps in an operation?
  - 3 Have pupils developed an ability to construct generic solutions to repetitive tasks?
  - 4 Do learners have a chance to experiment with spreadsheets: data, formula and graphs?
  - 5 Do learners have experience of complex (multi condition) searches using a database?
  - 6 Do learners have a chance to construct a slide show, web page or other multimedia presentation?

**Evidence at ages 5 to 14:** Learners

- 1.1 can confidently use word processor, desk top publisher, spreadsheets and databases; create their own images, record sounds digitally and import them into applications
- 1.2 can use generic spreadsheet functions within different applications
- 1.3 can demonstrate understanding of and ability to use different drives within a network
- 2.1 can check and correct hyperlink pathways
- 2.2 are increasingly likely to work collaboratively with their peer group to gain support with a problem
- 2.3 can use on-line application help to solve problems
- 3.1 can use data sampling hardware/software to monitor temperature change
- 3.2 can write more complex procedures within a *Logo* application to produce an applet
- 3.3 can create and use macros
- 3.4 can use spreadsheets to model what will happen 'if', eg how much money would a person save in a week, month, year if they stopped smoking?
- 3.5 can search a database, eg *The Solar System* to find out how many planets have more than 2 moons
- 3.6 can use multimedia applications, eg *PowerPoint*, *Composer*, *Front Page*, *Textease*, to present the research findings of a project

**Evidence at ages 12 to 18:** Learners

- 1.1 are confident in working with and between a number of applications while using simulation software, datalogging, browsers etc
- 1.2 can confidently use more complex functions eg charting
- 1.3 can use network facilities confidently
- 2.1 undo mistakes and recover original files if problems occur
- 2.2 recognise the need to seek advice at times from teacher or peers in order to progress and fulfil the task
- 2.3 can recognise when a change of strategy may be best and can explain why they made the decision
- 3.1 are familiar with the use of data loggers and can use them to gather information on a variety of environmental factors, create spreadsheets and graph results
- 3.2 can use more complex programming languages
- 3.3 can create and use macros
- 3.4 can use something like Scenario Manager from *Excel* to give best and worst case estimates
- 3.5 can search/sort using more than one field
- 3.6 can present project findings using multimedia applications

This relates to the learners' ability to work in a variety of modes (individually, in small groups, large groups, class), making best use of the teacher, learning resources in the class, school and beyond with a problem solving approach and the ability to break down a project into constituent elements

1 *Working in groups*

- 1 Are learners able to work with others in roles which have been outlined by the teacher?
- 2 Can learners manage the steps involved in a school project without frequent recourse to the teacher?

2 *Working with the teacher*

- 1 Do learners generally ask the teacher realistic questions?
- 2 Do learners seek validation from the teacher at appropriate points in a school project?
- 3 Does working with ICT enhance teacher-learner relationships?

3 *Making the most of learning resources*

- 1 Is the use of resources in the classroom when using ICT generally efficient?
- 2 Does each step in a school project using ICT embody genuine progress on the learner's part?

4 *A problem solving approach*

- 1 Do learners adopt systematic strategies to cope with mistakes when they are working with ICT?
- 2 Do learners seek appropriate help from fellow learners and the teacher when working with ICT?

**Evidence at ages 5 to 14:** Learners

- 1.1 can work in groups, following specific instructions from the teacher about what they should do
- 1.2 can follow through simple steps without asking lots of questions of the teacher
- 2.1 ask sensible questions which relate to the task in hand
- 2.2 ask for confirmation that they are correct after completing each step
- 2.3 work well with the teacher in a good spirit
- 3.1 do not waste time or materials when using ICT
- 3.2 demonstrate some improved knowledge or skills at each step of a class project
- 4.1 rectify mistakes by using undo, teacher-produced task-specific guide or personal knowledge (rather than trial and error)
- 4.2 seek help from peers or teacher when encountering a problem that they cannot solve on their own

**Evidence at ages 12 to 18:** Learners

- 1.1 can role play with specific instructions from the teacher about what they should do
- 1.2 can follow through a detailed specification without asking lots of questions of the teacher
- 2.1 ask sensible questions which relate to the task in hand
- 2.2 ask for confirmation that they are correct after completing parts of a detailed specification
- 2.3 work well with the teacher in a good spirit, with an air of mutual respect
- 3.1 do not waste time or materials when using ICT
- 3.2 demonstrate improved learning at each step of a class project
- 4.1 rectify mistakes by using simple guides, personal knowledge or online help systems (rather than trial and error)
- 4.2 seek focussed help from peers or teacher when encountering a problem they cannot solve on their own

This relates to the learners' ability to work in a variety of modes (individually, in small groups, large groups, class), making best use of the teacher, learning resources in the class, school and beyond with a problem solving approach and the ability to break down a project into constituent elements

1 *Working in groups*

- 1 Are learners able to work with other learners in various groupings with limited teacher direction?
- 2 Do learners benefit from working in groups, including mutual assistance within the group?

2 *Working with the teacher*

- 1 Do learners make good use of the teacher in an ICT-based project at all times?
- 2 Do learners seek help from the teacher at important points of decision-making when involved in an ICT project?
- 3 Do learners regularly contribute to the learning of others within the class?

3 *Making the most of learning resources*

- 1 Is there an evident aura of good organisation within the classroom when using ICT, including clear delineation of learners' tasks and good access to appropriate resources?
- 2 Is little time spent in each learning session in getting under way with the tasks in hand when using ICT?

4 *A problem solving approach*

- 1 Do learners adopt systematic approaches to putting things right when they go wrong using ICT?
- 2 Do learners involve fellow learners and the teacher sensibly in the rectification of problems?
- 3 Are learners able to apply a range of strategies in the solution of any problems they meet and are they able to articulate to the teacher and others how they did it?

**Evidence at ages 5 to 14:** Learners

- 1.1 can work in groups of different composition, following outline instructions from the teacher about what they should do
- 1.2 learn from using peer support during group work
- 2.1 regularly seek teacher support on important matters
- 2.2 ask for more information when faced with choices
- 2.3 often assist others to perform a task
- 3.1 conduct themselves in a work-like manner
- 3.2 can resume a task with minimum fuss
- 4.1 analyse mistakes and then rectify them using a step by step approach
- 4.2 seek help from peers or teacher only when their own attempts have failed
- 4.3 can show others about different ways to rectify a mistake

**Evidence at ages 12 to 18:** Learners

- 1.1 can role play with other pupils following outline instructions from the teacher about what they should do
- 1.2 seek to learn from using peer support during group work
- 2.1 regularly seek teacher support to effectively support their work
- 2.2 ask for clarification when faced with choices during project work
- 2.3 often coach others through a task or concept
- 3.1 the classroom atmosphere and organisation is purposeful and learning oriented
- 3.2 can organise their resources and work quickly, with minimum fuss
- 4.1 analyse mistakes and then rectify them using a step by step approach, selecting from a range of aids
- 4.2 seek focussed help from peers or teacher when their own attempts have failed
- 4.3 can instruct others about different ways to rectify a mistake

This relates to the learners' ability to search systematically and to make contextual use of the findings from a variety of sources and to their ability to break down a project into manageable steps

### 1 *Searching and researching*

- 1 Are learners able to use a growing range of media - books, CD-ROMs, web sites and other digital sources - to glean what is relevant quickly and accurately?
- 2 Are learners aware of issues such as bias and copyright and whether or not the information is current when they are making use of digital sources of information?

### 2 *Task analysis skills*

- 1 Are learners generally able to plan the break down of a project using ICT into its component tasks?
- 2 Are learners able to record their progress with a plan for a project using ICT and to mark sources for future reference, by making notes or bookmarking?
- 3 Are learners able to refine a task repeatedly into appropriate sub-tasks when using ICT?

### 3 *Collection and analysis of information*

- 1 Do learners develop their enquiry skills - asking the appropriate questions - by using ICT?
- 2 Does the use of ICT help learners to derive relevant information from a mass of data?
- 3 Do learners develop their search skills - how to look for what they need - by using ICT?
- 4 Does learners' use of ICT for searching help to improve their search skills even when not using an ICT source?

#### **Evidence at ages 5 to 14:** Learners

- 1.1 can look through a wide range of sources, both digital and in print, to find information relevant to a project
- 1.2 can explain why they might be suspicious of using some information from a web site as objective fact, on grounds of bias or up-to-dateness
- 2.1 can plan and explain the steps involved in tackling a task using the computer
- 2.2 are able to use the favorites or bookmark facility of their web browser software to mark a site for future re-use
- 2.3 can break down a large project into manageable small steps with a little help from the teacher
- 3.1 can search a database using simple criteria
- 3.2 can interrogate a database, eg *Ourselves*, to find how many have brown hair
- 3.3 can use key words within a simple search engine
- 3.4 understanding of keyword searches enhances their use of contents pages and indexes

#### **Evidence at ages 12 to 18:** Learners

- 1.1 can examine a wide range of sources, both digital and in print, to find relevant information for a subject project
- 1.2 can explain why they might be suspicious of using some information from a web site as objective fact, on grounds of bias or up-to-dateness
- 2.1 can plan and explain the steps involved in tackling a task using the computer
- 2.2 are able to use the favorites or bookmark facility of their web browser software to mark a site for future re-use
- 2.3 can break down a large project into manageable small steps with a little help from the teacher
- 3.1 carry out research using encyclopaedias and Internet and develop and refine redrafting skills
- 3.2 refine searches to focus on relevant data
- 3.3 gain time, through the ability to refine searches, which they can deploy in the final production of a piece of work
- 3.4 use search refinement techniques practised using ICT when they are working on other pieces of work

This relates to the learners' ability to search systematically and to make contextual use of the findings from a variety of sources and to their ability to break down a project into manageable steps

### 1 *Searching and researching*

- 1 Are learners increasingly expert in refining searches of the web and electronic databases?
- 2 Are learners able to focus on data relevant to the ICT project in hand?
- 3 Are learners increasingly aware of and able to articulate the criteria by which digital information is judged, such as up-to-dateness, bias, copyright issues, fitness for purpose and relevant technicalities?

### 2 *Task analysis skills*

- 1 Are learners systematic in analysis of tasks in hand through articulation of the overall purpose and plan for a school project involving ICT?
- 2 Are learners systematic in recording their progress through a school project involving ICT and in making notes?
- 3 Are learners systematic in repeatedly refining the tasks to be tackled and in adopting an on-going evaluative approach?

### 3 *Collection and analysis of information*

- 1 Do learners continue to refine their enquiry skills - asking the appropriate questions - by using ICT?
- 2 Are learners able to derive relevant information and patterns of occurrence from a mass of data when using ICT?
- 3 Do learners continue to refine their search skills - how to look for what they need - by using ICT?
- 4 Does learners' use of ICT for searching help them to refine their search skills - including developing their ability to evaluate the information derived - even when not using an ICT source?

#### **Evidence at ages 5 to 14:** Learners

- 1.1 can track down known/unknown sites on the Web using organised favorites/bookmarks files and search engines
- 1.2 can explain their selection of digital information as being relevant to the task in hand
- 1.3 can articulate the criteria by which they judge the appropriateness of information from a range of sources for the project on which they are engaged
- 2.1 can reproduce, orally and in writing, the overall purposes of an ICT-related task and their approach to its achievement
- 2.2 keep appropriate notes and otherwise record progress in a project over an extended period of time, involving (significant) gaps between working sessions
- 2.3 can break down a large project into manageable small steps with limited teacher support and bearing in mind the success or otherwise of prior steps
- 3.1 can search a database using multiple criteria
- 3.2 can interrogate a database, eg *Ourselves*, to investigate relationships between height and weight
- 3.3 show more efficient use of search engines by using advanced search techniques
- 3.4 use a more critical approach to media, eg appropriateness, relevance, bias

#### **Evidence at ages 12 to 18:** Learners

- 1.1 can track down known/unknown sites on the Web using organised favorites/bookmarks files and search engines
- 1.2 can explain their selection of digital information as being relevant to the task in hand
- 1.3 can articulate the criteria by which they judge the appropriateness of information from a range of sources for the project on which they are engaged
- 2.1 can reproduce, orally and in writing, the overall purposes of an ICT-related task and their approach to its achievement
- 2.2 keep appropriate notes and otherwise record progress in a project over an extended period of time, involving (significant) gaps between working sessions
- 2.3 can break down a large project into manageable small steps with limited teacher support and bearing in mind the success or otherwise of prior steps
- 3.1 use search engines to target specific responses
- 3.2 refine searches which allows them to draw conclusions from the data obtained
- 3.3 refine searches which allow them to make decisions as to the appropriateness of using ICT as their research tool [also appropriate for 3.4]

This relates to learners' ability to work as part of a team, in a flexible and constructive way

1 *Communicating and collaborating*

- 1 When using ICT collaboratively, do learners take some account of the needs of their audience?
- 2 Are learners willing to share the workload and the credit by working in groups?

2 *Working in groups*

- 1 Are learners able to work with others in roles which have been outlined by the teacher?
- 2 Can learners manage the steps involved in a school project without frequent recourse to the teacher?
- 3 Do learners benefit from working in groups including mutual assistance within the group?

**Evidence at ages 5 to 14:** Learners

- 1.1 discuss in a group the purpose of the presentation and the information required
- 1.2 share the workload and credit when working in groups
- 2.1 understand their own role (which has been outlined by the teacher) in a project and within their group
- 2.2 are able to organise the steps in a project with some teacher input
- 2.3 show willingness to work as part of a group with teacher support

**Evidence at ages 12 to 18:** Learners

- 1.1 discuss in a group the aspects of an investigation and needs of the audience eg purpose, audience and information presented
- 1.2 share the workload and credit when working in groups
- 2.1 can explain their own role (which has been outlined by the teacher) in a project and within their group
- 2.2 are able to plan and organise the steps in a project with some teacher input
- 2.3 show willingness to work as part of a group with limited teacher support

This relates to learners' ability to work as part of a team, in a flexible and constructive way

1 *Communicating and collaborating*

- 1 When using ICT collaboratively, do learners take account of the needs of their audience, and refine presentation and content appropriately?
- 2 Can learners be trusted to manage aspects of their communications such as electronic mail?

2 *Working in groups*

- 1 Are learners able to work with other learners in various groupings with limited teacher direction?
- 2 Can learners manage the steps involved in a school project without frequent recourse to the teacher?
- 3 Do learners benefit from working in groups, including mutual assistance within the group?

**Evidence at ages 5 to 14:** Learners

- 1.1 consider various needs of the audience taking into account the purpose of the presentation, audience age
- 1.2 are able to manage their electronic mail in accordance with school's acceptable use policy
- 2.1 liaise with group members to organise their role within a group with limited teacher input
- 2.2 are able to plan and organise the steps in a project with limited teacher support
- 2.3 appreciate the benefits of group work

**Evidence at ages 12 to 18:** Learners

- 1.1 consider various needs of the audience taking into account the purpose of the presentation, audience age and expertise and can refine a presentation accordingly
- 1.2 are able to manage their electronic mail in accordance with school's acceptable use policy for pupils
- 2.1 liaise with group members to organise their role within a group without teacher input
- 2.2 are able to plan and organise the steps in a project without teacher support
- 2.3 are able to explain and apply skills gained through group work

This relates to the degree of learners' enthusiasm, pride in work, enterprise and active participation in their own learning

1 *Enthusiasm and enterprise*

- 1 Do learners make an attempt to focus on the task in hand and avoid distractions when working with ICT?
- 2 Are learners sometimes willing to try to meet challenges, individually and in groups, when working with ICT?

2 *Pride in work*

- 1 Do learners take care to produce work which meets the success criteria laid down by the teacher?

3 *Enterprise and active participation in their own learning*

- 1 Are learners generally willing to try out new approaches in their work when using ICT?

**Evidence at ages 5 to 14:** Learners

- 1.1 are reasonably willing to persevere and find solutions when difficulties arise and sometimes ask questions about the ICT work in hand
- 1.2 display some enjoyment and collaborate fairly willingly with others using ICT
- 2.1 are motivated to produce classwork and homework of reasonable quality and sometimes want to improve their work by editing and improving presentation, using appropriate software
- 3.1 show some interest in exploring new facilities and functions within software packages

**Evidence at ages 12 to 18:** Learners

- 1.1 are reasonably willing to persevere and find solutions when difficulties arise and sometimes ask questions about the ICT work in hand
- 1.2 display some enjoyment, show some willingness to take responsibility for their own learning and collaborate fairly willingly with others using ICT
- 2.1 are motivated to produce classwork and homework of reasonable quality and sometimes want to improve their work by editing and improving presentation, using appropriate software
- 3.1 show some interest in exploring new facilities and functions within software packages

This relates to the degree of learners' enthusiasm, pride in work, enterprise and active participation in their own learning

1 *Enthusiasm and enterprise*

- 1 Do learners focus on the task in hand and avoid distractions when working with ICT?
- 2 Are learners evidently enthusiastic in meeting challenges, both individually and in groups, when working with ICT?

2 *Pride in work*

- 1 Do learners always take care to produce work which meets and sometimes appropriately exceeds the success criteria laid down by the teacher?

3 *Enterprise and active participation in their own learning*

- 1 Do learners willingly try out new approaches in their work when using ICT?

**Evidence at ages 5 to 14:** Learners

- 1.1 are keen to persevere, find relevant solutions when difficulties arise and ask pertinent questions about the ICT work in hand
- 1.2 display evident enjoyment and collaborate willingly with others using ICT
- 2.1 are motivated to produce classwork and homework of high quality and are keen to improve their work by editing and improving presentation, perhaps using desktop publishing and presentation software
- 3.1 show evident interest in exploring new facilities or functions within software packages

**Evidence at ages 12 to 18:** Learners

- 1.1 are keen to persevere, find relevant solutions when difficulties arise and ask pertinent questions about the ICT work in hand
- 1.2 display evident enjoyment, are keen to take responsibility for their own learning and collaborate willingly with others using ICT
- 2.1 are motivated to produce classwork and homework of high quality and are keen to improve their work by editing and improving presentation, perhaps using desktop publishing and presentation software
- 3.1 show evident interest in exploring new facilities or functions within software packages

This relates to teachers' and school managers' focus on setting expectations for continuing but realistic progress in the uses of ICT and of putting it into a wider context

1 *Progression in learning*

- 1 Are teachers aware of progressions of which ICT methods are capable, even when they are not personally comfortable with every technique?
- 2 Is there a variety of interactions within classrooms using ICT, including direct teaching (for technique, introducing purpose of task, evaluation), group tasks and individual tasks?
- 3 Are there inclusive practices ensuring involvement of all learners in ICT activity?

2 *Development of new teaching styles*

- 1 Are teachers aware of new pedagogical styles which using ICT facilitates?
- 2 Are teachers experimenting with forms of collaborative learning when using ICT?

3 *Enable learners to modify information in a variety of forms, including text, graphical objects, moving images, sounds and web pages*

- 1 Do teachers help learners to draft and redraft in text, graphics and multimedia forms?
- 2 Do teachers encourage the use of a growing range of software tools in a systematic way?
- 3 Do teachers insist on regard for rules about file management (eg where to save or print) appropriate to the circumstances?
- 4 Do teachers ensure that learners pay attention to the objectives of the task for which digital information is being used?

4 *Encourage development of informed attitudes in relation to ICT in society*

- 1 Does the learning environment begin to relate classroom activities to the wider world?
- 2 Are teachers trying to broaden learners' appreciation of how school activity relates to the uses of ICT in society to reflect the learners' stage of maturation?
- 3 Do teachers help learners to understand the impact for a range of issues - such as impact on privacy and the changing nature of the world of work - of new ways to process information?

**Evidence at ages 5 to 14:** The school

- 1.1 staff are aware of the range of available uses of ICT and conscious that these should be deployed in a progressive way throughout the curriculum
- 1.2 is characterised by use of ICT which involves different forms of teacher-learner and learner-learner interaction
- 1.3 encourages staff to involve all learners in curriculum-related ICT activities
- 2.1 ensures all staff are aware of how their role can encourage learning through ICT
- 2.2 encourages staff to explore and experiment with different forms of collaborative activity involving computers
- 3.1 staff encourage learners to draft and redraft text and multimedia work
- 3.2 staff integrate a range of software tools in their teaching and learning relevant to the stage/experience of learners
- 3.3 has specific rules and procedures for file management
- 3.4 staff encourage learners to use digital tools and digital information as a means to an end
- 4.1 staff locate some ICT activities to a real world context
- 4.2 helps pupils appreciate how ICT is used in wider society
- 4.3 staff develop learners' appreciation/understanding of the effects ICT can have on aspects of their personal life

**Evidence at ages 12 to 18:** The school

- 1.1 staff are aware of the range of available uses of ICT and conscious that these should be deployed in a progressive way in their subject and across the curriculum
- 1.2 is characterised by use of ICT which involves different forms of teacher-learner and learner-learner interaction in all subject areas
- 1.3 encourages staff to involve all learners in curriculum-related ICT activities
- 2.1 ensures all staff are aware of how their role can encourage learning through ICT in their subject
- 2.2 encourages staff to explore and experiment with different forms of collaborative activity involving computers
- 3.1 staff encourage learners to draft and redraft text, graphic and multimedia work and use presentation software tools
- 3.2 staff integrate a range of software tools in their teaching and learning relevant to the stage/experience of learners
- 3.3 has specific rules and procedures for file management
- 3.4 staff encourage learners to use digital tools and digital information as a means to an end
- 4.1 staff increasingly locate ICT activities to the real world
- 4.2 helps pupils appreciate and understand how and why ICT is used in wider society
- 4.3 staff develop learners' appreciation/understanding of the effects/implications of ICT for their personal life

This relates to teachers' and school managers' focus on setting expectations for continuing but realistic progress in the uses of ICT and of putting it into a wider context

1 *Progression in learning*

- 1 Do programmes of work allow for a diversity of entry points into tasks as well as a variety of satisfying exit points, to cater for different needs?
- 2 Are teachers aware of the need to refine and rephrase requests and instructions to reflect different prior experience and abilities on the part of learners?
- 3 Is there a discernible effort to ensure that all learners gain a range of experience of ICT use appropriate to their age, experience and needs?
- 4 Is there an effort to transfer skills practised using ICT to other learning situations?

2 *Development of new teaching styles*

- 1 Is there widespread teacher exploration of new pedagogical styles when using ICT?
- 2 Is there widespread use of collaborative learning using ICT tools?

3 *Enable learners to modify information in a variety of forms, including text, graphical objects, moving images, sounds and web pages*

- 1 Do teachers offer learners experience of text, graphical, numeric and multimedia data forms?
- 2 Do teachers help learners to deploy a variety of software tools, and options within those tools, to create and modify information?
- 3 Do teachers foster an understanding of the need for file management (eg where to save or print their work) and for the purposes of the exercise for which they are using the digital information?

4 *Encourage development of informed attitudes in relation to ICT in society*

- 1 Do teachers help learners to articulate ways in which school activity relates to economic, social and other activity in the wider world, including an appreciation of the impacts of ICT?
- 2 Does the learning environment effectively draw learners' attention to wider issues eg privacy, changing nature of work, copyright and developing technologies?

**Evidence at ages 5 to 14:** The school

- 1.1 has programmes of work which cater fully for learners with different needs/experience/skills in ICT
- 1.2 ensures staff are aware of the different ICT needs/experience/skills of their learners and plan lessons and set tasks accordingly
- 1.3 has an ICT policy stressing the importance of providing a range of appropriate ICT experiences to all learners
- 1.4 staff encourage learners to see the potential transferability of ICT skills across the curriculum
- 2.1 helps staff to experiment with different ways of interacting with learners when using ICT
- 2.2 uses ICT to foster many forms of collaborative learning
- 3.1 staff present many forms of digital information for exploration across all areas of the curriculum
- 3.2 staff encourage learners to use a variety of software tools to create and modify information resources
- 3.3 staff help learners understand why file management systems are necessary
- 4.1 ensures learners are helped to appreciate how various school activities mirror or relate to activities outwith school and appreciate the impact of ICT on society
- 4.2 ensures that, where relevant, learners are made aware of issues such as privacy and copyright

**Evidence at ages 12 to 18:** The school

- 1.1 ensures all subjects have programmes of work which cater fully for learners with different needs/experience/skills in ICT
- 1.2 ensures staff are aware of the different ICT needs/experience/skills of their learners and plan lessons and set tasks accordingly
- 1.3 has an ICT policy stressing the importance of providing a range of appropriate ICT experiences to all learners
- 1.4 staff encourage learners to see the potential transferability of ICT skills across the curriculum
- 2.1 helps staff to experiment with different ways of interacting with learners when using ICT in their subject
- 2.2 uses ICT to foster many forms of collaborative learning
- 3.1 staff present many forms of digital information for exploration in many areas of their subjects
- 3.2 staff encourage learners to use a variety of software tools to create, modify, analyse and interpret information resources
- 3.3 staff help learners understand why file management systems are necessary and how ICT offers solutions
- 4.1 ensures learners are helped to appreciate how various subject activities mirror or relate to activities outwith school and appreciate the impact of ICT on society
- 4.2 ensures that learners are made aware of issues such as privacy, copyright, impact on world of work

This relates to the setting and maintaining of high standards by learners on the part of teachers and school managers

1 *Assessment policies*

- 1 Is some use made of self-assessment techniques, such as maintenance of logs by learners and completion of checklists by teachers?
- 2 Is each learner's progress in refining their skills, insights and attitudes in ICT being monitored?
- 3 Is continuous assessment the norm, often built into project work, while being a reliable assessment of individual learner's achievements?

2 *Relationship to development planning priorities*

- 1 Is ICT seen to be making contributions to one or more of the school's development planning priorities, even if ICT is not itself a priority?

3 *Planning of resources*

- 1 Is there a culture of participation in the school in the ways that additional resources are acquired?
- 2 Are the needs of learners (rather than a desire for the latest technology) the key consideration in resource planning?

4 *Breadth of experience of ICT use in context*

- 1 Is ICT used for a range of purposes within appropriate learning contexts (rather than an extra element demanding time in the curriculum)?
- 2 Is there evidence of positive, rather than restrictive, coordination between teachers (and others) to maximise the progress which learners make in their uses of ICT?

**Evidence at ages 5 to 14:** The school

- 1.1 involves young learners in appropriate exercises in self-assessment, perhaps including completion of progress logs
- 1.2 has systematic monitoring of individual progress in development of ICT skills, insights and attitudes
- 1.3 has addressed the issues associated with continuous assessment of individual progress within collective project work
- 2.1 uses ICT as part of the processes of development planning, eg for drafting and redrafting, to permit a range of contributions to be pulled together
- 3.1 gives all teachers and others a chance to contribute to discussions about purchase of new ICT resources
- 3.2 explores the learning advantages which may derive from the purchase of the latest technology
- 4.1 ensures that ICT is not treated as a 'bolt on' extra to the curriculum but genuinely permeates learning activities
- 4.2 promotes teacher collaboration at all stages to try to develop a progression in learning which is coherent and continuous

**Evidence at ages 12 to 18:** The school

- 1.1 involves learners in appropriate exercises in self-assessment, perhaps including completion of progress logs, across a range of subjects
- 1.2 has systematic monitoring of individual progress in development of ICT skills, insights and attitudes in other subjects as well as computing
- 1.3 has addressed the issues associated with continuous assessment of individual progress in ICT within other subject activity
- 2.1 uses ICT as part of the processes of development planning, eg for collaboratively drafting and redrafting departmental/subject plans
- 3.1 gives all the chance to contribute to discussions about purchase of new ICT resources for school or departmental use
- 3.2 explores the learning advantages which may derive from the purchase of the latest technology
- 4.1 ensures that ICT is increasingly seen to permeate learning activities in all secondary subjects
- 4.2 promotes teacher collaboration in all subjects to develop a coherent and continuous progression in learning which meshes with the core skills framework

This relates to the setting and maintaining of high standards by learners on the part of teachers and school managers

### 1 *Assessment policies*

- 1 Is assessment usually varied and serving a range of purposes, including formative assessment of progress in a diversity of situations?
- 2 Do school assessment policies include deepening and broadening of skills in ICT?
- 3 Do assessment policies include assessment of progress with an ability to report on appropriate 'next steps' for individual learners?

### 2 *Relationship to development planning priorities*

- 1 Is ICT used for a wide range of special educational needs, including the need to stretch those capable of more rapid progress in their learning?
- 2 Does ICT feature as an important element in discussion of priorities for the school's evolving development plan?

### 3 *Planning of resources*

- 1 Is there shared ownership of the school's policies on the use of ICT?
- 2 Does the school have open-minded policies for sharing of resources rather than a tendency towards garnering personal resources?
- 3 Are there workable school policies on those aspects of ICT use which reflect the benefits of coordination, such as Internet access, progression in the use of software tools, the purchase of consumable items, and staff development?

### 4 *Breadth of experience of ICT use in context*

- 1 Is there a supportive environment in which ICT is used to help teachers and others to communicate with each other and with fellow professionals elsewhere?
- 2 Is the paramount concern of school planning to ensure a progression in the skills, insights and attitudes which learners develop as they experience broadening and deepening of their uses of ICT?

#### **Evidence at ages 5 to 14:** The school

- 1.1 plans opportunities for assessment of progress in ICT at appropriate intervals throughout the curriculum
- 1.2 monitors progress in learners' development of ICT skills as to breadth and depth
- 1.3 articulates appropriate next steps in ICT for individual learners
- 2.1 uses ICT to add to the instruments available to teachers for appropriately differentiated learning
- 2.2 always considers the potential contributions of ICT to the school's development plan
- 3.1 has a participative culture when making decisions about ICT
- 3.2 affords teachers at all stages realistic access to expensive and occasionally used resources
- 3.3 has a planned progression in the use of software tools through the stages
- 4.1 has teachers who are comfortable with a wide range of uses of ICT for communication and planning
- 4.2 has realistic working policies about progressions in ICT learning

#### **Evidence at ages 12 to 18:** The school

- 1.1 plans opportunities for assessment of progress in ICT at appropriate intervals in all subjects
- 1.2 monitors progress in learners' development of ICT skills as to breadth and depth
- 1.3 articulates appropriate next steps in ICT for individual learners
- 2.1 uses ICT to add to the instruments available to teachers for appropriately differentiated learning in all subjects
- 2.2 always considers the potential contributions of ICT to the school's development plan
- 3.1 has a participative culture when making decisions about ICT
- 3.2 affords teachers in all subjects realistic access to expensive and occasionally used resources
- 3.3 has a planned progression in the use of software tools through the years and in all subjects
- 4.1 has teachers who are comfortable with a wide range of uses of ICT for communication and planning
- 4.2 has realistic working policies about progressions in ICT learning

This relates to teachers' and school managers' policies and practices in helping learners to feel a sense of community, to take pride in their work and to be willing to experiment

1 *Use of ICT to enhance school ethos*

- 1 Does ICT contribute to school ethos, including a range of communications to parents through newsletters and possibly more ambitious forms of collective display such as intranet/Internet communications?
- 2 Do teachers avoid being overly restricted by security aspects when they are using ICT?
- 3 Is there evidence of some activity using ICT involving the wider school community, for example parents and learners?

2 *Encourage pride in work*

- 1 Do teachers promote care in learners' preparation of work using ICT which meets laid down success criteria?
- 2 Do teachers foster an atmosphere which encourages willingness to trial, to draft and redraft and to model?

3 *Encourage enterprise and the exploration of new approaches*

- 1 Do teachers value and encourage learners to be enterprising?
- 2 Do teachers value and urge learners to try out new approaches?

**Evidence at ages 5 to 14:** The school

- 1.1 distributes forms of communication using ICT, eg weekly diary, newsletters, timetables, pupil information from a created structure and perhaps a school website
- 1.2 tries to ensure that good access to ICT hardware and software is not limited by security issues
- 1.3 undertakes some projects to promote links with the wider community - parents, business, other agencies
- 2.1 encourages learners to produce quality work
- 2.2 uses ICT on occasions to produce quality work through a process of review and evaluation
- 3.1 encourages learners to be creative some of the time
- 3.2 encourages learners to explore different ways of completing tasks some of the time

**Evidence at ages 12 to 18:** The school

- 1.1 uses ICT to produce and distribute to staff some internal information (eg daily absence lists and bulletins) and to produce external information (eg school newsletters, special events published on the school web site)
- 1.2 tries to ensure that security issues do not constrain staff or learner use of ICT
- 1.3 undertakes projects to promote links with the wider community - parents, business, other agencies
- 2.1 helps some learners to produce quality work through a positive atmosphere of encouragement
- 2.2 uses ICT widely in some subject departments to produce quality work through a process of review and evaluation
- 3.1 encourages learners to be creative in some subject departments
- 3.2 encourages learners to explore different ways of completing tasks in some subject departments

This relates to teachers' and school managers' policies and practices in helping learners to feel a sense of community, to take pride in their work and to be willing to experiment

1 *Use of ICT to enhance school ethos*

- 1 Is there evidence of innovation, cooperation and collaboration using ICT involving the wider school community?
- 2 Is there a culture of appreciation of the potential advantages of ICT for learning rather than a dread of the insupportable workload implications among school staff?
- 3 Is there evidence of well embedded activity using ICT involving the wider school community, for example parents and learners?

2 *Encourage pride in work*

- 1 Do teachers consistently promote care in the preparation of work using ICT which overtakes the laid down criteria for success?
- 2 Do teachers support eagerness on the part of learners to trial, to draft and redraft and to model?

3 *Encourage enterprise and the exploration of new approaches*

- 1 Do teachers create an atmosphere conducive to learners suggesting and trialling new approaches and worthwhile strategies?
- 2 Do teachers promote an atmosphere in which learners are keen to evaluate the success of a chosen strategy and to do so publicly?

**Evidence at ages 5 to 14:** The school

- 1.1 clearly makes use of ICT in learning situations involving the wider school community
- 1.2 staff appreciate the advantages of using ICT for learning
- 1.3 undertakes many projects to promote links with the wider community - parents, learners, business, other agencies
- 2.1 encourages and expects learners to produce work of a high quality containing a variety of appropriate elements
- 2.2 helps learners to clearly demonstrate through their work practices a willingness to trial, draft, redraft and model
- 3.1 is receptive to suggestions about new approaches and worthwhile strategies
- 3.2 encourages learners to be innovative and share their findings with their peers and others

**Evidence at ages 12 to 18:** The school

- 1.1 uses ICT to produce and distribute internal information to staff and departments with efficiency and imagination and external information with sensitivity to the needs of external partners
- 1.2 makes sure that security does not limit access to ICT hardware and software in all subject departments
- 1.3 undertakes many projects to promote links with the wider community - parents, learners, business, other agencies
- 2.1 encourages and expects learners to produce quality work appropriate to the specific subject
- 2.2 helps learners to clearly demonstrate through their work practices a willingness to trial, draft, redraft and model
- 3.1 promotes a positive atmosphere to prevail where learners are encouraged to suggest and trial new approaches and worthwhile strategies where appropriate
- 3.2 encourages learners to be innovative and share their findings with their peers and others

This relates to teachers' competence in the use of ICT to support their productivity as facilitators of learning

- 1 *Skills in the use of general purpose software for production/modification of learning and teaching materials*
  - 1 Can teachers produce straightforward print documents for learning and teaching purposes with a limited range of media?
  - 2 Are teachers able to make straightforward adaptations to templates or other standard materials to customise them for their own purposes?
  - 3 Are teachers able to prepare a slide show or equivalent presentation related to their needs for learning and teaching?
- 2 *Skills in the use of computer tools for recording, reporting, registration, course planning and other aspects of the processes of management of learning*
  - 1 Can teachers cope with standard school or EA educational management information systems
  - 2 Can teachers make appropriate use of spreadsheets and databases (or other software tools) for recording progress within their own programmes of work?
- 3 *Skills in the use of communication tools such as electronic mail and the World Wide Web to communicate appropriate information and gather resources relevant to professional activities*
  - 1 Do teachers have basic skills to send and receive electronic mail?
  - 2 Do teachers know how to access appropriate sites on the Web?

**Evidence at ages 5 to 14:** Teachers

- 1.1 can prepare straightforward instruction cards using text and simple illustrations
- 1.2 can adapt materials related to early intervention schemes for reading at level A
- 1.3 are able to prepare a *HyperStudio* presentation (or equivalent) to illustrate a point or concept they are teaching their class about any topic they are studying
- 2.1 know how to get information from the management information system used in their school about pupil attainments related to target setting
- 2.2 can use spreadsheet or database software to record progress in Personal writing at any level
- 3.1 know how to send and receive electronic mail within and beyond the school
- 3.2 know how to navigate the Web and to store favorites/bookmarks for sites about a subject of current interest

**Evidence at ages 12 to 18:** Teachers

- 1.1 can prepare straightforward worksheets for a Standard Grade topic using text and simple illustrations
- 1.2 can adapt materials related to courses at all levels in their subject
- 1.3 are able to prepare a *PowerPoint* presentation (or equivalent) to illustrate a point or concept they are teaching their class
- 2.1 know how to get information from the management information system used in their school about pupil attainments related to target setting at Standard Grade
- 2.2 can use spreadsheet or database software to record progress in the relevant outcomes within the 5–14 programme or any other course
- 3.1 know how to send and receive electronic mail within and beyond the school
- 3.2 know how to navigate the Web and to store favorites/bookmarks for sites about a topic they are developing for a course in their subject

This relates to teachers' competence in the use of ICT to support their productivity as facilitators of learning

- 1 *Skills in the use of general purpose software for production/modification of learning and teaching materials*
  - 1 Can teachers produce a flexible range of print documents, embodying an appropriate range of media, for differentiated learning and teaching?
  - 2 Do teachers show imagination in the customisation of template or other standard source materials to reflect the diverse needs of learners?
  - 3 Are teachers able to use movies, animation, sound and other multimedia elements when they are preparing a slide show, web page or equivalent presentation for learning and teaching?
- 2 *Skills in the use of computer tools for recording, reporting, registration, course planning and other aspects of the processes of management of learning*
  - 1 Can teachers demonstrate independent, effective use of standard school or EA educational management information systems?
  - 2 Do teachers demonstrate independent, effective use of generic software to record progress and improve teaching and learning?
- 3 *Skills in the use of communication tools such as electronic mail and the World Wide Web to communicate appropriate information and gather resources relevant to professional activities*
  - 1 Do teachers have skills to send, receive and manage electronic mail, including handling attachments?
  - 2 Can teachers search efficiently for known and unknown sites on the World Wide Web?
  - 3 Are teachers capable in capturing text and graphics resources from the World Wide Web?

**Evidence at ages 5 to 14:** Teachers

- 1.1 can produce a range of versions of learning materials for a topic study, to reflect different paces of learning and interests among the learners
- 1.2 show initiative in making adaptations to materials supplied to them for standard areas of the curriculum, to meet the different needs of different learners
- 1.3 can use *HyperStudio* (or equivalent) to incorporate a wide range of multimedia elements to introduce a new concept within project work
- 2.1 can get the information they need from the school's management information system about patterns of attainment on the part of the learners in their charge
- 2.2 use spreadsheet software to keep a record of individual attainment of skills built into planning of a topic study
- 3.1 routinely send, receive, forward, file, print and delete electronic mail messages
- 3.2 are able to create and use a favorites or bookmarks file to revisit useful web sites and to use an appropriate search engine to look for materials in unfamiliar web sites
- 3.3 can copy materials in text and graphical forms from web sites with due regard to copyright

**Evidence at ages 12 to 18:** Teachers

- 1.1 can produce a range of versions of learning materials for a course or topic, to reflect different paces of learning and starting points among the learners
- 1.2 show initiative in making adaptations to materials supplied to them (eg for Higher Still units), to meet the different needs of different learners
- 1.3 can use *PowerPoint* (or equivalent) to incorporate a wide range of multimedia elements to introduce a new concept
- 2.1 can get the information they need from the school's management information system about patterns of attainment on the part of the learners in their charge
- 2.2 use spreadsheet software to record individual attainment of skills associated with relevant strands in the 5-14 programme or other schemes of work
- 3.1 routinely send, receive, forward, file, print and delete electronic mail messages
- 3.2 are able to create and use a favorites or bookmarks file to revisit useful web sites and to use an appropriate search engine to look for materials in unfamiliar web sites
- 3.3 can copy materials in text and graphical forms from web sites with due regard to copyright

**Outcome: Teacher facilitating the learning of ICT principles and good habits [12] Level: 2**

This relates to teachers' ability to develop their role as a facilitator of learning about ICT skills, insights and attitudes and to teachers' ability to make realistic contributions to holistic planning of children's learning experiences in ICT

- 1 *Developing confidence in the role of guide in a situation of less than perfect mastery (and contrary to the worthy Scottish tradition of thoroughness of knowledge)*
  - 1 Are teachers aware of national and local curricular guidance about progressions in the development of ICT skills?
  - 2 Are teachers able to anticipate some of the operational difficulties when learners are making use of ICT within a curricular context?
  - 3 Are teachers being good role models by deploying good habits in their use of ICT tools and systematically resolving problems which are encountered?
- 2 *Balancing the established traditions of professional discretion and holistic planning for the benefit of learners through an appropriately coordinated whole school approach to the progressive acquisition of knowledge, skills and attitudes*
  - 1 Do teachers show willingness to subsume their own preferences and habits to fit in with the legitimate needs of a whole school policy designed to develop understanding?
  - 2 Are teachers able to audit their schemes of work to identify progressions in ICT as well as in the core subject matter?

**Evidence at ages 5 to 14: Teachers**

- 1.1 are aware of the 5-14 guidelines on ICT and how they relate to realistic progress in the development of ICT skills
- 1.2 build 'technical training' into class preparations for use of a software program to ensure that learners know how to get going and make best use of the program for their learning
- 1.3 are seen to be making use of manuals, online help or other forms of help when they meet a problem and are conscious of their role model status
- 2.1 pay attention to policies and ongoing discussions in the school about overall policies for the development and consolidation of ICT skills throughout learners' school experience
- 2.2 build opportunities to note attainment of ICT skills (and problems regarding this attainment) into their schemes of work

**Evidence at ages 12 to 18: Teachers**

- 1.1 are aware of the 5-14 guidelines on ICT and the core skill in IT for Higher Still courses and how they relate to realistic progress in the development of ICT skills
- 1.2 build 'technical training' into class preparations for use of a software program to ensure that learners know how to get going and make best use of the program for their learning
- 1.3 are seen to be making use of manuals, online help or other forms of help when they meet a problem and are conscious of their role model status
- 2.1 pay attention to policies and ongoing discussions in the school about overall policies for the development and consolidation of ICT skills in all subjects and throughout learners' school experience
- 2.2 build opportunities to note attainment of ICT skills (and problems regarding this attainment) into their schemes of work

**Outcome: Teacher facilitating the learning of ICT principles and good habits [12] Level: 4**

This relates to teachers' ability to develop their role as a facilitator of learning about ICT skills, insights and attitudes and to teachers' ability to make realistic contributions to holistic planning of children's learning experiences in ICT

- 1 *Developing confidence in the role of guide in a situation of less than perfect mastery (and contrary to the worthy Scottish tradition of thoroughness of knowledge)*
  - 1 Are teachers knowledgeable about national and local curricular guidance about progressions in development of ICT skills and their relationship to subject and/or stage?
  - 2 Are teachers able to deal with most of the operational difficulties they meet when they are making use of ICT within a curricular context?
  - 3 Do teachers cultivate good habits in the use of ICT software tools and adopt systematic resolution to problems when they are met - and build these habits and solutions into lesson planning?
- 2 *Balancing the established traditions of professional discretion and holistic planning for the benefit of learners through an appropriately coordinated whole school approach to the progressive acquisition of knowledge, skills and attitudes*
  - 1 Are teachers able to contribute usefully to school policies on ICT skills development?
  - 2 Can teachers use their own schemes of work to add value to overall school schemes for the development of ICT skills?

**Evidence at ages 5 to 14: Teachers**

- 1.1 are familiar with 5-14 ICT guidelines and local/school implementation policy and how these can be delivered through permeation of the entire 5-14 curriculum
- 1.2 build appropriate training into their programmes of work to prepare learners to make best use of any software package they are using and can deal with most of the tangents on which curious young learners embark
- 1.3 demonstrate systematic use of software tools, including appropriate shortcuts and tool options, and adopt methodical ways to resolve mistakes when they happen
- 2.1 are able to suggest ways in which the school can build progressions in ICT skills into the school's overall programmes
- 2.2 routinely introduce and consolidate ICT skills within their school project work which are consistent with the overall school programmes

**Evidence at ages 12 to 18: Teachers**

- 1.1 are familiar with 5-14 ICT guidelines, Higher Still baseline guidance for their subject and local/school implementation policy and with how these can be delivered through permeation of the entire 12-18 curriculum
- 1.2 build appropriate training into their schemes of work to prepare learners to make best use of any software package they are using and can deal with most of the tangents on which curious learners embark
- 1.3 demonstrate systematic use of software tools, including appropriate shortcuts and tool options, and adopt methodical ways to resolve mistakes when they happen
- 2.1 are able to suggest ways in which the school can build progressions in ICT skills into the school's overall programmes
- 2.2 routinely introduce and consolidate ICT skills within their subject work at all stages which are consistent with the overall school programmes

This relates to skills in the selection, customisation and best use of appropriate software tools, to the development of new teaching styles embodying ICT use and to technical understanding to overcome routine operational problems

- 1 *Skills in selection, customisation or configuration and best use of appropriate software tools (generic software, communications facilities like the Web, reference CD-ROMs) and ready-made software appropriate to subject/theme*
  - 1 Are teachers aware of the ICT elements relevant to national and local curricular guidance for their subject(s) and/or stage(s)?
  - 2 Are teachers able to apply appropriate pedagogical and technical criteria to the selection of appropriate ICT learning resources?
  - 3 Are teachers able to articulate sensible configuration of ICT hardware or software for their purpose?
  - 4 Are teachers able to anticipate where use of ICT tools may obscure the development of understanding of important underlying skills or concepts in the subject matter for which it is used?
- 2 *Development of new teaching styles*
  - 1 Are teachers aware of new pedagogical styles which use of ICT facilitates?
  - 2 Are teachers experimenting with forms of collaborative learning when using ICT?
- 3 *Sufficient knowledge to overcome everyday operational problems*
  - 1 Do teacher know that changes can be made to the settings of the computer?
  - 2 Are teachers respectful of the need for certain settings for computers whose use they share with others?
  - 3 Are teachers able to report difficulties clearly to appropriate support agencies?

**Evidence at ages 5 to 14:** Teachers

- 1.1 know how ICT can contribute to learning within all areas of the curriculum at all levels of the 5-14 guidelines
- 1.2 can determine from a catalogue whether or not software is worth closer examination for their schemes of work and works on the computers to which they have access
- 1.3 are able to transform the installation notes for a software package into a configuration to suit learners/computers
- 1.4 know the operation of a software package sufficiently to anticipate which elements may obscure an important underlying concept and take appropriate remedial action
- 2.1 explore ways in which the use of the computers in the classroom and elsewhere can be used to extend the ways of learning which learners experience
- 2.2 use different forms of group activity with computers
- 3.1 are aware of ways (eg control panel) in which the operating environment can be set up to better suit the needs of their learners and know school procedures
- 3.2 understand that others may use computers with different settings and for different purposes and are aware of ways in which their learners could upset these settings
- 3.3 can explain symptoms of failure to appropriate agencies

**Evidence at ages 12 to 18:** Teachers

- 1.1 know how ICT can contribute to learning in their subject within courses at all levels
- 1.2 can determine from a catalogue whether or not software is worth closer examination for their subject and works on the computers to which they have access
- 1.3 are able to transform the installation notes for a software package into a configuration to suit learners/computers
- 1.4 know the operation of a software package sufficiently to anticipate which elements may obscure an important underlying concept and take appropriate remedial action
- 2.1 explore ways in which the use of single computers in the classroom and sets of computers in school suites can extend ways of learning which learners experience
- 2.2 use different forms of group activity with computers
- 3.1 are aware of the ways (eg control panel) in which the operating environment can be set up to better suit the needs of their learners and know school procedures
- 3.2 understand that others may use computers with different settings and for different purposes and are aware of ways in which their learners could upset these settings
- 3.3 can explain symptoms of failure to appropriate agencies

This relates to skills in the selection, customisation and best use of appropriate software tools, to the development of new teaching styles embodying ICT use and to technical understanding to overcome routine operational problems

- 1 *Skills in selection, customisation or configuration and best use of appropriate software tools (generic software, communications facilities like the Web, reference CD-ROMs) and ready-made software appropriate to subject/theme*
  - 1 Are teachers aware of developments for adding value through the use of ICT in their subject(s) and/or stage(s)?
  - 2 Are teachers able to identify and apply appropriate technical and pedagogical criteria for selection of appropriate ICT resources?
  - 3 Are teachers able to articulate the optimal configuration of resources to maximise the usefulness of the ICT resources for their curricular purpose?
  - 4 Are teachers able to judge progress in the development of ICT skills and understanding as well as in core curricular purpose and are they able to identify underlying conceptual problems which may be hidden by the use of ICT resources?
  - 5 Are teachers able to make learning more responsive to individual needs and interests through effective use of ICT resources?
- 2 *Development of new teaching styles*
  - 1 Is there widespread teacher exploration of new pedagogical styles when using ICT?
  - 2 Is there widespread use of collaborative learning using ICT tools?
- 3 *Sufficient knowledge to overcome everyday operational problems*
  - 1 Are teachers capable of controlling the computer environment in an optimal way for their curricular purpose?
  - 2 Are teachers able to modify settings on a temporary basis and restore them to meet the needs of others who share use of the computer?
  - 3 Can teachers deal with routine technical difficulties when they arise and explain serious problems to appropriate support agencies?

**Evidence at ages 5 to 14:** Teachers

- 1.1 are conversant with ways in which appropriate ICT resources can be used to maximise learning for a range of subjects and stages throughout the 5-14 curriculum
- 1.2 can make use of an on-line database to pinpoint software which might be worth seriously considering for their use
- 1.3 know how to install and configure software or hardware resources to best suit the learning environment
- 1.4 can simultaneously chart progress in the subject matter and the development of appropriate ICT skills and can identify where the software may obscure understanding of important concepts and take remedial action
- 1.5 know how to make use of the options within software packages to best meet the needs and interests of learners
- 2.1 use the computers in the classroom and elsewhere for a variety of individual, group and whole class learning
- 2.2 foster ways in which learners work with others, in and beyond school, to develop projects and extend learning
- 3.1 are familiar with a wide range of options for the configuration of their computer environment
- 3.2 can temporarily set up aspects of operating systems and application software to suit particular circumstances
- 3.3 are able to deal with most of the problems arising and can articulate the symptoms to appropriate agencies

**Evidence at ages 12 to 18:** Teachers

- 1.1 are conversant with the ways in which appropriate ICT resources can be used to maximise learning within their subjects at all levels from S1 to S5/S6
- 1.2 can make use of an on-line database to pinpoint software which might be worth seriously considering for their use
- 1.3 know how to install and configure software or hardware resources to best suit the learning environment
- 1.4 can simultaneously chart progress in the subject matter and the development of appropriate ICT skills and can identify where the software may obscure understanding of important concepts and take remedial action
- 1.5 know how to make use of the options within software packages to best meet the needs and interests of learners
- 2.1 use the computers in the classroom and ICT suites for a variety of individual, group and whole class learning
- 2.2 foster ways in which learners work with others, in and beyond school, to develop projects and extend learning
- 3.1 are familiar with a wide range of options for the configuration of their computer environment
- 3.2 can temporarily set up aspects of operating systems and application software to suit particular circumstances
- 3.3 are able to deal with most of the problems arising and can articulate the symptoms to appropriate agencies

## Overlaps and permeations

Learning does not take place in neat compartments. Some of the components in the **MIICE** toolbox deliberately appear in more than one outcome. There are also many links between components across the framework. In this way, the **MIICE** toolbox reflects the ‘messy’ reality of learning

The following table indicates some of the linkages within the framework. All the components within one outcome are linked to the other components in that outcome

In the table

**O** represents planned *overlap* (duplication)

**L** represents a thematic *linkage*

This table may be useful as a planning tool for school ICT coordinators (among others) for planning an ‘audit’ of a particular ‘strand’ or theme

	1.1	1.2	1.3	1.4	2.1	2.2	2.3	3.1	3.2	3.3	4.1	4.2	4.3	4.4	5.1	5.2	5.3	6.1	6.2	7.1	7.2	7.3	Group 2	
1.1					L				L		L	L	L	L		L		L	L	L	L	L	10.2; 10.3	
1.2									L	L			L	L	L					L	L	L		8.1; 9.4
1.3					L	L			L	L	L			L	L	L	L	L	L					9.1;1 10.3
1.4																		L						8.4
2.1	L		L								L								L		L	L		8.1
2.2			L						L					L				L			L	L		8.3
2.3								L	L	L			L	L	L		O							9.3
3.1		L						L								L	L	L						8.3
3.2	L	L	L			L	L					L	L	O		L	L					L		8.1; 10.3
3.3			L				L								L	L								8.1
4.1	L		L		L													L	O	L				8.2
4.2	L	L							L													L		8.2
4.3	L	L					L	L									L					L		9.3
4.4	L	L	L			L	L		O							L	L			L		L		8.1
5.1			L				L			L														8.1
5.2	L	L	L					L	L					L									L	10.3
5.3			L				O	L	L	L			L	L										9.3
6.1	L		L	L		L		L			L													8.2
6.2	L		L		L						O													8.2
7.1	L	L									L			L						L				10.1
7.2	L	L			L	L						L												10.1; 10.2
7.3	L	L			L	L			L				L	L		L								10.3

## **Appendix 3**

### **EAs and schools involved in the validation phase**

The **MIICE** project is grateful for the cooperation of the following councils and schools throughout Scotland, where interviews took place

#### **Aberdeen City Council**

Ashley Road Primary School  
Cults Primary School  
Kirkhill Primary School  
St Machar Primary School  
Scotstown Primary School  
Bankhead Academy  
Linksfeld Academy  
Beechwood School (SEN)  
Hazlewood School (SEN)

#### **Angus Council**

Grange Primary School, Monifieth  
Kinloch Primary School, Carnoustie  
Chapel Park Primary School, Forfar  
Andover Primary School, Brechin  
Brechin High School  
Webster's High School, Kirriemuir

#### **Dundee City Council**

Park Place Primary School  
Our Lady's RC Primary School  
St Fergus' RC Primary School  
Grove Academy  
St John's RC High School

#### **East Ayrshire Council**

Galston Primary School  
Gargieston Primary School, Kilmarnock  
Hillhead Primary School, Kilmarnock  
Ochiltree Primary School  
Doon Academy, Dalmellington  
St Joseph's Academy, Kilmarnock  
Hillside School, Cumnock (SEN)

### **East Lothian Council**

Dunbar Primary School  
Haddington Infant School  
Yester Primary School  
North Berwick High School

### **City of Edinburgh Council**

Balerno High School  
Currie Community High School

### **Falkirk Council**

Bantaskin Primary School, Falkirk  
St Mary's Primary School, Bo'ness  
Whitecross Primary School, Whitecross (near Linlithgow)  
St Mungo's High School, Falkirk

### **Highland Council**

Achnasheen Primary School  
Inverie Primary School, Knoydart  
Merkinch Primary School, Inverness  
Teanassie Primary School, Beauly  
Dornoch Academy

### **Midlothian Council**

Gorebridge Primary School  
Lasswade Primary School, Bonnyrigg  
Woodburn Primary School, Dalkeith  
Dalkeith High School  
Penicuik High School  
Westfield School, Dalkeith (SEN)

### **North Lanarkshire Council**

Alexander Peden Primary School  
Banton Primary School, Banton (near Kilsyth)  
Cathedral Primary School, Motherwell  
Condorrat Primary School, Cumbernauld  
Glenmanor Primary School, Moodiesburn  
Our Lady and St Joseph's RC Primary School, Glenboig (near Coatbridge)  
St Columba's Primary School, Uddingston  
Bellshill Academy  
Braidhurst High School, Motherwell  
Chryston High School  
Columba High School, Coatbridge

Kilsyth Academy  
Glencryan School, Cumbernauld (SEN)  
Viewpark School, Uddingston (SEN)

**Perth and Kinross Council**

Coupar Angus Primary School  
Milnathort Primary School  
Kenmore Primary School, Kenmore (near Aberfeldy)  
Kinross High School  
Perth High School  
Cherrybank School, Perth (SEN)

Totals

Primary schools	39
Secondary schools	22
SEN schools	7

Thanks are also due to Jim Scott, Rector, and the staff of Perth High School who provided a meeting place for meetings of the **MIICE** partners