Evaluation of the **Skillsbuild** Project

Report of the Institute of Education evaluation team

February 2001

Executive Summary

The aim of the **Skillsbuild** project was to develop a framework, curriculum, assessment and delivery system for basic skills in line with the developing model for the University for Industry (UfI).

This evaluation report seeks to address two main issues:

- innovation – what is new about the project, and how effective is it?
- mainstreaming – what is the potential for replication? (and in particular within Ufi?)

The evaluation team interviewed 45 tutors and 39 learners at 4 sites. 12 of the tutors were re-interviewed after a three to six month period.

Skillsbuild was found to have been enthusiastically received amongst a wide range of tutors and learners and there is a strong basis for mainstreaming the product. A number of potential barriers exist but these barriers are also faced by other technological innovations in this area.

Innovation

Instructional design and Curriculum Model: The tutors initial response to **Skillsbuild** was overwhelmingly positive, they liked using the materials, thought they would be effective with their learners and declared their intention to use the materials. Almost all tutors and learners (that is to say more than 90% in each category) using **Skillsbuild** agreed that the materials had good basic skills content.

The design of the materials was based on a previously developed instructional model, and the skills taught within the system were closely matched the to Basic Skills Curriculum, however because this was a pilot study the materials did not yet have a complete coverage of the curriculum.

Learning and Motivation: Both tutors and learners expressed confidence in the impact of **Skillsbuild** on learning as part of a course involving a wider use of technology and of traditional materials. In particular learners claimed that **Skillsbuild** helped them to concentrate on the task in hand.

There was evidence that **Skillsbuild** was being used mostly with learners at Entry 3 and Level 1 and with learners under 33 years of age. However these were not hard and fast barriers and learners at Entry 1, and older learners were also using the system.

Skillsbuild had a strong impact on motivation, learners were motivated to use the system and would work with it for extended periods of time.

Skillsbuild appeared to be particularly successful at involving people who were relatively new to basic skills learning, those who needed initial assessment and some first steps. Learners who arrived at a centre looking for literacy and numeracy courses were surprised and pleased to be asked to undertake their assessment on a computer. Instead of the worksheets they might then have expected, they were then quickly assigned a series of tasks to carry out on the system, and within a few weeks had moved on from there to using the Internet (as part of the integrated tasks). Learners who had been in the basic skills system for some time already had a history of doing assessments, and often had established patterns of working with worksheets and wordprocessing - such learners were interested to use **Skillsbuild** as an extra tool, but they tended to be less enthusiastic than the new comers.

Usability: The software was found to be readily usable by the majority of the intended user group. Some learners were completely new to the use of computers, and most of these were comfortable with the system within an hour. A few users (less than 10% of the ones we interviewed) continued to have difficulties in using computers at all.

Tracking and Assessment: The initial assessment and tracking features of **Skillsbuild** were very attractive to many tutors. Concerns were expressed over the length of the testing.

Customisability: The ability to customise the materials was seen as very important by a small number of tutors, but ignored by most. This is clearly an important element of the system, but one which involves considerable involvement on the part of tutors if it is to work effectively.

Delivery model: Most tutors welcomed the **Skillsbuild** delivery model, but some tutors found the use of the internet a problem and would have preferred a purely CD-ROM based system.

Tutor training and support: The training programme for the tutors was very well received. A somewhat longer training programme would have been useful to a number of tutors.

Mainstreaming

Technical aspects:

Whilst some centres had no difficulty in dealing with the technical aspects of installing and running **Skillsbuild** other centres had difficulties. It seemed to us that the closer the working relationship between the basic skills tutors and the technical team, and the more that the technical team had been involved from the start of the project the better things went.

ICT use in Basic Skills provision: The great majority of learners were enthusiastic about the use of computers in their learning.

Basic Skills tutors: Whilst most of the tutors we interviewed were positive about the use of technology they were of course a self selected group. The account they gave of their colleagues leads us to believe that there may be a considerable level of resistance to the use of technology in basic skills learning, particularly among part-time tutors.

CHIEF Recommendations

Instructional design: Consideration should be given to a greater mix of instructional approaches, including attention given to actual modes of use which are both individual and group based, and to the

integration of the materials within the learning trajectory of the learners. The use of integrated tasks was clearly very effective and this approach should be further developed.

Curriculum model: There is a need for a greater range of content, at other levels, particular at the lower and higher levels, and within a range of contexts.

Assessment: The assessment element of the materials was widely welcomed by learners as well as by tutors. There is potential scope for considerable improvements in tutor efficiency in this area. It is likely that this aspect of the work will need further development but it is one of great importance.

Tutor training and support: There is a need to develop further both training and documentation to support the use of **Skillsbuild**.

Technical aspects: There is a need throughout ICT projects of this kind for extensive training and technical support. There needs to be close involvement in these projects by the technical staff in the sites where the learning will be delivered from the very start.

Basic Skills tutors: There is a clear need to address issues of training of Basic Skills tutors, and to begin to address the unwillingness to engage with ICT that is common particularly amongst part-time tutors.

Commercialization: Urgent consideration should be given to commercialisation of **Skillsbuild**.

Evaluation of the **Skillsbuild** Project

1. Evaluation questions
    1. Introduction

The aim of the **Skillsbuild** project was to develop a framework, curriculum, assessment and delivery system for basic skills in line with the developing model for the University for Industry (UfI).

This evaluation report seeks to address two main issues:

- innovation – what is new about the project, and how effective is it?
- mainstreaming – what is the potential for replication? (and in particular within Ufi?)

Skillsbuild was found to have been enthusiastically received amongst a wide range of tutors and learners and there is a strong basis for mainstreaming the product. A number of potential barriers exist but these barriers are also faced by other technological innovations in this area.

    2. Innovation

The project sought to demonstrate the use of novel forms of courseware including novel forms of tracking and assessment for basic skills, delivered partly on CD-ROM and partly via the Web. The courseware and the delivery mechanisms were innovative both separately and in the particular combination shown in this project. We addressed the following areas in looking at this aspect of the evaluation:

INSTRUCTIONAL DESIGN

- What is the model of learning adopted?
- To what extent does the design of the materials match this learning model?
- How effective and appropriate are the instructional aspects of **Skillsbuild**?

Curriculum model

- Does the course have good, relevant basic skills content?

Learning

- What was the impact of the use of **Skillsbuild** on learning?
- In what situations does it work best/worst?

Motivation

- Do the materials engage the learner?
- Who do they engage?

Usability

- How the materials look and feel to the users – learners, tutors and employers. Are they attractive, new, user friendly or condescending? Which aspects of the materials cause difficulties in use?
- Is the purpose of the materials clear?
- Are any instructions clear?
- Is the software readily useable by the intended user groups?

Tracking and Assessment

- How effective and appropriate are the tracking mechanisms and assessment instruments of **Skillsbuild**?

Customisability

- How useful are the customisability aspects of the **Skillsbuild**?

Delivery model

- How effective and appropriate are the proposed delivery mechanisms for delivering **Skillsbuild**?

Tutor training and support

- How effective is the training programme for tutors?
- What ongoing support was available for the tutors?

3. Mainstreaming

What factors in the immediate environment would affect take up of the materials? Aspects which seemed to us to be important in examining the possibilities for mainstreaming were:

Technical aspects

- To what extent is the available infrastructure in colleges and SMEs able to support the use of **Skillsbuild**?

ICT use in Basic Skills provision

- Is the widespread use of ICT in basic skills provision likely to be welcomed by potential clients?

BASIC SKILLS TUTORS

- Do basic skills tutors have the necessary skills to make effective use of ICT in their work?

2. Evaluation process

The main elements of the evaluation process were as follows:

- Attendance at the Steering Groups meetings of the project
- Interviewing of personnel working in partner organisations involved in the development of the materials (CTAD and NFER-Nelson)
- Attendance at 4 training events for tutors and 1 training event for intermediaries
- 33 tutors were interviewed after training at 4 training events during Feb/March 2000 and 4 intermediaries interviewed at another training event
- On the basis of these interviews, reports were produced identifying tutors' initial reaction to **Skillsbuild** and their response to the training
- A sample of 12 tutors was selected to represent a range of ICT preparedness and the various areas of Literacy, Numeracy and ESOL, and this sample were interviewed again after a period of between 3 and 6 months.
- Case studies of these 12 tutors were constructed.
- Four sites were selected for special study because they were making significant use of **Skillsbuild**. Case studies were constructed of these four sites.
- A further 8 tutors and 29 learners were interviewed at these sites. 10 of these learners had made a significant use of **Skillsbuild**. Case studies were constructed for these 10 learners.
- The **Skillsbuild** system automatically maintained a database of the learner interactions. We obtained a copy of the database as of 14th October 2000 and carried out a number of analyses of learner interactions with the system. This information was also used within the case studies of the learners.
- **Skillsbuild** materials were reviewed by a team at the Institute of Education consisting of staff with expertise in learning theory, assessment, ICT and education.
- The Institute of Education staff who worked on this evaluation were: Dr Harvey Mellar (Director), Dr Maria Kambouri, Professor Alison Wolf, Dr Chris Fowler, Jasmina Zugic, Tina Goodwin, Violet Windsor, Pavlos Koulouris, and Aileen Earle.

3. Findings
    1. Innovation

INSTRUCTIONAL DESIGN

- What is the model of learning adopted?

CTAD defined the learning model – the ILDIC model – in a document made available to the project early in its development. This model adopts an eclectic approach to teaching styles and instructional theories. There are no indications within the model of specific theoretical approaches to the development of literacy and numeracy being adopted. The learning model references behaviourism and constructivism, and the social context of learning, but makes no reference to socio-cultural theories. It may be that the model needs to be extended to use such approaches in order to look more closely at the support of learners within the working context as distinct from simply within the context of the learning centre. In interviews CTAD staff described instructional design as: training needs

analysis, skills analysis, with a stress on flexibility and ability to customise. The design was seen as being informed by the basic skills teaching expertise of the staff, and generally was a cyclical process.

For the development of **Skillsbuild** the requirement to match the Basic Skills Standards and the emerging Basic Skills Curriculum provided a strong steer; the initial assessments were based on the standards and the emerging curriculum helped to define the approaches used with the **Skillsbuild** structure. A strong emphasis on input skills was used because of the emphasis of the Moser report on this aspect. Subsequently the project adopted the methodology of the new Basic Skills Curriculum and this drew its model of literacy and numeracy learning from the National Literacy and Numeracy strategies.

- To what extent does the design of the materials match this learning model?

Whilst the model calls for a mixture of instructional positions there is actually relatively little use of constructivist learning within **Skillsbuild** – it is mainly restricted to the areas of the 'integrated tasks'. Within the areas implemented **Skillsbuild** was closely related to the Basic Skills Curriculum.

- How effective and appropriate are the instructional aspects of **Skillsbuild**?

The tracking system built into **Skillsbuild** seems to suggest that individuals are working with the program on their own. Whilst this was commonly the case, we found that learners were using often the program whilst engaged in collaborative discussion with other learners. Interviews with learners showed that the social side of their learning, belonging to a group of learners within a centre was very important to most (though not all) of them.

CURRICULUM MODEL

- Does the course have good, relevant basic skills content?

The tutors initial response to **Skillsbuild** was overwhelmingly positive, they liked using the materials, thought they would be effective with their learners and declared their intention to use the materials. Almost all tutors and learners (that is to say more than 90% in each category) using **Skillsbuild** agreed that the materials had good basic skills content.

We recognise that these were pilot materials in which only part of the materials had yet been developed, and therefore the following comments of tutors should be interpreted as focussing attention on where the additional content should be.

The tutors liked the structure of the materials - short chunks, some idea of time commitments, good progression of tasks, logical development.

There was a range of opinions about the level of difficulty of the materials that presumably related to the specific clientele that a tutor worked with.

One group of tutors found the materials at too high a level:

> It "is really aimed at what I call a bit higher level than basic skills students"

"They can't do it they just sit there and look at the screen or they just press anything and then they get frustrated."

[One tutor talked about old BBC computer programs which she felt better met the needs of her group]

Others thought it was pitched at too low a level:

"I think because they give people practical exercises, for a lower level **Skillsbuild** they can be good; the cloze exercises and the matching and mixing of the words, putting them in sentences, that's fine for lower level."

Similarly some tutors said there was insufficient teaching, others that there was insufficient practice – whilst others declared themselves satisfied with the balance of teaching and practice.

All tutors and all learners who used the integrated learning tasks commented very favourably on them, they were seen as developing the materials beyond themselves, taking the learner out into a wider learner context in the internet.

Some tutors referred to the difficulty of knowing what was available on the system and looking for some type of overview

"we'd like a list of everything that it contains; a proper menu, illustrations of things to give a tutor and idea of what's going on without having to go through everything".

A tutor who was very experienced in the use of ICT in teaching basic skills learners spoke of the dangers of tutors trying to work their way through such a bank of resources and stressed the need for tutors to have a good overview of what is available and to direct learners to appropriate resources sensitively. A number of tutors were clearly having difficulties in managing the use of **Skillsbuild** because they did not have a sufficient overview of the contents available, and did not feel that they had the time to become familiar with it. One solution to this problem was felt by some tutors to be close team working and sharing of knowledge.

One tutor spoke of the value of the mapping to the new basic skills standards as a useful form of training for basic skills tutors in the use of the new standards.

A number of tutors pointed out that the materials were less suited for ESOL students - and the project was clear that this was not the intended audience for this trial. Nevertheless in follow up interviews it was found that **Skillsbuild** was being used with some success with ESOL learners in a number of centres.

Concern was expressed over some details of content - punctuation was a common area of concern, vocabulary another (e.g. use of the word 'inventory' in the materials).

Some reviewers felt that the cultural aspects of the materials needed to be thought through more carefully, there were implicit assumptions in the materials about the user that may not be born out in practice.

LEARNING

- What was the impact of the use of **Skillsbuild** on learning?

Many of the students interviewed claimed that the use of ICT in general and of **Skillsbuild** in particular helped them to learn, one of the common reasons given for this was that it made them concentrate more. No-one who was using the materials dissented from this view (though there were learners who could not get started with **Skillsbuild** – see later).

One tutor's success story describes how she decided to put a particular student onto **Skillsbuild**, and how he then moved on from there to a wider use of ICT:

> I've got one particular student who, a basic skills tutor would know: you're looking for some way to motivate that person; he will turn up every week but I could never find the way to get him to do what I wanted him to do he would sit there and listen and sometimes practice the things I asked him to do but not always. Sometimes he would chat away to everybody else but he was extremely motivated by the computer. He comes in, logs on and does his assessments or whatever he's got to do [on **Skillsbuild**]. It then led on to him using the word processor to do his work that he'd written out beforehand and he would then use the text help to correct. I overheard him one night going out saying, "That's the best lesson I've ever had." It's a success story for someone like that and I suppose I don't need to have many success stories to feel that something is going well but the whole evening group, there are 14 of them [using **Skillsbuild**], have really moved on with it and they've asked me to find other programs to use".

Here is an account of a success story from the learner's perspective:

> Tim a man in his early 30's was a new basic skills learner in August, at that time he was unemployed. He came into the centre for literacy and was directed towards **Skillsbuild**. Over a three of months he used **Skillsbuild**, and worprocessing as an integral part of his literacy course. Whilst he was new to computers he had no difficulty learning to work with them, and in the first interview said that using computers helped him to concentrate - at that point **Skillsbuild** had been his only contact with computers. Three months later when interviewed he had completed gained his Wordpower Level 1 Certificate and had a job as a security guard. In the second interview he was confident about the role that computers had played in supporting his learning. He thought that **Skillsbuild** had been a particularly important element of this and that it had helped him to improve his literacy:
>
> Tim: I have to read the paper now a lot better. Before I could only do the car version. Because I know all the different makes and models of cars so I just use to look at the cars. Now I can actually sit down and read the paper a bit more.
>
> Tim's comments on writing also indicate that his chief improvement from his point of view had been an increase in the range of his reading and writing vocabulary. Tim valued the multiple choice questions within **Skillsbuild**:
>
> > Interviewer: Do you think I would be able to get through it by a guessing game. Taking potluck. Would it actually teach me?
> >
> > Tim: Well yeah it is actually teaching you 'cos at the end of the day you know the answers wrong and at the end it actually tells you the actually correct answer.
>
> Interviewer: If you have got your answer to the question wrong then and you thought oh it's not that one I will have that one here and you opt for that do you think you are learning by it?
>
> Tim: Yeah it has helped me a great deal.

Like all forms of learning for basic skills learners, **Skillsbuild** has the potential to be a threatening experience. One learner in his sixties observed doing the **Skillsbuild** Numeracy Assessment commented:

"It's like when I went to school, it's like the dentist. You shake."

(This is not a response by this learner to **Skillsbuild** per se, but rather it reflects his response to any form assessment.)

The biggest reservation that tutors expressed about the effectiveness in promoting learning was that ICT approaches in general were not sufficiently sensitive to the subtle variations of approach that a tutor would use instinctively.

One tutor was more negative about the potential learning benefits of **Skillsbuild**:

> "Things like when they've got to identify where there are errors in punctuation, and they'll say "two of these sentences have punctuation errors: identify them", and they've got three to choose from. So they've always got to get one of them right. …if they've guessed at something like that, it's not actually identified why that student perceives that there is a problem in that sentence"

- In what situations does it work best/worst?

In the initial interviews the great majority of tutors said that they would use **Skillsbuild** as one tool among many in their teaching approaches. A minority of tutors laid greater emphasis on learner autonomy, on learners working on their own and leaving the tutor free to move on to other tasks. In follow up interviews there was evidence of both approaches having been taken with some success, but there was more scepticism expressed about the possibilities for learners working on their own with the materials.

The **Skillsbuild** database records 452 learners as having used **Skillsbuild**. We calculated a score indicating volume of activity based on the amount of activity and progress recorded in the database, and students were then ordered from the most active to the least active by this score. Most users had used the system very little. The top 50 users had logged in 2- 3 times or more, the top 15 users had logged in 7-8 times or more.

The database showed the following skills profile for the 50 most active learners:

	E1	E2	E3	L1	L2
Numeracy Overall	5%	11%	39%	26%	18%
Listening Overall	9%	7%	4%	80%	0%
Reading Overall	7%	2%	48%	43%	0%
Writing and Spelling Overall	7%	14%	79%	0%	0%

It is clear from this that **Skillsbuild** was being used principally with learners at levels E3/L1. Relatively few learners at E1 and E2 are using the system. The high level of the numeracy scores here is an artifact of one particular group of apprentice welders who made particular use of **Skillsbuild**. Taking these apprentices out of the figures gives the following table:

	E1	E2	E3	L1	L2
Numeracy Overall	7%	14%	50%	25%	4%
Listening Overall	8%	8%	6%	78%	0%

Reading Overall	5%	3%	49%	43%	0%
Writing and Spelling Overall	9%	18%	74%	0%	0%

This emphasis on use with learners at level one is reflected in a tutor's comment:

"**Skillsbuild**, from just watching the students, I think for the very basic students, it's not really helping."

Some tutors pointed to the under 25's being more adapt with computers than the over 25's. The age distribution of these more frequent users is also biased towards the younger learners.

Age	Top 50	Top 15
18-23	40%	67%
24-33	20%	
34-52	40%	33%

A few tutors expected the materials to be more motivating for men than women. Interviews with learners found little difference between the impact on men and women. Gender information was not available in the **Skillsbuild** database.

Skillsbuild appeared to be particularly successful at involving people who were relatively new to basic skills learning, those who needed initial assessment and some first steps. Learners who arrived at a centre looking for literacy and numeracy courses were surprised and pleased to be asked to undertake their assessment on a computer. Instead of the worksheets they might then have expected, they were then quickly assigned a series of tasks to carry out on the system, and within a few weeks had moved on from there to using the Internet (as part of the integrated tasks). Learners who had been in the basic skills system for some time already had a history of doing assessments, and often had established patterns of working with worksheets and wordprocessing - such learners were interested to use **Skillsbuild** as an extra tool, but they tended to be less enthusiastic than the new comers.

MOTIVATION

- Do the materials engage the learner?

The large majority of both tutors and learners reported that they enjoyed working with **Skillsbuild**.

The perseverance of the learners in taking the initial assessments was a strong indicator of the motivating power of this aspect of **Skillsbuild**. Many learners persevered with the test for an hour or more – longer than they would normally devote to a learning activity at one sitting. Of the 452 learners registered on the database 71 spent more than one hour working on the initial assessments.

.Drill exercises were made more interesting by being presented in this way, it took the drudgery away from paper and pencil exercises.

The internet is a particularly strong motivator at the moment, and a **Skillsbuild** feature that was particularly appreciated (as shown in interviews with both learners and tutors) was the progression through **Skillsbuild** to the integrated tasks where the internet was used. So one tutor reports:

> "students don't normally get onto [the internet] on a college course for a long time, basic skills students usually use the Internet within 2 or 3 weeks of coming in because it's part of the **Skillsbuild** programme and I think they find that extremely interesting."

It is commonly assumed that there is some kind of transfer between the use of computer games and the use of computers, we saw little evidence of this, and one learner expressed his own view of the difference:

> "today we're on the computers. I am not so excited about the computers. The nearest I get to a computer is the Playstation. Give me a Playstation game and I'll sit there and play it and complete it but give me a PC and I'm like, "Whoa!""

USABILITY

- How the materials look and feel to the uses – learners, tutors and employers. Are they attractive, new, user friendly or condescending? Which aspects of the materials cause difficulties in use?

The tutors were all very positive in their accounts of their initial impressions of the software. The use of audio and animation were commonly singled out for positive comment. However about half of them raised the issue of entry level basic skills learners using the interface. There was some evidence from the learners that some learners did indeed have difficulty (and this may have been particularly acute for some ESOL learners), however most learners used the system effectively as soon as they were introduced to it, and most of the others found that they learned to use it effectively within half an hour to an hour.

A few tutors expressed a small number of minor problems with the software – for example areas where the program did not read out the question, or the possible answers and where they thought it would be better to do so. In exercises in which items had to be dragged from one location to another the item did not move as it was 'dragged' but suddenly moved into the correct location, a number of tutors thought that it would be better to see the word actually being dragged from one location to another.

Most tutors said that they found navigation of the materials straight forward, but a few tutors commented that they were not initially clear about how to move from one question to the next.

Some of the reviewers (who were all very experienced computer users) found the graphic style too simplistic, and some of them found the icons difficult to interpret due to mismatches with well-established Windows conventions. These findings were not reproduced amongst either the tutors of the students, and so may well be attributable simply to the different expectation arising from greater computer use.

- Is the purpose of the materials clear?

Interviews showed that the tutors and learners were clear about the purpose of the materials.

- Are any instructions clear?

Whilst most of the materials were extremely clear there was concern about activities such as skimming which involved the use of two screens, where it was felt that it was not clear how to move between screens.

- Is the software readily useable by the intended user groups?

A small number of tutors felt that there was too much use of the mouse, and in particular that there were too many variations in the types of questions and the way that things were done for entry level learners:

"they've built into to it, to make it more interesting, different ways of doing the same thing, like dragging and dropping, but in a way it would be much better if they chose one method and stuck to it throughout because once they've learnt that method then every time they come across a similar sort of question they are then able to do it rather than confusing them by having a different method of doing it."

The great majority of learners who used the system adapted to it very quickly – learners new to the use of computers were reporting themselves feeling comfortable with the use of **Skillsbuild** after less than an hour. However there was evidence that tutors were not using **Skillsbuild** with learners who they thought would have difficulties with using computers, and when they did do so the consequences could be unhelpful:

We were working with a student yesterday on **Skillsbuild** and she's never used a computer so her actual manipulation of the mouse, it's excruciatingly slow and to actually go through the assessment which probably shouldn't have taken any more than 20 minutes took about an hour and 40 minutes. It was very tough going cos she needed me to sit beside her the whole time because she forgot having highlighted her answer every time I had to remind her she had to go back to the top of the screen to move it onto the next question. So she'd sort of highlight it and then sit there with her arms folded waiting for something to happen. So it is very very time-consuming.

A couple of tutors made the suggestion that the software should contain a short training section on using the mouse that learners could use before starting on the assessment. A contrast was made with Best! – a basic skills assessment package which does include such a section.

TRACKING AND ASSESSMENT

- How effective and appropriate are the tracking mechanisms and assessment instruments of **Skillsbuild**?

Tracking

Five of the tutors interviewed made spontaneous reference to using the tracking mechanisms available in **Skillsbuild**. One of the tutors commented favourably on the possibilities of taking this information from the system for use elsewhere in reporting on learners' progress, and viewed the tracking mechanisms as a very important element of **Skillsbuild**. One of the tutors found the construction of learners' action plans tedious and said she did them rather haphazardly.

Assessment

The initial assessment elements of **Skillsbuild** were very popular with tutors. Some tutors saw this as the main feature of **Skillsbuild**, and some used it as a screening test with the learners starting on a variety of courses, appreciating the automatic marking and logging of results and the provision of feedback. There were many requests for it to be possible to halt and later resume the assessment process (this has since been incorporated in the software). The use of the initial assessment to help select activities was appreciated. Some tutors expected these aspects of **Skillsbuild** to improve efficiency and save time.

One tutor felt that the **Skillsbuild** initial assessment was more in depth than her usual assessments and also appreciated the 'objectivity' of the test, admitting that tutors can be swayed in their judgement of learner's skills by interpersonal factors irrelevant to the assessment. Tutors felt that the results of the initial assessments were congruent with their experience of the learners abilities.

Some tutors were critical of the lack of flexibility of the assessment system. Typically:

"I think the other thing that any basic skills tutor would say to you is that whatever assessment you do with them on the computer, we always like a piece of free writing because without that piece of free writing that they do, how on earth can we ascertain how they are putting things down, how their sentence structure… We need that and it tells you so much. You can build a work programme on a piece of free writing without anything else."

The tutor who expressed this view went on to question the value of the time taken to give the computerised tests.

It is clear from the project documents recording the development of the initial assessment elements of **Skillsbuild** that tutors were expected to play a role in the assessment process and not simply leave learners to work with the assessment on their own – however this message does not seem to have been clearly delivered to the tutors.

Almost all tutors commented on the length of the tests – which they were felt to be too long. One tutor suggested that the program needed to respond more quickly to the perceived level of the student and move them up quickly if necessary. Whilst this caused problems for some learners it was also interesting to see that many learners persevered with the test for an hour or more – longer than they would normally devote to a learning activity at one sitting. Of the 452 learners registered on the database 71 spent more than one hour working on the initial assessments.

One tutor said that the materials did not assess the higher levels of spelling and punctuation accurately enough. Some good spellers weren't being assessed and other people were poor spellers came out at quite a high level.

Some tutors and learners wanted feedback on individual questions as the assessment progressed. Some tutors did not want learners to have feedback, because it could be potentially demoralising. This was an issue much discussed by the project, and on balance the project team had decided that feedback should not be given by the computer, but felt that tutors should be involved directly in this aspect.

Not everyone was so keen on the way adaptive testing was done. One tutor described some learners as being confused by a pattern of testing in which they did very well to start with, then had a period of problems, and then found themselves doing well again.

A number of the learners who had made significant use of **Skillsbuild** commented on the value of the assessment to them in order to help them to see what they knew and what they did not know, "where they were up to" as one of them expressed it.

Reviewers felt that the assessment activities seem somewhat decontextualised, but in fact the tutors did not agree in general though there was some expression of concern over the decontextualisation of the numeracy aspects.

Reviewers commented that the assessment was apparently designed to measure abilities to perform skills that can be readily aligned with curriculum targets, the implicit learning model being one of

accumulation of discrete skills. The assessment then enables the tutor to choose tasks to practice those skills. There are a number of problems with such an approach:

- if a student is weak in a particular skill it may be that they need help to identify alternative strategies rather than further practice in the same strategy (though, it needs to be said in fairness that neither the assessment nor the **Skillsbuild** model per se actually implies any specific strategy to adopt with a learner)
- it encourages a tendency to teach lower level skills before high level understanding as if the two were separable (though the assessment in **Skillsbuild** partially addresses this problem though the generation of 'spiky' profiles indicating both the higher level and lower level skills that learners have).
- it devalues the role of context, it may not be that the learner does not have that skill, but simply that s/he do not have it in that context
- it does not address issues of modifiability. It tells us what a student can and can not do alone, but it does not give us any insight into how much teaching would be required to change this.

CUSTOMISABILY

- How useful are the customisability aspects of the **Skillsbuild**?

The customisability of **Skillsbuild** – the ability to create new modules- was seen as an important element of **Skillsbuild** by the project, and training sessions in the use of this facility were given by CTAD. However, few tutors referred to this aspect of the software in the interviews, and only two spoke of it at length. For these two tutors however it was the most significant aspect of project! These tutors argued that the authoring capabilities meant that the modules could be closely customised to the needs of particular client groups, and for one of them this was of particular importance to prepare materials specific to particular SMEs.

It may be that the project under-estimated how difficult this aspect of **Skillsbuild** would be for tutors. It demands considerable time as well as skills in designing and writing, ability to collect appropriate illustrations, and all the technical issues of creation and integrating into the system. A lot more input would perhaps be required from the project to enable tutors to take this on board in a significant way. However these considerations need to be weighed against the great importance attached to this element of **Skillsbuild** by those able to begin to make use of it.

DELIVERY MODEL

It was intended that **Skillsbuild** be delivered initially at least with close tutor support. It was particularly important that tutors be present during the initial assessment. The main teaching modules were available on the CD-ROM which was installed either on a stand alone machine or a network. **Skillsbuild** connects to the internet in order to process the initial assessment and for tutors to access the results of learners' initial assessments and construct work packages, and for learners to access the work packages, and for learners and tutors to communicate by email.

Most tutors found the delivery model appropriate. They commented on future possibilities of more flexible learning situations, reducing child-care costs, on providing access to learners who would not be willing to come into an educational establishment. Some tutors commented on the fact that they could check from home on the progress of a learner, and commented positively on their use of email to keep in touch with learners.

However, there were a number of technical problems in some centres around networking and also around access to the internet that led one tutor to comment:

> "We'd like it portable, we'd like it CD-ROM"

Only one tutor commented on the advantages of the delivery model for delivery within SMEs:

> " I think as a workplace basic skills tool it is potentially extremely valuable because of the ability that is built into it to make the thing very, very specific for companies. That is it's great strength as far as I can see."

TUTOR TRAINING AND SUPPORT

- How effective is the training programme for tutors?

Tutors responded very positively to the training sessions. They enjoyed the sessions and described them as inspiring, relevant, appropriate, and a good preparation for using the software in a teaching context. They welcomed the opportunities to question and discuss the project.

Many tutors expressed a need for further time for practice and consolidation. This does not seem to have been built into the project in any obvious way.

One tutor said that she would have liked the sessions to be a little faster as she was quite computer literate and wanted to get out and get to work with students using the materials.

There was also a request from some tutors for a greater overview of what was there to enable teachers to see how they would use it, how to slot it in with what they knew already

Several training sessions were troubled by technical problems – usually to do with setting up of multimedia facilities or networks, and whilst the tutors were tolerant of this in their own case they were worried about similar things happening in use with learners.

Follow up interviews with the 12 case study tutors showed that 7 had made use of the software with learners and 5 had not. The tutors who were not using the software felt that the training they had received had been sufficient, but they had not used the software because of technical problems (could not install **Skillsbuild** on their network), ICT access problems (computers are being used by other groups, and we can not access them), because **Skillsbuild** was felt not to be appropriate to the groups of learners the tutor was working with or to the organisation of the centre in which s/he worked, or because they had not had chance to work **Skillsbuild** materials into their work plans for the learners.

Tutors who had used the system widely had found that the system did offer something significant to their teaching which compensated for the level of time investment they had put into it. Those who had not used the system in a significant way had often found the process of coming to terms with the system daunting and time consuming.

- What ongoing support was available for the tutors?

The tutors had access to the technical and support teams at CTAD, but in practice this seems to have been chiefly re-active rather than pro-active support. CTAD invested resources in following up the various pilots to determine support needs but received little feedback from the organisations. Some pilot centres had very little or no technical support from their own organisations, as we have noted below.

2. Mainstreaming

The extent to which **Skillsbuild** can be mainstreamed depends on a number of factors relating to the necessary infrastructure, learners' attitudes and tutors' skills. We examined these issues within the context of the learners, tutors and colleges within the **Skillsbuild** project in order to give some indications as to the likely impact of these factors.

TECHNICAL ASPECTS

- To what extent is the available infrastructure in colleges and SMEs able to support the use of **Skillsbuild**?

Many sites reported initial installation difficulties resulting from the setup of multimedia facilities and Windows NT networks. In most cases these were overcome but a number of sites were not able to run networked versions of the software, including the Institute of Education. Some colleges had slow internet access, and some of the potential SME sites had no internet access at all. There were very variable levels of ICT availability and support – and one tutor talked of a North-South divide in access to ICT facilities. Concerns about the cost of internet access were expressed by a small number of tutors. A tutor who used a laptop when away from the main centre and then had to connect to the internet found the process too longwinded.

Some sites had no difficulty at all in installing and running the software and getting appropriate internet access. This was not a matter of chance. Interviews and the case studies of the centres suggested that successful ICT practice in basic skills necessitates a good relationship between the technical support staff and the basic skills tutors, and that this needs to be developed over time. There needs to be a mutual appreciation of the role of each partner – technical staff need to have a commitment to the basic skills learners, and tutors need to treat technical staff as partners. Technical staff need to be involved from the start of the project:

"I think that the overall message is to involve the technical staff at as early a stage as possible to get as much technical advice and guidance during the planning phases of the development and keep them involved through the development because often what you want to achieve is only achievable if you work in partnership with technical staff"

Technical staff need to adapt to work with basic skills learners:

"I think they've got to take into account the nature of the students as well, because sometimes technical support can be very quick and sharp, but if they come in to a basic skills class, they're usually more understanding of the nature of the students, so they're not pushy, they're not quick they're not snappy with them, they're not like 'Oh, do you not know how to do this?"

ICT USE IN BASIC SKILLS PROVISION

- Is the widespread use of ICT in basic skills provision likely to be welcomed by potential clients?

There is a tension in the use of ICT in basic skills provision between the view that sees ICT as very attractive and motivating to students and one that sees ICT as a potential barrier. Overall the evidence we collected from the tutors and students in this project would suggest that for the majority of basic skills learners ICT is a strong motivator. There is another group of learners for whom ICT is worrying but who overcome their initial worries quickly (often within a few hours) and go on to enjoy using the technology. There is a small group of learners for whom ICT is a barrier.

Most tutors felt that the connection of ICT to vocational interests was a strong motivator for many students - and this was reflected in many students accounts of their interest in using ICT for learning.

About a half of the learners interviewed had ready access to computers outside the classroom, they or someone else in their home owned one, or they had access via relatives, partners or close friends. One of those who did not own his own computer gave his chief reason as fear of theft in his neighbourhood rather than the cost.

Tutors' concerns

The problems of ICT usage may be changing:

"For the older students, the adults, the mature students it is just concern about computers. If they have never, ever handled a computer before they think it is something hard and complicated and really that just needs a bit of time, a bit of individual attention to get them over that. The younger students – it is concentration. They are used to surfing, as they call it. Where you just literally you flick from place to place and do different things and it is getting them to say, no, this is an exercise that I need you to concentrate on. Alright, it is only internet, but I need you to work through it, you know. And getting them to see that it is something that needs as much concentration as working with pen and paper, it is not like a game."

A number of tutors claimed that learners preferred the use of the keyboard to the mouse. There were problems arising from slow typing but also from lack of motor skills in controlling the mouse.

Most tutors felt that barriers to use of ICT could be quickly broken down, and some expressed the opinion that the barriers to the use of classroom based literacy and numeracy teaching were actually greater because learners had a history of failure with paper-based materials.

At least one tutor thought the motivational appeal of ICT was oversold:

"Maybe with children, but adults are a little more discerning. I mean, I've had students, you know, a couple of times say to me "I don't want to use the computer, I'd rather do this from a book.""

Students' concerns

Some students just do not like computers:

"'cos for me computers are difficult, the keyboard, the keys always move around and so on and so forth. So no, if I wanted to I could use the computer a lot more at home, but I just don't like computers I have to say."

Some had serious misgivings:

> "They said it's got radioactive and it can cause cancer. They said you have to use a screen if you use a child and those screen cost £100, I think. They prevent children getting cancer. And it can cause eye problems if you wear contact lenses."

Others were somewhat put off by previous experiences:

- Setting them up is a problem
- Logging on procedures are often a problem

- Previous experience of internet providers: "No, I don't like the email. When I did the Internet I tried to get it cancelled and I had trouble trying to cancel it so I don't go into the Internet anymore either."
- Experience of computer crashes and losing work on a computer
- Accidentally losing work
- Lack of access to machines (too much competition for access in the centre).

New users

Most learners new to computers adapted very quickly:

"I've started on computers on a Wednesday as well now and I quite enjoy it. It wasn't as hard as I thought it might have been."

> [How long did it take you to learn to use things like the keyboard and mouse on the computer?]
>
> "I think after the second. I am still not 100% but maybe 3rd time, I kept coming and asking my teacher how to use it."

Need for support

A number of learners indicated their need for support whilst working with technology, and some even suggested that they might need more support than they needed with traditional approaches to learning. This concern was echoed by those tutors who spoke of the need for a lot of support for some learners.

BASIC SKILLS TUTORS

- Do basic skills tutors have the necessary skills to make effective use of ICT in their work?

A number of the staff interviewed had had specialist ICT training themselves, but this was uncommon. Most of the tutors interviewed had either attended short courses within their colleges, or were self-taught. A few of the tutors were rather apprehensive of ICT themselves despite having been chosen to take part in the pilot. Tutors who were in charge of basic skills units within colleges generally relied on a staff that was largely part-time, and they often described these tutors as being somewhat resistant to the use of ICT. One tutor reported about half her staff as computer phobic. A significant proportion of these part-time tutors is also untrained in basic skills teaching.

However, tutors, like learners can change:

"the students are teaching me. I was a computer 'phob' until about 12 months ago and I had to do a computer module for the Cert. Ed. I was dragged screaming through it. My assignments had to be work processed so I had to do it and I was frightened to death. I've got a word processor at home and that's done me good actually, it's not quite so frightening"

TRAJECTORY OF PARTICIPATION

Tutors and learners were both fairly mobile groups, people who were at a centre on one visit had sometimes moved on at the next visit. There is perhaps an element of chance encounters in this group greater than in many groups of learners and tutors. No-one sets out with a life goal to become a basic skills learner, and few tutors set out with the goal to become basic skills tutors.

In examining the accounts by tutors and learners of their experiences of working with **Skillsbuild** and how it related to their own concerns we were struck by the importance of the individual route along which learners, tutors and indeed centres were moving. We found that a useful way of thinking about this route was to use Wenger's1 ideas of a 'trajectory of participation' within a 'community of practice'. Looking at the experience of using **Skillsbuild** from the perspective of the learners and tutors may give rise to insights about improving the design and use of such materials.

Here is a fictitious account (indeed almost a parody!) based on an amalgam of several of the more successful learners who used **Skillsbuild**:

> John is 35, and has a 7 year old daughter, he used to work in the motor industry but is now unemployed. He has used his girl friend's computer to produce some fliers for an event he was organising and to play some games. He is aware of his difficulties with literacy and numeracy. He had tried going to a learning centre in a college before but he drifted away quite quickly. He decided to give it another try. The college put him on to the assessment part of **Skillsbuild** – he had not expected to use a computer and he quite liked the fact that he was using it. He felt he was learning how to use computers as well as doing the work he needed to do. Over the next couple of months we worked through a number of **Skillsbuild**. During this time he is going home and talking with his daughter and girl-friend about what he is doing with **Skillsbuild**, and comparing it with their experiences of using computers in school and work. Then he moves on to some of the integrated tasks - he enjoys this because it further extents his use of computers - introducing the World Wide Web and email. He is starting to feel like an expert and is helping other learners in the centre with their use of ICT. He starts to talk about taking a course about the internet, he moves on.

Similar stories can be constructed for tutors:

> Ann is in charge of basic skills provision in her college, she has one other full time person working with her and a team of 16 part-timers. She gets involved in a range of projects, and in using ICT with her groups. She develops a good working relationship with the technical staff. She volunteers to take part in the **Skillsbuild** pilot. She puts a lot of effort into getting to grips with the program and in enthusing and training her own staff. The project raises the profile of basic skills within her college, and raises her own personal profile, and this makes it easier for her to obtain resources within the college for her own work. She registers for a PhD, she moves on.

These are the real contexts in which **Skillsbuild** is being used, but these contexts are not sufficiently reflected with the materials' design process. It may be that **Skillsbuild** works, but not always for the reasons that its designers expected it to work.

4. Recommendations

INNOVATION

INSTRUCTIONAL DESIGN

Consideration should be given to a greater mix of instructional approaches, including attention given to actual modes of use which are both individual and group based, and to the integration of the materials within the learning trajectory of the learners.

The use of integrated tasks was clearly very effective and this approach should be further developed.

The instructional approaches addressed within the instructional design model are quite general, it may be productive to pay more detailed attention to specific theories of learning and teaching in the areas of literacy and numeracy and to test these systematically.

CURRICULUM MODEL

There is a need for a greater range of content, at other levels, particular at lower and higher levels, and within a range of contexts.

USABILITY

A number of detailed usability issues are raised in the report and these should be considered.

The simple graphic style of the materials and the rather linear navigation paths were clearly acceptable to the users but this may change as users are exposed to more graphical forms of presentation of materials, and the project should look closely at this aspect of the materials.

ASSESSMENT

The assessment element of the materials was widely welcomed by learners as well as by tutors. There is potential scope for considerable improvements in tutor efficiency in this area. It is likely that this aspect of the work will need further development. The first range of issues is that the time taken to do the assessment needs to be shortened, and there needs to be greater contextualisation of the numeracy items. If computer based assessment is to gain the full confidence of the tutors then it also needs to begin to address some of the harder issues:

- identifying weaknesses in a particular skill might lead to additional practice, but might alternatively lead to the identification of alternative strategies
- lower level skills and high level understanding should not be seen as separable
- accepting the role of context, it may not be that the learner does not have that skill, but simply that s/he do not have it in that context
- addressing the issue of modifiability. It tells us what a student can and can not do alone, but it does not give us any insight into how much teaching would be required to change this.

It is not likely that these issues can all be effectively addressed within the computer system, and ways in which tutors can work together with the computerised assessment system in order to deal with these issues need to be devised.

CUSTOMISABILITY

This needs to be developed and made easier

TUTOR TRAINING AND SUPPORT

There is a need to develop further both training and documentation to support the use of **Skillsbuild**. There is a need for training materials addressing issues about its use in practice, giving examples of how it might be integrated with in sessions, with which learners it might be most effective etc. There is also a need for some kind of overview enabling tutors to find the materials that they want without

having to be familiar with all the contents of the disk. Training materials alone may well not be sufficient. Tutors welcomed the face to face courses, and these should perhaps be extended.

2. Mainstreaming

TECHNICAL ASPECTS

There is a need throughout ICT projects of this kind for extensive training and technical support. There needs to be close involvement with these projects by the technical staff in the sites where the learning will be delivered from the very start.

BASIC SKILLS TUTORS

There is a clear need to address issues of training of Basic Skills tutors, and to begin to address the unwillingness to engage with ICT that is common particularly amongst part-time tutors. The main cause of this unwillingness for part-time staff is time considerations

COMMERCIALIZATION

Urgent consideration should be given to the commercialisation of **Skillsbuild**. In those centres where **Skillsbuild** has been used widely there is now some concern that it is being taken away from them.

3. Further research

EVALUATIONS

This evaluation has established the general viability of the approach taken by **Skillsbuild**. The evaluation undertaken has a number of significant limitations. The fact that the client group was so volatile made serious study of learning gains almost impossible. Moreover most of the pilot centres did not have a clear plan of their use of **Skillsbuild** with learners, and so it was not possible to develop detailed observational studies.

One important area for study is to establish clearly through laboratory studies whether learning does take place when learners use these materials, and if so what is learned?

A second important area of study is to develop a principled approach to instructional design in this area. Varied design decisions clearly based in theories of literacy and numeracy need to be tested against one another in small scale experimental studies.

A third issue concerns how learners actually use the materials, and for this observational studies are needed. It may well be that such a study can not be conducted with tutors who volunteer to run a pilot project, but needs to be taught by staff specifically appointed for the purpose. Such a study should also look at how learners work with one another.

The above are all issues concerning **Skillsbuild** itself, but if the materials are to be successful in widespread use then we perhaps also need to ask questions about the minority of learners who are reluctant to use ICT in their learning, and about the reluctance of tutors to use ICT.