

Definitions of indicators of quality on the application of ICT to University Teaching

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What is quality?

In any endeavour, quality is easier to describe and illustrate than to define. There are rarely any absolutes. Quality of ICT in University teaching, for instance, depends *inter alia* on clarity of purpose, relevance of that purpose to all stakeholders, coherence of design in relation to that purpose, ease of implementation, and impact on intended and unintended beneficiaries and stakeholders. There are other important elements such as cost effectiveness, return on investment (ROI) and ethics. The challenge is further complicated by the existence different models of higher education. It is not therefore a straightforward matter to do justice to the issue of identifying indicators of quality of ICT in University teaching without first reviewing its purpose, the context in which it operates and its intended and incidental consequences. There is one further complication: the medium of ICT has a momentum of its own, driving changes in the service it is supposed to be supporting. As was once famously stated, 'the medium is the message' (Marshal McLuhan, 1964).

Some current practice

To illustrate the wide diversity in interpretation of the notion of quality in ICT usage in HE, here is a selection of approaches currently in use.

The broader perspective

Lopez et al at an ESOE forum in 2003 suggested gathering data in seven areas reflecting a Total Quality Management (TQM) perspective on ICT based programmes. Their approach embraces institutional characteristics and programme structures as well as learning activities. Though not explicit, Lopez's indicators imply a learner managed learning pedagogical approach. The seven dimensions are:

- availability of ICT qualifications
- online management of academic information
- on-line self-inscription
- personalisation of online facilities
- virtual university campuses
- proportion of e-learning experiences
- participation in shared virtual campus experiences.

Though in the similar vein to that of Lopez et al, Lorenzo and Moore (2002) proposed a more fundamental approach to quality assessment in the Sloan Consortium's 'Report to the Nation' (i.e.

USA). The Lorenzo and Moore list, called the 'Five Pillars of Quality Online Education', covers a wider context and longer term, and includes dimensions beyond the immediate features of the programmes themselves. Each pillar is a broad area within which measurements or observations should indicate the overall quality of provision as opposed the quality of specific programmes. The pillars do not imply any particular pedagogical approach. The Sloan pillars are

- Learning Effectiveness
- Student Satisfaction
- Faculty Satisfaction
- Cost Effectiveness
- Access

Using a more general indicator of quality, the impressions of key providers, Allen and Seaman (2003) asserted in The Sloan Report of 2003 that the majority of academic leaders (57 percent) already believe that 'learning outcomes for online education are equal to or superior to those of face-to-face instruction' and that 'nearly three-quarters of them expect learning outcomes for online education to be equal to or better than face-to-face instruction.'

At the operational level

Indiana University's Center for Research on Learning and Technology (CRLT) also has a list of seven criteria but in contrast to Lopez et al's TQM approach, theirs is more explicitly related to identifying good practice within a conventional pedagogical model that emphasizes good practice within a fairly traditional teaching paradigm. Good ICT practice, according to Grahan et al (2001):

- encourages student-faculty contact
- encourages cooperation among students
- encourages active learning
- gives prompt feedback
- emphasizes time on task
- communicates high expectations
- respects diverse talents and ways of learning

Others use indicators that focus on the minutiae of on-line teaching, as in Corich et al (2004) who measured effectiveness of online discussion forums in helping students focus on **problems** by counting frequency of examples of

- triggering
- exploration
- integration
- solution

Similarly Corlich et al demonstrated that the extent to which online discussion develops student **understanding** could be indicated by counting student inputs that showed

- elementary clarification
- in-depth clarification

- inferencing
- judgment
- application of strategies

The above examples are just two of an extensive array of detailed research studies into good practice in specific processes involved in online learning.

At the pedagogical level

An early example focusing on pedagogical aspects of quality is Tom Reeves's (1997) list of fourteen pedagogical dimensions that should be taken into account when evaluating Computer Based Education (CBE). Reeve's fourteen dimensions were:

- epistemology
- pedagogical philosophy
- underlying psychology
- goal orientation
- experiential value
- teacher role
- program flexibility
- value of errors
- motivation
- accommodation of individual differences
- learner control
- user activity
- cooperative learning
- cultural sensitivity

The underlying pedagogical stance of Reeve's list is constructivist and learner centred. Quality, Reeves argues, needs to be discussed in the context of the preferred pedagogical paradigm. CBE, Reeves sadly observed, is more frequently seen as 'an alternative delivery system for traditional pedagogy rather than as a tool for implementing alternative pedagogical dimensions. **Evaluation approaches based upon clearer delineation of the pedagogical dimensions within different types of CBE' he further argued, 'will surely be a step forward.'**

The UK Government's University for Industry initiative in 1998 explicitly embraced a learner centred pedagogical stance for its programme of ICT based programmes at all levels, including university level. Ufi expressed its quality mark in the form of its pledges to learners. The quality of Ufi provision could be judged by the extent to which each pledge was met. The seven UFI pledges to learners were:

- to offer the time, place, pace, and style of learning that responds to your needs
- to give clear information that helps you make the best personal choices about learning programmes and maintain control of them
- to offer learning materials that are relevant to your own work interests and that actively involve you in practical examples and exercises
- to enable you to monitor your progress and record your achievements as you go, not just at the end of a complete programme
- to give easy access to the specialist support you need
- to put you in touch with other people studying in the same topics

- to give you the chance to relate your learning to your own longer term ambitions.

The longer term perspective – Return on Investment

But there are wider dimensions to quality than indicators specific to particular ICT based programmes. Return on investment (ROI) is a legitimate concern for those committing large investments into infrastructure and materials. In the world of business, ROI has always been a concern and is increasingly so in universities where set-up costs for online learning can be high. Big business, of course, is also heavily investing in ICT based training strategies. The guru of ROI, Donald Kirkpatrick (1997), formulated four levels at which evaluation should occur:

- **Reaction** – how those who participated in the programme reacted to it. Usually measured using end of course feedback (Happy Sheets), usually based upon a 5 or 7-point scale.
- **Learning** – the extent to which participants change attitudes, improve knowledge and increase skill as a result of attending the programme. Usually measured using objective based test questions immediately after completion of the training.
- **Behaviour** – the extent to which a change in behaviour has occurred because the participants attended the programme. Measured (assessed) in the workplace. Usually by self-assessment or sometimes by 360 degree peer review. Assessment are subjective, difficulties arise in base-lining the pre-course behaviours.
- **Results** – the final result that occurred because the participants attended the programme. This requires a view on the extent to which changes in key business metrics can be attributed to changes in individual behaviours.

Full Kirkpatrick evaluations are difficult to achieve, even in hard-nosed businesses. Sutton (2005), for instance, reports that fewer than 20% of cases studied reached Kirkpatrick's levels 3 (behaviour) and 4 (results). Assessing long-term changes in behaviour and overall impact is just too difficult when under pressure. Sutton's informants (senior managers in large companies) came up with five indicators of their own:

- Techniques and skills from the learning programme are seen to be adopted in the workplace.
- People share knowledge and experience
- People show signs of new ways of thinking and working
- The organisation and the employee adopt a symbiotic approach to personal development.
- Learners enjoy their experience; they are enthused by it and recommend it to others.

A LEARNER MANAGED LEARNING PERSPECTIVE

For the rest of this review of quality indicators, the focus will be on pedagogical matters in general and learner managed learning in particular. Three aspects are explored: the impact of the ICT revolution; the wider purpose of university education; quality as coherence of understanding and practice; and some working examples.

The ICT Revolution

Let's start with McLuhan's dictum about the medium being the message. The Internet has transformed how when and where we a) book flights and hotels, b) acquire and listen to music, c) access, disseminate and contribute to news, d) conduct our personal banking, purchases and money transfers, and e) do our professional work. In each one of these everyday situations, major institutions have experienced fundamental changes to the way they operate. Almost universally, intermediaries such as bank branches, travel agents, music suppliers, work supervisors and news reporters have seen their roles diminish. New solutions and processes are being devised by users themselves. What these examples have in common is that the end user has much more control. Businesses claim to be more efficient and provide a better service by providing the user direct access, information and support. Our lives are enriched because we can order our priorities to suit our personal needs, not the convenience of the provider. If ICT can give people responsibility for managing their access to travel, music, news, business and work why shouldn't it happen in education?

We are of course seeing some undesirable changes beyond the immediate control of teachers and institutions. Students, for instance, can now get their essays written for them by experts for a few dollars, countered by the development of plagiarism detection software. You can even purchase your degree online. Other peripheral developments are the growth of distance learning colleges and open source materials. Google Scholar is a major research tool giving browsing access to academic articles available on the web. However, there are much more fundamental changes taking place. They concern the underlying pedagogical principles on which we traditionally operate, inviting an irrevocable shift from teacher determined to learner centred learning.

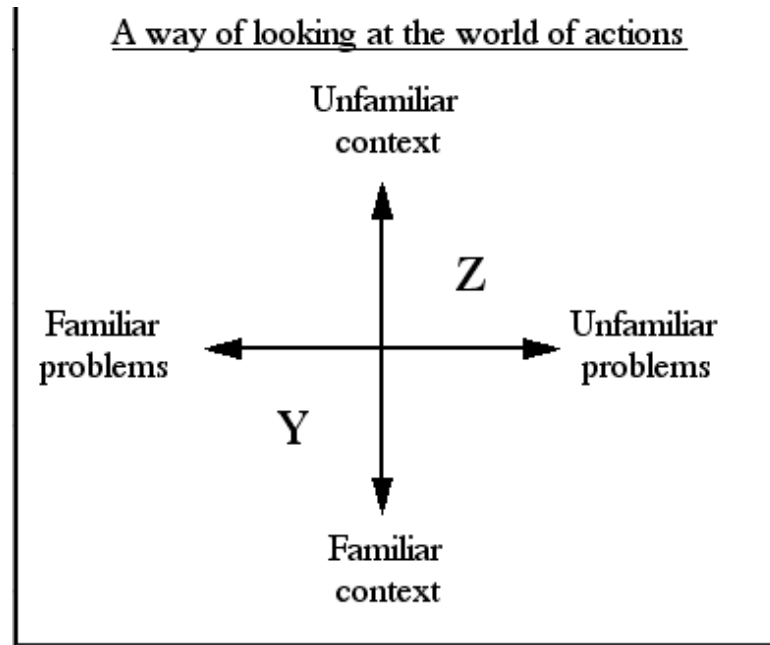
The quality of purpose

For many of us in HE a change to learner-managed higher education is wholly welcome. In 1997, Lord Dearing produced a major report on the future of UK higher education in which he made the following categorical statement about curriculum: "*On leaving HE, all students should have developed the practice of taking responsibility for their own learning*". Fujitsu's statement that '*Corporate capability is dependent on the motivation for continuous learning of everybody in an organisation*' is typical of industry's views. The challenge for us in HE is to find ways of giving students real confidence, based on real experience, that they can indeed manage their own learning. The way to achieve this is to give students real experience of managing their own learning, within a critical and quality controlled environment. The process of learning, in this respect, is also the outcome of learning. A quality feature of ICT in university education would be the extent to which we use ICT to bring such a fundamental change about.

The dominant characteristic of our working lives in the 21st century is change – leading change, managing change, responding to change, coping with change. We can illustrate this with

Stephenson's simple grid published in 1992, as in Figure 1. The diagram and description that follows are in Stephenson 1998.

Figure 1: Stephenson's Competence and Capability Grid



Most of us operate, for much of our time, in Position Y in Stephenson's grid. In position Y, we are dealing with familiar problems for which we have learned familiar solutions. The context in which we are operating is also familiar. Position Y can apply to the work place, the home, community activities or artistic pursuits. Good performance in Position Y may require technical skills and knowledge of the highest order, or at the simplest level. We give students information about the context; the more complex the context, the more information we give them. We give them information about the kinds of problems they will meet, and details of the solutions, which have been found to be effective. We might even give them practice in the implementation of the solutions and evaluation of their effectiveness. We seek to develop student capability in Position Y by passing on other people's experience, knowledge and solutions. Though no doubt effective in the context of Position Y, the resultant capability is essentially a dependent capability.

But Position Y is not the whole of our experience. As indicated above, change is the order of the day. Many more of us will be spending more of our time having to operate in Position Z. In Position Z, we have less familiarity with the context and we have not previously experienced the problems with which we are faced. The slavish application of solutions perfected for familiar problems may have disastrous effects in Position Z. To a large extent we are on our own, either individually or collectively. Very often, what distinguishes effective pilots, effective surgeons, effective social workers, effective teachers, effective builders and effective accountants is that they perform as well in Position Z as in Position Y.

The famous American cartoonist Gary Larson depicts a group of sheep in a cocktail party, uncertain about where to stand and when to eat. 'Thank God', one says, 'here comes a Border Collie'. Sheep, of course, have all the skills for being a sheep - they are expert at both eating and standing. They do both, at the same time, all day. Put them in a cocktail party and they are totally lost, dependent upon the arrival of a sheep dog to tell them what to do. They have the skills but not the confidence to use them when circumstances are totally different. If these sheep were capable (in the sense in which we use the term) they would have three extra attributes: an **ability to learn for themselves**, and to quickly suss out the new environment; a **belief in their personal power to perform** in new situations (they would have the confidence, having spotted the pasture discretely left by the host, to do something about it) and **powers of judgement** (they might even question whether it was appropriate for sheep to be at the party and simply leave).

A significant contribution of ICT to the quality of higher education, therefore, would be to remove the collusion between students and teachers that ensures continuing inter-dependence between teacher and taught, and to engender in students the ability to learn for themselves, a belief in their personal power to perform and proven powers of judgement when in new and unfamiliar situations. In a review of current research on pedagogical aspects of e-learning, reported to the American Education Research Association in 2003, good practice is increasingly being characterised by 6 key words that also chime with Position Z in figure 1:

- ownership,
- responsibility,
- flexibility,
- personalised,
- self-managed,
- on-line help
- recognition.

Quality as Coherence

For an effective switch to a learner managed approach, there needs to be a clear consensus amongst the key players of what learner managed learning means. Securing such a consensus is very difficult. Moreover, surveys by Bonk (2001, 2002) and Collis (2001, 2002) point to a lack of understanding amongst key players of online pedagogy related to good e-learning design, leading to disappointing completion rates (Martinez 2003). The problem, it seems, is that the complexity and cost of setting up new e-learning systems requires the active involvement and agreement of six very different key professionals: the teacher, the supplier of software systems, the institutional manager (budget holder), the designer, the technician and, of course, the learner. Each has a different set of expertise, priorities and concerns. Each speaks a separate professional language making it very difficult to achieve consensus. Usually, the teacher and always the learner are left out of key decisions. And worse, the academic researcher who reviews what works and what does not work is

rarely around the table. Coherence of understanding is, as a consequence, difficult to achieve and sustain.

To achieve consensus in ICT provision (irrespective of pedagogical paradigm) we need a common language about teaching and learning to facilitate mutual understanding amongst all the key players. And we, the academics, do not help communication with the language we use. Here is just a flavour: constructivist, instructivist, industrial, post-industrial, teacher centred, learner centred, authentic, situated, experiential, tacit, learning styles, problem-based, communities of practice. The list is not exhaustive. And academics like to argue about what each means thereby making communication with other specialists even more difficult. To achieve coherence through consensus, therefore, we should make the language we use as simple as possible, as in Figure Two, The Online Paradigm Grid (Coomey and Stephenson, 2001).

Figure 2:

Coomey and Stephenson's Online pedagogy Grid

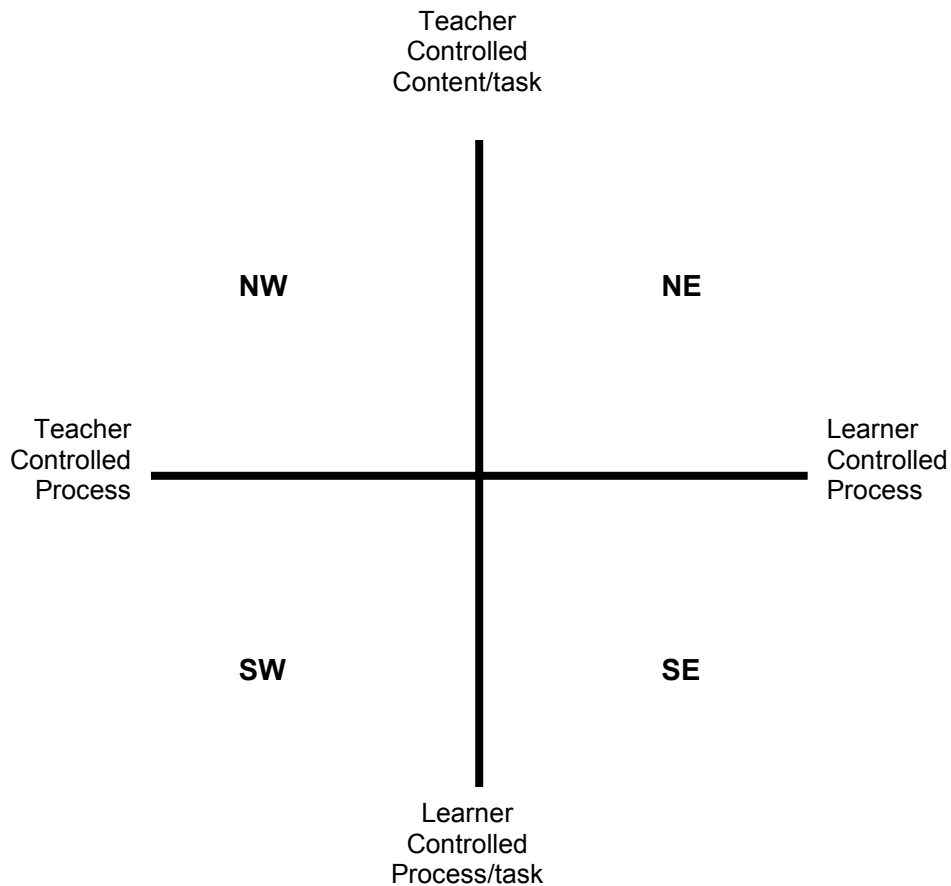


Figure Two is based on two key variables: who controls the content / task and who controls the process? Is it the teacher or is it the learner? The creators of the grid (Coomey and Stephenson) avoided giving names to each quadrant to avoid arguments over choice of quadrant titles, hence the simple compass descriptors.

The North West quadrant is the traditional model where the teacher controls both the content and the process. Of the 100 case studies of e-learning examined by Coomey and Stephenson the vast majority were in the NW sector, including many creative and innovative schemes making imaginative use of a range of e-learning facilities. Many blended learning schemes are in this quadrant, despite employing a variety of media. The SW and NE quadrants are intermediate: in the NE the learners control the style, location, pace, duration and sequence of learning but not the task;

in the SW teachers define the learning activity leaving the learner to decide and direction. But it is the SE quadrant that interests me the most. It is here where the learner is fully in control. The SE quadrant is where students are most likely to develop confidence in managing their own learning in life and at work, as called for by Dearing and Fujitsu earlier.

However, many e-learning models used in HE are steadfastly in the traditional quadrant despite using sophisticated systems. Lectures on line, electronic page turning, email feedback on assignments submitted as attachments, online discussion groups and archived resources are commonplace. Traditional pedagogies are supported by very expensive and sophisticated systems such as online dispersed classrooms using web-cams and an array of virtual learning environments covering everything from content management, learner progress and learner-learner-tutor dialogue. Web-CT, Blackboard and First Class are well established means of sustaining a dependent learning model.

Coherence within the same quadrant

In their review of 100 research reports, Coomey and Stephenson (2001) identified four key processes that characterised the relationships between staff and students: **D**ialogue, **I**nvolve**m**ent, **S**upport, and **C**ontrol (DISC for short). They also noticed that the nature of each component of DISC was different in each quadrant of the online pedagogy grid. This can be illustrated by just one of the components, Support:

Support in the NW quadrant:

- Assumed to come only from the teacher via e-mail or phone calls or face-to-face meetings that are scheduled.
- Main feedback from instructor

Support in the NE quadrant

- Tutor provides advice on nature of the task, learning goals etc.
- Mainly e-mail contact, or tutor moderated discussion groups
- Students provide feedback to members of their own groups and others

Support in the SW quadrant

- Tutor support could be online or occasionally face-to-face
- Range of support: traditional feedback in the first phase of the course (NW quadrant)/ instructor acting as facilitator, offering suggestions but not answers during the 'discovery' phase of the course (SE quadrant)

Support in the SE quadrant

- Contacts with supervisor initiated and monitored by the learner, facilitated by the system
- Teacher in background, offering advice on procedures and resources
- Feedback sought from variety of sources and experts
- The structure and design of the online learning facilities provide a framework of support within which the learner has considerable discretion

Dialogue, involvement and control are similarly different in each quadrant. It is clearly essential that a quality ICT based programme requires all four components to occupy the same quadrant if a coherent model is to emerge.

Moving out of the NW Quadrant

Technical developments and greater user confidence are greatly facilitating a drift towards the SE Quadrant. These include:

- SCORM – disaggregated learning objects
- Wireless networking
- Open-sources
- Intelligent intuitive tools
- Super search engines
- Large storage and indexing systems
- Open sources
- Blogs

The above features allow easy interrogation of content, leaving teachers free to provide advice and quality assurance.

Two examples illustrate the point. There are very many more. The first is Books 24x7, an example of publishers making all their refereed published materials available online with sophisticated search facilities of disaggregated content delivering a range of specialist content in immediate response to requests. Responsibility for content acquisition can safely be entrusted to the learner. Online encyclopaedias, specialist web-sites and research sources are also increasingly available, some without prior arrangement.

The second is an example from my own institution, Middlesex University. Our unit was approached by the British Council to provide a staff development service for the Islamic University of Gaza (IUG). In particular they wanted IUG us to train a core local team who could then train others in the development of electronic supportive content for use on IUG programmes. We were invited to send two advisers to IUG to provide 24 hours of face-to-face training in 5 days.

There was one major difficulty and one opportunity. The difficulty was practical. Because of the instability in the region our Vice Chancellor would not sanction staff travel to IUG. The opportunity was pedagogical, to give HE tutors real experience of being in control of their own programmes as a way of giving them confidence to do the same with their colleagues in a cascading model of staff development. We used a learner managed learning approach in which we helped each participant to explore and articulate their personal starting and desired end points and negotiate online for our agreement and support for their individual learning programmes. Peer support was encouraged and resources were available online. We used web-based video conferencing for 1 to 1 and 1 to many exchanges to encourage a sense of urgency and belonging. By the end of the week, the 'students' were teaching their colleagues about their plans for helping others. They learnt about Web-CT: we did not teach them. I hasten to add it was my colleagues who did this work, and they were rightly given the prestigious award of '2004 e-tutors of the year' by the British Higher Education Academy.

Into the SE Quadrant – learner controlled content and process

In this quadrant we are seeing what in effect amounts to ***the end of the course as an organising structure for learning***. Fixed syllabi, pre-determined outcomes and assessments, and strictly time-tabled activities imposed by programme managers give way to frameworks or shells of support materials and services surrounding loosely defined fields of study, generalized outcomes, generic levels statements and activities pursued by the learners.

In the place of the course there is a learning support framework that provides easy access to online support from tutors, mentors or external specialists, open chat facilities, special interest groups, one-to-one exchanges with a personal supervisor, tracking and personal log services and links with other frameworks and activities. The framework will allow each individual learner to negotiate their whole programme, including its general field, content, location, time-scale and, above all, level and title of the intended award. Such a scenario is fully learner managed, exploits the features of online learning and is consistent with current trends and developments.

SOME EXAMPLES OF COHERENCE

Two examples chosen from the SE quadrant will suffice: The Ufi/learndirect Learning through Work programme (LtW) and the emergence of online e-portfolios.

Learndirect's Learning Through-Work programme (LtW).

The LtW web-site, viewable at www.learndirect-ltw.co.uk, provides direct help and personal support to enable any individual to review their working and personal circumstances, articulate their personal and working aspirations, design a programme of study built around their work to take themselves and their work forward, involve their employers as active partners, and secure an appropriate university qualification such as a first degree or master's degree. Each individual learner's programme and resulting qualification is negotiated online with the university of their choice.

There are three distinct stages to the LtW process:

Exploration – a free initial interactive online package designed to inform, provide diagnostic feedback and assist the learner in making a decision on the suitability of the scheme for them. Learners wishing to join the scheme submit an online application to their chosen university.

Design – all learners must use this facility to negotiate a learning contract leading to a particular award. The learning contract must specify an individualised programme, its associated aims and components and the award sought. Learners negotiate their intended learning outcomes, the evidence they intend to produce and the assessment criteria to be

used. The online Design Package contains many levels of help including downloadable expert advice on key processes and detailed help on the criteria relevant to different levels of award. Users have access to support from their university either via online dialogue facilities, private e-mail or telephone.

Implementation and assessment - learners undertake their agreed programme and present evidence for assessment with online support by their tutor(s).

Being online, Stages 1 and 2 are available to anyone at any time and place, whilst Stage 3 can be completed through work with online help from the University they have registered with. It means that learners may choose whichever university best suits their needs and are not confined to a nearby campus.

Since its launch in 2001, more than 25,000 have used the free online Exploration Package on the LtW site, many out of curiosity. Most were exploring what the programme involved and whether it suited their needs. At the time of writing a total of 1679 (61% female) aged between 21 to over 65 (mean age 32) have had their online applications accepted by one of the participating universities, 39% of them at post graduate level, and have moved into Stage Two. More than a thousand people have successfully negotiated learning contracts and are in Stage Three pursuing their own learning-through-work programme leading to full university qualifications. To date, three hundred have received their degrees.

Online e-portfolios

E-Portfolios are emerging as self management tool both within and outside formal educational programmes. I will illustrate with an e-portfolio I would design for myself. It would be customised as my personal site with myself in centre page surrounded by links to key services and support materials to enable me to take complete control of my own learning. These links would be:

- Activities - ongoing, recent activities;
- Self – diagnosis tools of needs, aspirations
- Personal log - goals, achievements, credits from previous learning, private reflections
- Resource library - assembled intuitively by the 'back office' in response to my stated / inferred personal and programme interests to be available when I need it
- Personal development plan - strategic, immediate, progress made, priorities
- Help - access to peers, tutors and mentors
- Networking - peers, wider specialist community
- Pooled experience - knowledge bank, archives of previous work, other people's experience
- Awards qualifications – tools and help with levels criteria for target qualifications and procedures for negotiating their award

POST-SCRIPT – RETURN ON INVESTMENT

Earlier, the Kirkpatrick model of judging return on investment was described. Financial returns are a quality issue. Consider this: course content is now cheap and widely available; expert feedback and

guidance on learning are essential and expensive; and the most expensive resource in the university is academic staff time. So... don't use the most expensive resource to deliver the cheapest item – leave that to the learners themselves. Use the most expensive resource on the most valuable service, tutorial support and guidance, and quality assurance. In that way we can ensure the learner is always at the centre and the financing agents will be satisfied. And that would be quality use of ICT in the University.

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