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1   Abstract

Using Technology to Enhance Formative Assessment

A paper describing the issues raised in the development of formative assessment tools for the UK DfES "Skills for Life" programme. The tools are an essential part of ensuring that learners on Literacy, Numeracy and ESOL programmes are placed on programmes from which they gain maximum benefit.

Technology has enabled the development of easily administered tools. They use sophisticated algorithms to track users' progress and ensure that teachers get a comprehensive and reliable set of data on the performance of the learner. This helps them develop a tailor-made learning programme. Using technology has been cost effective, enabling the project team to develop tools for general use, the workplace and for specific employment sectors such as health and retailing.

The paper deals with the challenges of developing tools that are engaging whilst reliable and on making the technology accessible to a wide range of users. The writers have been associated with the development of e-assessment over a number of years.

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2   The DfES "Skills for Life" Project

Background

In 2001 the Department for Education and Skills (DfES) in England launched their "Skills for Life" strategy[1]. The strategy was designed to support the needs of learners, young people and adults, who had not yet achieved a Level 2 qualification in Literacy, Numeracy or Language.[2] The strategy had replaced an earlier range of basic skills strategies which had been increasingly viewed as flawed in that they promoted a "deficit" learning model rather than a model which encouraged learners to add to the skills they already had. Furthermore, basic skills programmes were perceived as being for learners who had significant literacy, language and numeracy needs, whereas the "Skills for Life" strategy encouraged everybody who felt they needed to improve their skills to do so and enabled anybody who had not already achieved a Level 2 qualification to access fully funded learning. At the same time, the DfES was

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[1] Skills for Life: The national strategy for improving literacy and numeracy skills. DfES, London 2001. Available at www.dfes.gov.uk/readwriteplus/Skills_for_Life_policy_documents

[2] A UK Level 2 qualification is equivalent to a GCSE Grade A* - C which would normally be obtained at the end of compulsory secondary education at the age of 16.

set challenging targets by Government for the number of successful learners in Skills for Life programmes from 2002 onwards.

To support the achievement of these targets, the DfES set up a unit[3] specifically charged with developing a range of support for tutors and organisations charged with delivering the strategy and helping to meet the targets. Firstly, the support was designed to ensure that learners had access to high quality programmes that were flexible and available through a variety of providers and that learners embarked on programmes that were matched to their needs. Secondly, it was designed to ensure that programmes were accessible to all who wanted to undertake them, whether they be learners in training, in employment, with family commitments or, for example, in prison.

3   Engaging Learners

The Issues

It has long been recognised that successful literacy, numeracy and language programmes are partly dependent on ensuring that the learner embarks on a programme that meets their particular needs. Prior to 2001, organisations providing learning programmes were already undertaking some form of pre-programme diagnostic assessment to develop individual learning plans (ILPs) for learners. Many of these assessments were paper based although some were already beginning to exploit the use of technology. However, the DfES felt that the use of these tools and their application was inconsistent across providers[4] and, in the case of some learners (e.g. those in employment), the tools available were not well suited to their needs. To address these issues, the DfES embarked on an ambitious three year project to develop and deploy a full range of tools which would ensure that all providers had access to high quality tools that were free.

In developing this strategy, the DfES designed the concept of the Learning Journey.(see Fig. 1 below) Essentially, the concept ensures that the learner is able to identify their current skills and the level at which they are operating, can identify the skills they need to acquire and be supported to develop an ILP that meets their specific needs.

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[3] Originally the unit was known at the Adult Basic Skills Strategy Unit (ABSSU). From 2005 the name was changed to the Skills for Life Strategy Unit (SfLSU) to reflect the move away from the term "Basic Skills".
[4] In England, skills programmes are provided by a range of organisations. These include Further Education Colleges, Private Training Providers, Community Adult Education and Employers.
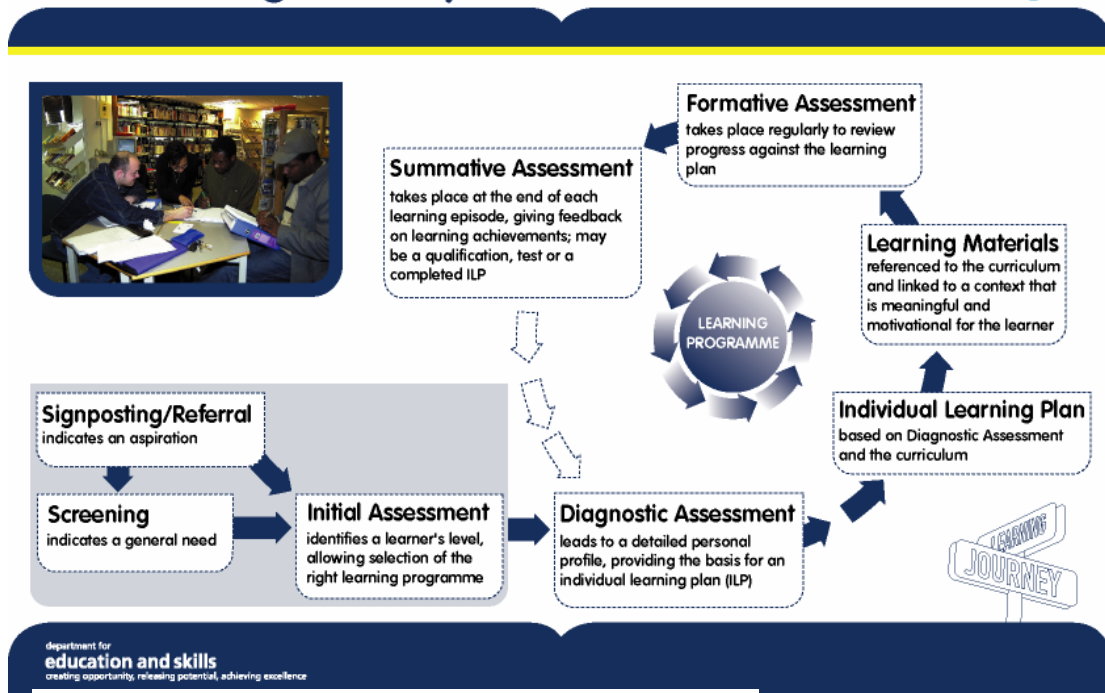
Figure 1 – The Learning Journey

There are three elements in that part of the journey that occurs before the learner embarks on their learning programme:

- Screening[5]

- Initial Assessment

- Diagnostic Assessment

The three year project was designed to ensure that deliverers had access to suitable tools in these three areas and, specifically, to author and design screening and initial assessment tools to cover Literacy, Language and Numeracy.

Within the brief given to the project team[6], were a number of requirements designed to ensure that the tools would be accessible and engaging to learners and manageable by providers. Whilst the project specified that the tools should be available in both paper-based and computer-based formats, it was recognised that the computer-based formats provided the greatest opportunity to meet these overarching requirements.

This paper looks specifically at the development of the computer-based initial assessment tools.

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[5] The term "screening" is now being superseded by the term "skills check" to encourage the perception of a positive rather than deficit model.

[6] The project was awarded to a consortium of Alpha+ Consulting and BTL Group Ltd.

4　Using Technology

The Solution

There were a number of "givens" within the project that helped to shape the nature of the technology chosen. In no particular order, these included:

- A requirement to provide a valid outcome that could be at one of five levels:

    - Entry 1, 2 or 3, Level 1 or Level 2. (the tool also indicates if the user is below Entry 1)[7]

- An average user time of 30 – 40 minutes.

- A tool that would not present the user/potential learner with items that were either far too difficult or far too easy for them.

- A tool that would engage the user/potential learner.

- The need to design three tools – Literacy, Numeracy and Language.

- A tool that would be capable of running standalone on a PC or laptop with no installation necessary.

To address the first three of these, the project team decided that the technology would need to employ a fairly sophisticated algorithm. In a simplified format the algorithm looks like this:
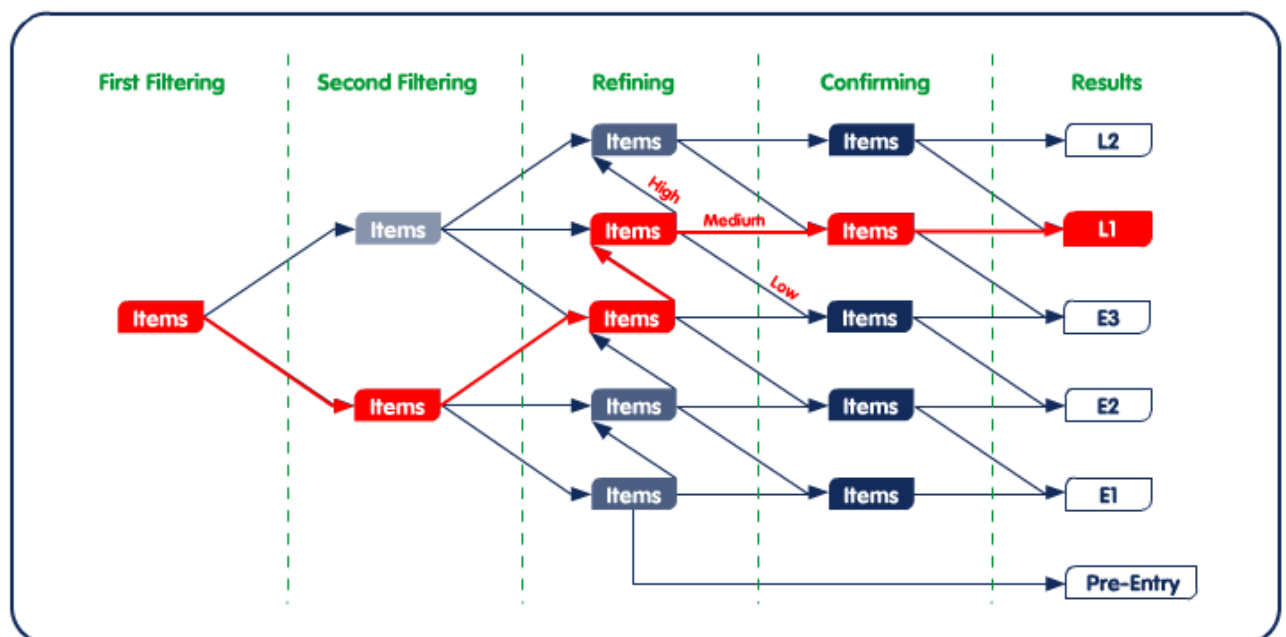

Fig. 2 The adaptive structure of the computer-based version of the Initial Assessment tools.

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[7] The UK qualifications system is divided into levels from pre-Entry to Postraduate.

Each tool consists of some 70 items grouped as shown in Fig 2. Performance in each group determines whether the user moves up a level, stays at the same level or moves down. The average user undertakes only about 25 items to complete the tool. By employing an algorithm, the team has been able to meet the requirements because:

- Users can complete the tool, on average in the time available.[8]

- Individual users are not presented with items that are either too difficult or too easy for them. This makes engagement far easier and eliminates the need in a traditional linear assessment to present users with items at all levels.

- The outcome is presented as one of five levels + pre-entry.

To encourage engagement from the user, the item authors have made good use of the technology to design items that both engage the user and offer opportunities to assess parts of the curriculum that cannot be easily assessed on paper.[9] The opportunity has also been taken to include audio. For Literacy and Language this has meant that listening skills can be assessed and for Numeracy, users whose literacy skills may be poor, can use the audio to supplement their reading of the items.

Advantages and Disadvantages

The key advantage of using technology has been the ability of the tools to meet the criteria detailed above.

However, there are disadvantages in using technology. The first relates to users who may not be IT literate and for whom this presents a barrier to accessing the tools. Whilst the IT skills required are low – for example the use of a mouse to drag and click – they could, nevertheless, be a barrier to those users with no IT skills.

The second relates to the ability of providers to access equipment. The IT specification for using the tools is low but many providers do not have guaranteed access to IT equipment or they may be conducting the assessment in third party premises.

It was for these reasons that the project was also required to produce tools in a paper-based format so that providers had a choice of formats available to them.

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[8] There is no time limit on the user. The average time is given as an indication to providers so that they can plan their use of the tools.

[9] The tools will be demonstrated within this presentation at the IAEA 2006 Conference.

5   Widening Access

In the original project the team were asked to provide two sets of tools – one for general use and one for use in the workplace. The only difference between the two sets of tools is that the items in the workplace tools use contexts that would be familiar to users in employment or training.

Studies have shown that adults in particular are more likely to embark on a learning programme if they can relate the programme to their everyday lives. This includes their employment. Furthermore, employers are more likely to engage with the Skills for Life strategy if they perceive the programme to be a direct benefit to their organisations. Developing workplace versions of the tools was designed to do this.

In the second year of the project this was taken one step further. The project team was asked to develop four further sets of tools that would contain items contextualised to the needs of four specific sectors:

- Health

- Road passenger transport – buses, taxis and community transport

- Retail

- Buildings maintenance

Whilst these tools were based on the workplace tools, they differed in one important aspect and that was the extensive involvement of employers in their design to ensure that the contexts used in the items reflected the kinds of situations that would be found in their organisations. Employers reasoning for wanting separate tools to be developed is based on extensive experience which suggests that employees are more likely to be engaged by tools and learning materials that fully reflect the settings in which they work.

The contextualised tools were developed from the workplace tools and a full set of both computer and paper-based versions is being made available to these four employment sectors.

Having seen these tools, a number of other sectors now want their own set of tools and the development has also encouraged them to look at how they can provide contextualised learning materials linked directly to the tools.

6   Implementation

An important stage in the development of the tools was an extensive trialling programme conducted with users and providers. By completion, the trialling across all the tools will have involved over 3,000 people of all ages and from all backgrounds and settings. The trialling process is designed to ensure that:

- The tools are manageable in a range of settings.

- The tools produce a consistent and valid outcome.

- The tools meet the needs of a range of users and providers.

- The tools are engaging for potential learners.

- The software is working correctly.

- For the contextualised tools, the contextualisation meets the needs of the employers.

The outcomes of the trialling enabled the project team to make amendments to the tools that reflected the responses from both users and providers.

The main set of tools is now available (April 2006) for use and the project will be completed by August 2006. The DfES is concerned to ensure that the tools are implemented by providers in ways that are consistent with the aims of the "Learning Journey" and to ensure that potential learners are steered towards learning programmes that are designed to meet their specific needs.

To do this they are designing a range of support mechanisms which will include cascade training, a website and access to telephone support. By providing both the tools and the mechanisms to support them, the DfES expect to raise both the profile and the quality of this provision in England.