Spaces for learners and learning: evaluating the impact of technology-rich learning spaces

Introduction

As this edition of the New Review of Academic Librarianship demonstrates, the concept of learning spaces - both within and outside libraries - is high on the UK higher and further education agenda. Many universities and colleges are investing in major projects to redevelop existing spaces and to create new spaces to provide responsive learning environments that meet learners' needs and reflect changes in pedagogy and technology. Library and information professionals are often at the centre of such developments, and are seeking best practices in design, management and evaluation. This article focuses on the latter of these, making a strong case as to 'Why evaluate?' It provides a brief introduction to the concept of 'technology-rich learning spaces' and explores approaches to evaluation, suggesting a process for developing an evaluation framework and using specific case studies to illustrate the varying approaches to evaluating innovative space design in higher education institutions. The role of learners in the evaluation methodology, and the importance of institutional context, will also be explored to highlight whether impact can effectively be assessed. Evaluation must be a key priority, as 'An eloquent case can be made to explain the relationship between learning spaces and learning. But how do we know when a learning space enhances learning?' (Hunley and Schaller 2006).

Technology-Rich Learning Spaces: Context and Trends

The phrase 'technology-rich learning spaces' has developed in further and higher education circles to describe a new generation of student-centred learning facilities designed to accommodate pedagogical shifts in considering the ways in which students learn and tutors teach. They purport a model of integration that brings together physical and virtual facilities and services for the benefit of learners, utilising appropriate technology and innovative architectural designs. Central to their development is a constructivist approach to learning that models curriculum change, learning and teaching delivery - often expressed in the mission and aims of institutional learning and teaching strategies. A number of these spaces exist in the United Kingdom and internationally, and current trends are well reflected and explored in the Joint Information Systems Committee (2006) research and report. Whilst these spaces might appear to be very different in appearance, a common theme in their conception is the desire to understand the needs of existing and future learners and to ensure that learners are supported to achieve their potential. A blended learning approach is often used to describe the form of learning approach that an institution espouses at a strategic level.

Massie provides a useful overview of what blended learning might be:

. Blending classroom instruction with on-line instruction
. Blending on-line instruction with access to a coach or faculty member
. Blending simulations with structured courses
. Blending on-the-job training with . . . informal sessions
. Blending managerial coaching with e-learning activities. (Massie 2002, 59)

Universities that champion 'blended learning' can have very different learning environments depending on their institutional context, space planning strategy and learning and teaching strategies. These developments are radically changing the learning landscape, not least in the area of learner support as learning is leaving the classroom and taking place any time, anywhere and without tutor intervention.

Given the complexities of the modern learning environment, evaluation of these learning spaces can provide new insights into learner perspectives, for example:
. Practical demonstrations of interactivity between people, and with media.
. Multi-professional approaches to learning technology development.
. Supporting the needs of diverse learners and the Net generation.
. Researching and evaluating the impact of technologies on learning.
. Pathways to information access and use, and to learner engagement.

The effective evaluation of learning spaces requires a rigorous and action-oriented approach, and one that fits with institutional requirements and outputs.

Why Evaluate?

Librarianship literature abounds with approaches to evaluation studies, many of them offering sound advice. The seminal work on evaluation was written by Lancaster in the 1990s. Interestingly, at that time, evaluating space was seen only in relation to stock and weeding policies, not clients and certainly not 'learners'! However, Lancaster did warn against only studying current expressed demand as opposed to unexpressed future need and potential users. He reminds us that evaluation is not an end in itself, as 'An evaluation should only be performed with definite objectives in mind' (Lancaster 1993, 16).

From the outset a clear view is required of why evaluation needs to take place and not simply evaluation for evaluation's sake. Seminar delegates at the North West Academic Libraries (2006) Designing Spaces for Learning Conference developed a comprehensive list of the reasons - as might be applied to learning spaces:

. To gain first-hand knowledge of student learning needs.
. To capture how the learning environment features in the student lifecycle in order to link evaluation outcomes more readily to student achievements, progression and learning outcomes.
. To analyse how best to use Information and Communications Technology (ICT) and record novelty in real-life settings (as an iterative process feeding back into development).
. To define what adds value and what is valued by the institution and individuals/teams.
. To reach a common understanding on the use of language/terminology around evaluation.
. To ensure that there is evidence to support the institutional return on investment by providing tangible evidence as justification for continuing investment.
. To feed into future planning - evaluation must be an iterative process and undertaken early on before the project is implemented.
. To connect project outcomes to the context of the university and what it is trying to achieve, ensuring fit between evaluation approaches and required benchmarks.
. To demonstrate the benefits to the institution and the learning community, and maximise them during ongoing change.

These imperatives are echoed in the various standards that exist to help libraries to benchmark their provision. One such model is the Association of College and Research Libraries Standards. They

advocate the use of input, output and outcome measures in the context of the institution's mission statement.

They encourage comparison of these measures with those of peer institutions; they provide statements of good library practice, and they suggest ways to assess that practice in the context of the institution's priorities. (American Library Association 2004)

Effective evaluation considers inputs, outputs and outcomes, providing a quantitative and qualitative approach to assessment. Saunders argues for the embedding of the legitimate voice of users into any evaluation. Drawing on the work of Chelimskey, he provides a helpful model in this respect, advocating early discussions about evaluation in the stage of a project focussing on the following perspectives:

. Evaluation for accountability (measuring results or efficiency)
. Evaluation for development (providing evaluative help to strengthen the institution)
. Evaluation for knowledge (obtaining a deeper understanding in some specific area or policy field). (Saunders 2006)

Asking Better Questions: The Need for Critical Enquiry

Writers considering adult learning often infer that learning is a complex, individual and private world and is socially constructed. Goodyear articulates the three worlds of the learner:

1. An objective world - physical and external to me.
2. My subjective world - my individual learning takes place here (psychological).
3. Objective world of ideas and bodies of knowledge e.g. science. (Goodyear 2006)

Therefore, a logical conclusion might be that the context and meaning applied by students to their own learning approaches are also individually formed - albeit they are affected in some way by a variety of intrinsic and extrinsic factors, including interactions with physical learning spaces.

A number of theories abound about learning styles and their impact on student learning approaches. It is a commonly held view that there is a dialogical relationship between the learning environment and student learning approaches, and in the strategies that students ultimately employ (Richardson 2000, 2005). If we assume that the role of the learning environment is to provide support for learners to help them develop appropriate context and meaning in order to engage them in developing more effective approaches to study, any evaluation study of the learning environment must include the learner perspective, underpinned by a critical enquiry approach.

In this context, valid questions to ask include 'how can the learning environment provide individual support and meaning?' and 'Is the learning environment an intrinsic or extrinsic factor in assisting students to choose a learning strategy?' This takes the evaluation plan far beyond the simplistic input and output model, into a research-based inquiry arena where 'real' questions are developed using critical enquiry techniques. In order to answer the above, evaluation plans need to research the theories underpinning the project using an action-oriented approach. Saunders' article again is helpful here. He says that 'theories orientate an evaluation and determine the kinds of claims we might be able to make on its basis' (Saunders 2006). The case studies in this article illustrate how this might be achieved in practice.

Tools and Approaches to Consider for Evaluating Learning Spaces

Given the theoretical context outlined above, and the imperative to evaluate critically and with purpose, what are the implications for the tools and approaches we might consider for evaluating our learning spaces? There is little current literature available on evaluative approaches to learning spaces. Hunley and Schaller (2006) provide the most recent and effective overview, arguing from a US perspective that:

Higher education has significant investments in learning spaces with the expectation of making a positive impact on learning. Well-designed assessments will provide the information needed to confirm the impact of learning spaces on learning.

This article suggests that well-designed assessments must begin with an 'assessment framework' that comprises basic tenets and then considers the most appropriate evaluation tools and approaches. An assessment framework should be tailored to the specific context but could consider the following (adapted from Hunley and Schaller, 2006):

. The space being assessed (who interacts with it, its purpose; i.e. formal, informal).
. Person-environment interaction (how does the environment encourage or constrain engagement).
. Learning outcomes ('students will be able to . . .').
. Engagement (the relationships between the environment and individual, the involvement of students in learning activities could be measured).

We would also recommend considering the Society of College, National and University Libraries/Library and Information Research Group Impact Studies model, which has been developed to assess the impact of libraries (in general) on learning and teaching. Payne (2006) asks 'What difference does your library make to teaching and learning?' and exhorts us to use the impact studies model to assess particular services, initiatives or new developments. Impact relates to how specific outcomes (i.e. learning space redesign) link with the mission and strategic goals of the institution/departments; consequently, using such a framework could enable a more strategic study. The stages in assessing impact are set out cyclically and can be compared with an action learning research model:

1. Choose the 'intervention' (e.g. the learning space redevelopment).
2. Specify the objectives for the intervention.
3. Develop success criteria against which a judgement can be made.
4. Identify evidence that needs to be collected.
5. Select appropriate data collection methods.
6. Collect and analyse data.
7. Present results.
8. Feed into further developments/changes (i.e. start again!).

The Society of College, National and University Libraries has more recently established the VAMP project to further develop toolkits for assessing the impact of library and information services. Outcomes from this project may be valuable in our development of 'assessment frameworks' for learning spaces.

Whatever the framework, it is important to consider the possible assessment methods - in particular, the tools to collect the data. This article can only touch briefly upon such an extensive subject and does so in the context of learning spaces. A combined method encompassing quantitative and qualitative approaches to data collection is recommended by many authors,

enabling the evaluator to develop a multi-faceted picture. A longitudinal study over time would also explore the impact of the learning space over time as students move through their learning experience. Consequently, possible assessment methods include focus groups and interviews, surveys and photographic or video studies.

Case Studies

Learning Gateway, St Martin's College

Context

St Martin's College's emerging academic strategy, envisioned in the Corporate Plan 2004-2009 (St Martin's College 2004), sets out to move from a traditional delivery mode to more flexible forms of learning and teaching as required by students. This strategy recognises that formal teaching space may not necessarily be the best way to attract, retain and support student achievement, or to support a variety of learning styles. In response to this challenge, the Learning Gateway at the Carlisle campus was conceived, designed and built as a catalyst for change, to further support the college's flexible and distributed learning aspirations in Cumbria and beyond.

The Learning Gateway is very different from other college physical spaces. It offers an exciting opportunity to draw together a completely new community of learners with diverse support needs. The Learning Gateway also supports learners, tutors and support professionals in ways that foster independent learning. It is an example of a technology-rich learning space that integrates physical and virtual space with learning facilitation and support.

The concept of the Learning Gateway is based on a number of assumptions:

. The relationship between the physical setting and the student learning experience is vital.
. The student experience can be enhanced if the former is designed using learner need as the basis.
. Flexible learning space can best effect and support a variety of learning preferences - now and into the future.
. Technology can be successfully integrated into the learning environment, especially as a basis for extending learning opportunities.
. Pedagogy underpins the design concept.

These are central to the evaluation methodology that aims to test these assumptions.

Learning Gateway evaluation approach

Evaluating technology-rich learning spaces is a complex process, particularly because the Learning Gateway is an experimental environment. To guide the iterative evaluation, an evaluation plan was devised to capture, record and analyse the effect of the new environment on the student experience. The following questions are guiding the evaluation strands:

. What is the impact of the Learning Gateway on learning and teaching methods?
. To what extent does the space support students and staff wishing to move to more flexible forms of learning delivery?
. What is the effect of the technology on learning and teaching, and how might this enhance student potential for lifelong learning?

. What other areas deserve further research?
. What are the implications of the innovation for the future planning of spaces on other campuses?
. What examples of best practice in innovative use of space emerge?
. What are the implications for learner and tutor support and facilitation?

Methodology

A formative evaluation approach is being taken to explore how learners and tutors are engaging with the environment and to judge whether the Learning Gateway concept is delivering the student experience as intended. Some quantitative data are being collected to create the evaluation context; for example, electronic people counter to count footfalls on entry, laptop loan figures to map usage and volume, head counts at standard intervals to demonstrate occupancy rates and inform staffing levels, room booking figures. This information was collected from the outset to help provide evidence on outcome and to demonstrate that the Learning Gateway is giving sufficient return on investment to the Institution.

The Higher Education Funding Council for England (HEFCE) is also a major stakeholder since the Gateway was funded under the HEFCE Project Capital Round 4 Learning and Teaching Strand. It is envisaged that a Post Occupancy Evaluation will take place in 2007. A good practice guide and toolkit has been devised to assist the process and to 'encourage good building design by allowing others to learn from the experience of constructing each building . . .' (HEFCE 2006) The framework is designed to facilitate the delivery of the project from inception to handover and the underpinning decisions, and also the operational management of the building. Interestingly it is assumed that this will be the role of the Estates team, which would not be appropriate at St Martin's, given that the Learning Gateway is much more than a physical building and consequently operated by the Learning and Information Services department. A partnership approach will be taken. Techniques and templates are included in the toolkit, covering instruments such as interviews, focus groups, questionnaires and analysis of the building's environmental benchmarks and its whole life cost. It is felt that this helpful guidance will yield credible results that can be disseminated across the sector.

Despite the above, the usual evaluation methods alone may not deliver the rich qualitative data that will facilitate insights into student learning or tutor interactions in technology-rich environments. The flexible nature of the environment is proving difficult to 'measure' in some significant respects. It is not possible, for example, to easily collect complete data on the use of the space by students, since they are free to move around the space as they choose. Also, Cowan (2006) suggests that evaluation should distinguish between the differences that arose out of novelty and differences that might be a feature of learning under the new arrangements, once it was well established. These positions may not be mutually exclusive in a learning environment where discovery and innovation is encouraged.

Role of staff as participant observers: supporting learning

The Learning Facilitators working in the Learning Gateway therefore are central to the evaluation strategy. They can observe, first hand, examples of innovative practice by either staff or students or note problems. This is achieved by:

. Keeping a daily log of activities.
. Personal reflection and research.

. Construction of 'learning scenarios' to test the pedagogical principles of the Learning Gateway in practice.
. Sweeps of the spaces and observation analysis.
. Facilitating student learning by providing advice and support.

A site has also been set up on the college's virtual learning environment for discussion and debate on learning and teaching in the Gateway. Obtaining qualitative information in this way has drawbacks. By carrying out the evaluation you have to be careful not to interfere with the students' learning process and to avoid 'evaluation fatigue'. It is also wise to obtain permission from subjects since tutors may not necessarily wish to share their approaches with evaluators. The institutional ethics committee may also need to be informed.

It is thought, therefore, that in the St Martin's context, behavioural studies are needed in addition to the strategies outlined above. To this end, a cross-college research project team has been appointed to carry out academic qualitative research into flexible and distributed learning in the college. This will include work with learners and tutors. The convergence of these findings with the evaluation studies of the Learning Gateway should lead to a further understanding of the nature of student-centred learning.

In conclusion, evaluation is central to any learning initiative. The St Martin's 'method' is at a very early stage and is being adopted at an institutional level with involvement from a wide range of staff and student groups. However, similar to the deep learning we wish to promote in our students, evaluation of the Learning Gateway needs to be thorough, developmental and multi-faceted.

SOLSTICE, Edge Hill University

Context

Edge Hill University is a higher education institution in the North West of England, with 9,000 students on a range of degree and diploma courses and a further 6,000 on continuing professional development courses, particularly in education and health-related areas. Edge Hill has strong centralised academic support structures enhanced by the formation of Learning Services in 2003. Learning Services incorporates learning resource centres and information provision, learning support, ICT user support for learning and teaching, e-learning development and support, media services, and skills and dyslexia support. Introduced in 1999, the institutional virtual learning environment (WebCT) now supports over 400 courses delivered across the curriculum and currently has approximately 8,000 registered users studying on a range of courses, both undergraduate and postgraduate. The concept of 'blended learning' is well established, with many students experiencing mixed-mode teaching.

Technology-enhanced learning developments

From 2001 to 2004, Edge Hill established the HEFCE-funded COMET project (collaborating and managing through the educational application of technologies). The project's main aim was to deliver institution-wide change through the embedding of technologies in learning and teaching. COMET aimed to foster collaboration between staff, thus enabling synergies and establishing more formal partnerships. The strategies that emerged during the project included:

. Collaborative working amongst different groups of professional support staff.

. Collaborative working between central support services and academic departments.
. Collaborative work with partner institutions involving both academic staff and support services.
. Joint staff development activities for the range of staff involved.

During this period of project and partnership development, a conceptual framework began to emerge and to be discussed at Edge Hill. The concept of the 'new academic team' embraced this vision of a multi-professional team of academics, learning technologists, information specialists and others creating a learning environment and learning experiences with the learner at the centre. In the Edge Hill context this term refers to the professional groups working together, particularly, but not exclusively, in the e-learning domain. This concept has started to become part of the institution's language and framework for learning and teaching development. In January 2005 Edge Hill was awarded Centre of Excellence in Teaching and Learning status by the HEFCE for its work in supporting students online: SOLSTICE - Supported Online Learning for Students using Technology for Information and Communication in their Education.1 The following extract from the bid clearly articulates the partnership working at its core:

SOLSTICE is an innovative method of programme delivery that has been developed within the Faculty of Education in collaboration with Learning Services and the Teaching and Learning Development Unit over the last six years. It involves the use of supported online learning or blended learning designed on sound pedagogic principles and developed as a result of ongoing evaluative research. It seeks to capture the power of new technology to deliver programmes flexibly, using a virtual learning environment alongside other methods of support. It is learning focused not technology driven.

SOLSTICE is also a team of academic and learning support staff who have been responsible for developing the innovative method and for designing and delivering the programmes which have attracted plaudits of excellence from students, peers, and employers. The team is a hub of excellence and expertise in supported online learning.

SOLSTICE learning spaces and their evaluation

The consideration and development of learning spaces (both in classrooms and generically) is an integral part of SOLSTICE, and is viewed as central to enhancing the student experience in a blended learning environment. Developments have been approached collaboratively, using the 'new academic team' as the vehicle for learning space design and evaluation. Three projects are currently at different stages of development but all of them have been the product of both the SOLSTICE method and a holistic approach to learning space strategy across the university. The outcomes from the evaluation of these SOLSTICE developments will also feed into a longer term space 'master plan.' These three projects are:

1. Redevelopment of library space as 'social learning' space (for further information see the article by Black and Roberts in this issue).
2. Development of one model of a flexible classroom.
3. Development of a permanent SOLSTICE Centre, taking on board lessons learned from the two projects above, and influencing a £14 million new build project.

A common framework has been developed to evaluate all SOLSTICE learning spaces. This is based upon the following key principles:

. Evaluation should be undertaken by a multi-professional team of staff who bring together complimentary skills, knowledge and different perspectives (e.g. learning technologist, library and information staff, researchers, academics).
. Evaluation should be closely based upon the individual student experience and should aim to capture this as effectively as possible.
. Evaluation should also take into account staff views, particularly the academics and other professionals engaged in learning and teaching and learner support.
. Data collection is by multiple methods (surveys, interviews, focus groups, photographs).

The findings from across the projects will be shared across the teams and within the university to stimulate discussion and inform future strategies.

Conclusions

Evaluation is an integral part of any learning space development and should be considered from the outset of any project, not merely as an 'add on'. Whether a learning spaces project is a multi-million-pound development or a less costly refurbishment, effective evaluation that is thoughtfully designed and tailored to local institutional contexts can enable us to assess impact on learners and learning, inform and influence future plans and provide a closer understanding of the relationship between spaces and learning. We hope that this overview has provided possible frameworks, tools and approaches as well as examples of projects that are placing evaluation at their heart. The evaluation principles explored here move away from simplistically counting and recording to a deeper engagement with the learner and their experiences, perceptions and feelings. This is a challenge for library and information professionals that requires new skills and the development of methodologies that capture the personal learning experience. It is only by real understanding of this experience that libraries can ensure they contribute fully to learner success.

Note

1. See <http://www.edgehill.ac.uk/solstice>.

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