Using Fibre Optic Motorways and Software Cars to enhance the student learning experience in an undergraduate Marketing Module at Staffordshire University: a short case study

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Abstract:

Staffordshire is notorious for a stretch of the M6 motorway that is always at a standstill. Ten mile tailbacks are an everyday occurrence and it is often referred to as the UK's largest carpark. Soon this congestion will be alleviated by Britain's first toll motorway. This is not a universally popular development. We are used to 'free' road use in the UK! All in all, motorways and Staffordshire are not synonymous with success. However, this may soon change, albeit with a very different kind of highway. As a result of careful planning and successful bidding for funds, Staffordshire will soon have a county wide, pervasive, broad band network that will link up further and higher education via 155 – 622 mbps links. It also has the capability of linking to schools, businesses, libraries and other learning centres that are beginning to emerge, including rural village public houses, community halls and indeed individuals' homes. This hi-tech infrastructure is part of a radical agenda to distribute learning across the county in ways that encourage and enable learners, and would-be learners, to begin their own individual journeys for self development, in terms of skills, ideas, concepts and knowledge, that will make them, and those for whom they work, more efficient, effective and competitive in the modern global marketplace. The aim is to genuinely widen participation and to give access to all, irrespective of personal circumstances that might otherwise make access to learning resources difficult, if not sometimes impossible.

There are many 'drivers' behind this project, not least of which is to improve the competitiveness of Staffordshire trade, commerce and industry, which performs below (<80%) European norms. Since the Industrial Revolution in which Staffordshire was at the epicentre, the county has been dependent on

coalmining, the pottery industry, engineering and agriculture for wealth creation. All of these have latterly been industries in decline, and economically, the county has suffered from the consequent backlash of industrial rundown, and many traditional communities have been decimated by unemployment, poverty and a sense of no future. Staffordshire University and the county's further education colleges have been at the forefront of leading a regional learning revolution that takes advantage of the opportunities that modern computer and information technology makes available.

Infrastructure alone is not especially useful. What is also needed are sophisticated 'cars' to run up and down it. In short, traffic! Over the past three years, initiatives have also been encouraged and nurtured to develop appropriate software that will help students to be motivated to use modern learning materials, and to learn from them. This is a complex process, not only from a development perspective, but also from a pedagogic, administrative and resource one too. In fact, it has become clear that the opportunities afforded by new technology fundamentally permeate all aspects of any organisation that provide education, training and learning. Learning that makes use of ICT is often multi-dimensional and pervasive, and challenges existing culture, traditions and practices, and that if insufficient attention is paid to this, then what on paper are innovative and futuristic projects may well not succeed, or be as successful as they might be.

The use of information and communications technology (ICT) to facilitate access to lifelong learning and to widen participation, is one of the central tenets of the present United Kingdom's (UK) government's thrust to inculcate and embed a pervasive learning culture, which in turn is part of the overall drive to make the UK a genuine, and continuous, learning society. Kennedy, in her seminal work that has influenced the thinking of many politicians and educationalists alike, conceptualises of a learning nation that makes use of the new information superhighways, for learning on need and demand. She articulates the view that learning does not, and should not be seen, to take place only in organised educational centres. She sees bricks and mortar as becoming increasingly less significant in the whole process and structure of learning, to be replaced, at least in part, by the means provided by new technology, and delivered into the home, the workplace, the leisure centre or wherever, whenever it is required. The changes that ICT bring in relation to learning will, according to Kennedy, 'be akin to those brought by the printing press and the Industrial Revolution, both of which precipitated revolutions in the speed and method of learning'. To existing providers, such sentiments represent both opportunity and threat, probably in equal measure, but they will be ignored at their peril. A clear lesson from history is that one cannot undo, or ignore, technological innovations and that one should not underestimate their potential long term impact. Organisations have to assimilate them within a newly constructed structural repertoire, which may have to be very different to their 'modus operandi' of the past.

As in most developed nations, the UK has in place a complex web of learning providers, spanning the length and breadth of the composite countries, mostly public (state) funded but with many private initiatives too. Most of these are traditional in the sense that they have physical premises, that they offer ‘paper based’ courses, often leading to formal qualifications, and that direct, face to face teaching, is central to delivering knowledge and concepts and to enhancing specific and generic skills that relate to a particular programme of study. To suggest that these may not be necessary, or will play a lesser role in the future, is to implicitly question exactly what their purpose might be.

It could be argued that this historic infrastructure is both blessing and curse. On the one hand, these traditional centres of education are well thought of and respected by their user base, what they do is usually done well, a wide range of provision is made in terms of academic level, programme area and mode of study, and geographical coverage is theoretically good (FEFC, HEFC reports, 1995 – 1999). On the other hand, strong tradition and culture can be an inhibitor to change. Because much investment has been made in the existing educational infrastructure, there can be a reluctance to embrace radically new approaches for a combination of financial, human, social, organisational and other reasons. A powerful argument can be constructed that the existing systems, structures and processes are fine for those who are mobile, motivated, based in one place and have fixed and repetitive schedules. For others, the majority, where these pre-conditions are not met, they are effectively excluded from many of the ‘opportunities’ that exist. Hillman comments that ‘at the moment, lifelong learning is a minority activity, with only

16% of the workforce engaged in formal learning every year'. Advocates of this point of view would comment on the need to free learning from the traditional confines of educational institutions, and foster instead a culture of lifelong learning based on convenient access to resources and materials (Selwyn 1999). This would genuinely help to widen participation, and to combat social exclusion from learning, that has effectively become a by-product of the existing system.

The present government made their electoral slogan in the 1997 campaign 'education, education, education'. They won a landslide majority. They are now endeavouring to honour their pledge, and recognition has been given to the fact that technology-based learning, aimed at all sectors of society, is critical to achieving their overall vision. This is reflected by Government policy and funding opportunities that have subsequently been made available. The National Grid for Learning, the People's Network of Libraries and Museums, Centres of Excellence and many Digital and Virtual College initiatives have been supported. Some of this builds on existing infrastructure. Some is new. Another key feature in the present administration's philosophy is that of working together in partnership, and sharing, in the belief that this will bring synergy and greater momentum to new learning initiatives and developments. The soon to be re-named 'University for Industry' (UfI) is a centralist umbrella organisation, that has been entrusted with the role of building a nation-wide, coherent, learning framework to stimulate and co-ordinate approved ICT- based lifelong learning, training and courses. Existing and new providers will have to work closely with UfI, who will also be responsible for quality control, offering clear

and reliable information and advice, marketing (the UfI kitemark / brand) and encouraging curriculum developments that fit in with user and societal needs and lifestyles. It would seem likely that in the near future, they will also have a significant input as to what funding goes where, and when, thereby enabling them to use the ‘carrot and stick’ approach to driving the vision forwards.

Cynics of ICT based learning argue that the vision is driven as much by the additional cost that widening participation inevitably causes, as it is by advanced pedagogy. They articulate the view that much of what is being done is untried and untested, and that it is not known whether effective learning can happen using a virtual environment (Selwyn 1999). That is not to say that they disagree with the overall need to create genuine lifelong learning opportunities for all, or the economic and social imperatives that underlie this (Birch 1999). More it is a question of how effectively to achieve this. In the short and medium terms, it would seem likely that hybrid transitional arrangements will take place, with organisations combining the ‘old and the new’, to varying degrees. Anecdotal evidence gives some validity to this perspective. Retalis argues that institutions will be able to enhance and enrich conventional classroom based teaching using ICT resources, thereby creating an advanced learning environment, both pedagogically and technically. Organisations will gradually develop idiosyncratic models that suit the needs of their different user groups. Creativity and innovativeness in finding solutions that work, which successfully address user and could-be user needs, will potentially give competitive advantage to the individual institution, whilst at the same time working towards achieving the broader societal goals.

In the real world in which we live, where resource is finite, it is difficult to see how the massive expansion of activity that is required could be either feasible or affordable by simply increasing the throughput of conventional structures. And given that these structures have never attracted the majority, for whatever reason, one would have to question the desirability of a purely additive model. It could well be that in the fullness of time, new ways of distributing learning turn out to be the key to engaging some, or many, of those that currently do not participate. Hillman clearly states that traditional forms of provision are often firmly associated with bad experiences, and psychologically in the individuals mind set, they become barriers to, rather than opportunities for, learning. One should not underestimate the negative associations that many people have towards traditional education, based on their own first hand experience, and the consequent impact that this has. To simply offer more of that with which previous failure is associated, merely results in a vicious spiral that exacerbates inequality of opportunity (Hillman 1998). ICT gives the opportunity to radically shift and change the relationship between the learner and the provider, thereby removing, at least in part, one of the main barriers to entry to lifelong learning.

For good or bad, it is clear that ICT is here to stay and that it will, to a greater or lesser extent, impact on what, when, where and how learning takes place. Potentially, it can globalise the supply and distribution of learning as well. However, it is also important to remember that ICT only facilitates change. It makes possible new ways of distributing learning but it does not in itself create the materials, or establish the requisite pedagogy. This is for ‘experts’ to do. In

this context, experts might be considered to be those who understand what learning is, and how it can be shaped, influenced and packaged in the context of electronic, or digital, learning materials, but with a very clear recognition and understanding of the human aspects of effective learning processes. The UK Open University know much about the phenomenon. Most learners need more than just well thought out programmes of study, excellent booklets, videos, other interactive materials and assignments. They also need regular personal contact with tutors and fellow students to discuss and develop ideas. Without this, the overall value of the learning experience diminishes rapidly. This is the human dimension to effective learning that is difficult to quantify, but that should not be underestimated.

Retalis et al emphasise that technology push should not be the key driver, or determinant, of new ICT developments. The focus should be on learning pull. Educators need to be aware, and conscious, of the unique pedagogical and learning advantages that new technology offers, including the potential for remote, but 'human' interaction. In deciding to use new technologies, it is because they are appropriate vehicles for learning, and not because of what Retalis interestingly describes as 'technolove' or technical determinism. i.e. it can be done electronically, using ICT, so therefore it will be. It is clear that whilst new technologies do have the potential for more learner centred pedagogies, that new learning resources will have to be developed to properly exploit them. It is pointless, for example, simply scanning in pages from a book, and then believing that this provides a radical new improvement in the delivery of learning. A whole new approach is needed to capitalise on the potential of

electronic media. This is likely to be expensive in terms of initial development time, and is not a soft, or cheap, option. Careful follow-up evaluation will be necessary to ensure that learning objectives and outcomes have been achieved.

Retalis's group advocate the need for a model or conceptual framework which educators can use to justify using new technology as a means of distributing learning, rather than using more established means. Such a framework should include, for example, an evaluation of the need for flexibility, including on-demand use, lifestyle factors, geographical considerations, demographic issues, proper cost / benefit analysis, and in-house expertise. ICT also offers the opportunity of levering a lecturers expertise to a wider population of participants, ultimately with very much a global perspective. Implicit in all of this is the need for an understanding of the user, and potential-user base, and this type of information will need to be gathered, analysed and synthesised regularly to inform the decision process. This in itself represents a major challenge to many organisations. The point should be emphasised that ICT is not an end in itself. It is a means to an end. It should only be used selectively and appropriately, and in the context of achieving carefully defined objectives.

It is against this general background that Staffordshire University (SU) and many of its federated partner colleges have proactively been developing a county wide strategy to develop ICT infrastructure and learning resources to capitalise on this. A further driver within the UK generally, and SU specifically, relates to changes in funding of higher education (HE), and the growth of the

sector over the past ten years. The SU 1996 – 2000 strategic plan comments that ‘British HE has made the transition from being a well funded elite system, to an economically funded, mass system, in little more than a decade’. Some practical manifestations of this include much higher staff-student ratios, bigger classes, less contact hours, less one to one contact, less assignment work, proportionately fewer library books, student indebtedness and students working in paid occupation for increased amounts of time. At best, this infers that the student experience is changing, and that this needs to be taken account of when planning learning provision, in its broadest context. This is acknowledged in the SU strategic plan, which goes on to say that ‘this new situation requires significant efficiencies in the way that education is delivered to larger numbers of students, but offers an opportunity to adopt learning strategies which promote better learning, as well. The university is dedicated to discovering and implementing radical developments of its learning strategies which will promote a learning community and sustain its position as a major provider of learning into the next century’. This then gave a very clear indication that a fundamental shift would have to take place in the way that SU, as a university, operated. This would be necessary, not only to survive, but also to ensure that as a university, our hard earned reputation as a high quality learning provider would not be further compromised.

This part of the strategy should also be seen in context of how SU saw itself in terms of the region and the potential of ICT for developing new learning environments. SU has always considered it an important part of its mission to play a full and dynamic role within the county and its surrounds. It provides

courses of international quality to those living and working in the region, and it also works closely with business and industry. Working in partnership with other local providers, be they public or private, has always been part of the university's tradition, and these positive relationships are seen as vital in ensuring that the region is well served in terms of learning opportunities. These well established and strong relationships were to be of critical importance in future developments related to ICT.

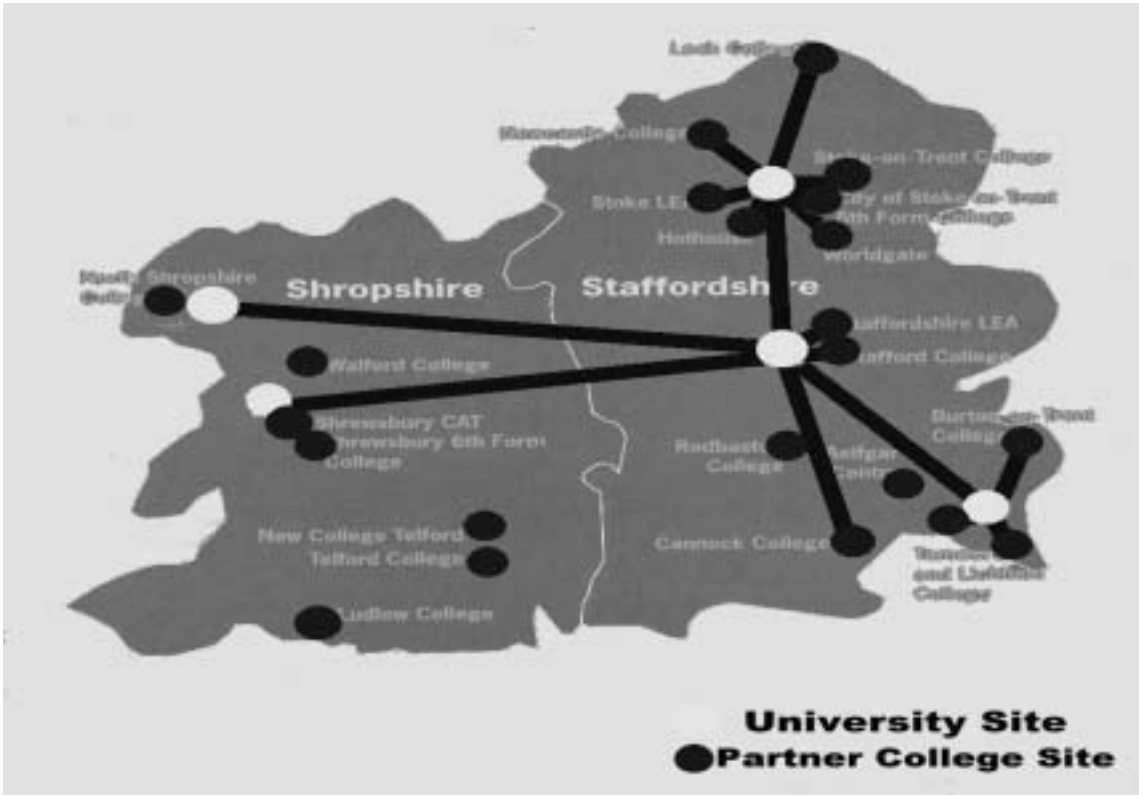
From its very early days, first as a technical college and then as a polytechnic, SU has had a reputation for being a leader in computing and information technology. The School of Computing is now one of the largest in the UK, and the Octagon Building in Stafford is still one of the most impressive computer centres in any UK university, and has a reputation for being at the leading edge of change. This tradition, and the expertise that went with it, made consideration of using ICT to distribute learning, both natural and practical. Within the 1996-2000 strategic plan, the intention to re-focus on learning as opposed to teaching, and to re-engineer processes accordingly, was made clear. Shifting the teaching and learning paradigm is complex, and inevitably all-pervasive, and ultimately involves changing cultures as well as building infrastructure. This takes time and resource. Recognition was made that paper based knowledge transmission would quickly be overtaken by electronic / digital means, and that efficient electronic links can provide interactive information transmission that effectively negates the effect of geographical separation, of whatever scale.

In December 1996, SU and Tamworth and Lichfield College succeeded in a bid to the European Regional Development Fund (ERDF) to jointly fund a new campus in Lichfield, in the south of Staffordshire. This was completed in December 1997 and opened in January 1998. The building is compact, and is permeated with a high technology infrastructure, including a 622 mbps (ATM) link to the Octagon in Stafford. This meant that there was now in place an ATM spine, spanning 35 miles through the middle of the county, north to south. The beginnings of the county-wide fibre optic motorways were beginning to emerge.

In March 1998, David Blunkett, Minister of State for Education and Employment, announced that £90m was to be made available for developing 'Centres of Excellence' to 'help small firms and individuals in specific industrial and commercial sectors and in particular geographical areas, to gain new, or update existing skills'. It was made very clear in the detail that successful bids would make new provision, which would provide flexible learning opportunities for the target users already defined. It was also made clear that partnership bids, combining separate providers, would be viewed positively. The constraints were also significant. Bids had to be completed within a month. Projects had to be up and running by March 1999, and money spent by then. Successful bids would be notified in June 1999, thereby giving only nine months to complete the project. This, for infrastructural investment that may involve multiple partners, is an almost impossibly short timeframe.

Building on well-established relationships, and against a very clear vision of the future, SU co-ordinated a bid involving twenty partners covering the length and

breadth of the county. This included all of Staffordshire's further education colleges and other significant providers of education and training, particularly those with experience working with small to medium sized enterprises (SME's). The proposal centred on creating a virtual Centre of Excellence, created across the whole of Staffordshire, using the university's existing local area network as the starting point for a backbone, to link all key sites together. Using this network, employers and individuals would be able to access the combined resources of all of the delivery partners. 'Using the university's distributed learning capabilities, anytime, anyplace, anywhere learning opportunities can be provided through off the shelf packages, or tailored programmes to meet the requirements of individual employers'. The bid was successful, and the partners received £1.57m of unmatched funding to create the virtual county infrastructure. As of March, 1999, Staffordshire now has a broadband IT link that spans the length and breadth of the county.



Simultaneously, development started on devising electronic learning materials … the software cars. A key decision was made to use Lotus Learning Space (LLS), based on Lotus Notes and hosted on Domino servers. The aim was to integrate Virtual Learning Environments (VLE's) into both the University's undergraduate and postgraduate programmes using LLS as the delivery platform, in the UK and overseas over a five year period. A further decision, to deliver LLS through the web rather than through Lotus Notes was critical to the University's objective to offer access as wide and as soon as possible. The alternative, delivery using only PCs loaded with Lotus Notes (such as current at Nottingham University), was considered too restrictive. This was seen as being important not only for part time students, but also for full time students accessing modules off-site too. The opportunity to deliver material unhindered by traditional time-tabling pressures reflected the projected needs of the student of the future, whether in part time or the traditional full time mode. Whilst students can interact through the web, module design can only be done through Lotus Notes. This ensures that only authorised personnel can actually change or modify module material.

What is Lotus LearningSpace? First introduced in 1996 by the Lotus Institute, LearningSpace was designed to provide technology solutions and methods to support collaborative learning any time and any place. Derived from the established Lotus Notes commercial communications platform, it was intended to move on from available traditional distance learning methods such as CD-ROMs. LearningSpace was intended to provide a means of offering what is

now considered to be *distributed learning*, that is, a type of distance learning that is defined as technology-enabled, learning-focused education, facilitated by a content expert, and delivered anytime and anywhere.

LearningSpace is considered to be learner-centred because students can explore and navigate to information based on their own interests as well as their levels of competency. They can work individually, at their own pace, in their own time. Its strength is that it can support a collaborative learning team approach in a distributed environment. In common with many other higher education institutions, staff throughout the University had developed previously piecemeal computer-aided learning (CAL) materials. Within the Business School these included (part) web-based modules as well as commercial CD-ROM packages, but the introduction of a custom-designed platform presented the opportunity to both standardise and simplify module development and delivery and, as importantly, give more structured institutional backing to those "isolated" CAL pioneers. LLS would act as a common template for students and staff to work with, and would potentially act as an integrated communication package, linking students with each other and staff.

From the outset, a special University unit was established to consider and advise developers on both pedagogy and IT issues involved in establishing LLS modules. The aim was to avoid the temptation to simply transfer existing modules / material into LLS without undergoing a fundamental questioning of learning objectives and intended learning outcomes. What emerged was the Learning Development Centre, charged with the task of not only initiating the

diffusion of LLS training, but also the monitoring of the impact of these modules on the student experience. Staff attend a three-day training programme to familiarise them with both pedagogy and the software before they can be granted access to a development server. Further quality assurance checks are in place before an LLS module goes live to students. Central IT Services also underwent a structural change with a view to the anticipated increase and change in demand for its services as LLS was established University-wide.

Marketing Concepts (BS502) went partial virtual learning environment in September 1998. With 434 students registered it was certainly one of the largest modules in the UK to use LearningSpace. LLS was to be used to provide support to traditional delivery methods, but the design was ambitious enough to aim to replace aspects of the module that would otherwise have been done by traditional methods (e.g. face-to-face tutorials). There were some hic-coughs, fortunately few could be attributed to either IT support or the platform itself (some JavaScript instructions crashed but were sorted). The biggest problem was human, in particular student registration. This was not so much the process of enrolling students, but rather the late enrolment of the few which had to be done manually. And needless to say, some students managed to lose registration documentation and forget passwords. However, overall, both full and part time students appear favourably disposed to the idea of flexible module availability / delivery. This 12-week module ended in December 1998, though access to it has been kept ‘alive’ for revision purposes.

Not only was it was considered vital that a supporting infrastructure was established, but also that ownership of the project was shared with lecturing staff to minimise any cultural change problems. It was recognised that an inherent barrier to the adoption process could be staff reluctance to move away from traditional teaching/delivery methods. Following a series of open meetings, the Schools themselves carried out more focused and structured meetings and presentations. Staff were reassured that LLS was intended to contribute to, not necessarily (totally) replace, other delivery methods. Early pilots across the University reflected a number of different approaches to integrating Lotus LearningSpace into module design.

The “safest” route followed was where LLS (electronic material) was used to offer additional resources to an existing module’s design. Somewhat more challenging was to use LLS to replace part(s) of the module that previously would have been delivered by traditional methods (such as tutorials and project work); this was achieved by introducing additional material that best used the platform (such as group discussions and web-research). None of the pilots were expected to fully replace traditional face-to-face delivery. The signs are that staff confidence in LLS to deliver module learning objectives and student responses are favourable, so it is expected future LLS modules will move away from the safest route described above.

An interesting observation on staff resistance was that it occurred in two distinct forms. The more obvious “technofear” was encountered, but also there was some hesitancy from those colleagues who had been at the forefront of using /

developing other CAL materials. There was the fear that all that they had produced would in some way become redundant. The LLS platform does have the facility to embrace all such materials, but it was not an easy conversion process.

The evaluation process from the pilot projects is now happening, and early indicators are generally positive in that they have enriched the student learning experience. The way that these materials are used will change and evolve with time, with type and level of module, and with the staff that author the materials. There is no prescriptive or universal formula that relates to this, partly because a journey into the unknown is being made, but also to gain the confidence and trust of staff and students alike. This is about developing new, individual, independent learning skills and improving learning opportunities. Fundamental is to carry creators and users with the project. To give ownership of development to those that will ultimately use it, either as a teacher / instructor / guide, or learner.

Staff confidence was only one part of the picture. The Institution, likewise, required the confidence that standards as well as resources invested in the project would not be compromised. Institutions have tended to develop CAL materials, web-based, CD ROM etc, in a piecemeal fashion; innovators in isolation of their colleagues doing their own thing. As only support for other delivery methods this might not have raised the issue of consistent quality in quite the same way as when moving towards establishing VLEs, where the emphasis would increasingly be upon electronic delivery. Whilst LLS allows

considerable flexibility in design it does, nevertheless, standardise presentations and some assessment mechanisms. New quality assurance checks were introduced on all VLE modules to consider pedagogical and presentational issues such as considerations for the visually impaired.

The user likewise has not been ignored in the introduction of LLS modules. Paper-based and on-line Help facilities are provided, including a custom designed student help module (in LLS) available to every registered user[1]. IT Services Help desks have been set up in the Libraries, to bring assistance nearer to the user. Embedded within module design are guidance notes, communication facilities and feedback mechanisms. These include surveys, administered in LLS, at the beginning and at the end of a module. The intention is to embed these questionnaire(s) into every module and at every level (academic year), though some of the questions themselves will be fine-tuned to maintain their relevance.

Attention to the needs of user, developer and the institution are intended to foster an environment of joint-ownership. If a standard model were forced on unwilling participants, it would quite likely not work, as Thames Valley University (UK) has recently discovered.

The fibre optic (and micro-wave!) motorways are now firmly in place and the electronic learning materials to be transmitted along them are emerging. Soon, a regular stream of ‘learning’ traffic will flow. A further joint bid has recently

[1] There is a similar Help module available to staff developers

been made to fund software development in an endeavour to speed this process up. Whatever, there is now a head of steam in Staffordshire that will be very difficult to stop. The beginnings of a virtuous circle are in-place, and it will not be long before Staffordshire becomes a globally used example of how effective learning, using ICT, can happen, given strategic thought, planning, co-operation and shared vision. The potential synergy created by this network is huge, in that it gives the opportunity to jointly create a new, county-wide learning environment, in a planned and holistic way. It should also encourage the joint sharing of up-front development costs for new materials, help to avoid wasteful duplication, and bring together the expertise needed to make these to the standard required. It will not be long before Staffordshire has a better reputation for the efficiency and effectiveness of its motorways!

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