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Evaluation and the Pedagogy-
Space-Technology
Framework (D. Powell)

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Both the research work carried out by the project investigators and an analysis of the papers presented at the 2008 Next Generation Learning Spaces (NGLS) Colloquium, strongly indicate that the Pedagogy Space Technology (PST) framework has significant utility not just in the conception and design of teaching spaces but also in the crucial process of evaluation.

The project was able to track the creation process and outcomes of three generations of Collaborative Teaching and Learning Spaces at the University of Queensland (UQ). These were important and novel spaces, well suited to study and of significant interest nationally. Analysis

The colloquium closing session pulled together the threads of these presentations to examine the fabric of evaluation. The classic investigative questions of 'why, who, when, what, and how' emerged from the debate as useful guidelines to understanding the issues.

Why Evaluate?

The papers presented at the colloquium gave ample evidence that universities are seeking to experiment with different kinds of learning and teaching spaces. In many cases, the completion of a new kind of learning space prompts a

The focus of the NGLS project across two years was to follow the development of succeeding generations of new-style teaching space and to study longer term generational developments in library space. These two foci yielded an interesting divergence in evaluation issues as well. Roughly one third of the papers presented represent library spaces. The papers that were not library-based covered faculty learning spaces and "non-traditional" teaching spaces.

Library spaces tend to be constantly evolving, though punctuated by major refurbishments from time to time. By and large, libraries are both competent and experienced at self-evaluation. In contrast, teaching space in general is poorly represented in terms of evaluative studies. It seems likely that traditional teaching spaces are seen to be well understood and hence not in need of research or evaluation. Many of the non-library examples in literature and all of the examples presented here are revolutionary spaces, new kinds of teaching and learning spaces which are seeking to push change in practice. The UQ Collaborative Teaching and Learning Centre, Victoria University Engineering Project Based Learning Space and the Deakin Immersive Learning Environment are clear examples in this respect. While the library spaces focus more on finding out how users' needs are changing and responding, the teaching space design and evaluation looks more intentional with a desire to shift behaviours.

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strongly supports the contention that to produce better spaces, the cycle must include a robust evaluation of existing rooms that is used to inform the design of succeeding projects.

The PST framework taken as the basis for this project, places significant weight on analysis after the design phase. Each of the contributors to the 2008 Colloquium was asked to include significant sections on evaluation, with the questions drawn from the framework itself. The questions were specifically intended to place considerable emphasis on gathering evidence of outcomes which could be then evaluated against the design intent. An examination of the evaluation sections of the papers in succeeding chapters shows a wide variety of methodology and varying success in gathering consistent and useful evidence. One benefit of this diversity is that it brings the key issues regarding evaluation methodology into sharp focus.

plethora of "me too" requests within and across institutions. The University of Queensland (UQ) is a case in point. Colloquium attendees in 2007 were able to examine the first faculty-based "Student Learning Centre" at UQ (though many already existed at other institutions). By 2008 however, UQ had completed another two such spaces with a further four under construction or in planning. While these spaces had different planners, builders and user groups, they were essentially similar in concept and pedagogic intent. The pace of work and overlapping schedules has meant that new centres are being designed, specified and tendered before others are even occupied, leaving little or no opportunity for evaluation and hence improvement of space design or technology provisioning. Clearly this is undesirable and the intention is that evaluations be undertaken in a timely way and that results might be shared across institutions so that we may move ahead and avoid repeating mistakes in novel spaces.

Who are the evaluators?

- Users
- Builders
- Managers
- Researchers

Analysis of the literature (reflected in the colloquium) finds that the most prolific evaluators are librarians. Library staff members are active managers of their spaces and are constantly engaged with their users or clients. In general, librarians are committed to ongoing evaluation with often highly developed and standardised instruments. It is worth pointing out, however that part of the goal in this case is the evaluation of library services, with only a portion relating to issues of space design. However in seeking to understand the changing usage patterns, librarians are often in the position of having long term data upon which to draw. This provides solid empirical evidence for change.

Interesting differences in perspective are evident in the evaluations of space performed by other groups. Some of the papers presented here are authored by space builders (both architects and technologists) who have a vested interest in improving their solutions as briefs become more standardised. Academics who study tertiary teaching practice are also becoming more active along with a smattering of independent researchers.

When should space be evaluated?

- Post Occupancy
- Pre Funding
- Short or long term

It is not surprising that since the majority of evaluative studies presented in this collection were conducted post occupancy and over a relatively short term that we can be beguiled into thinking of 'evaluation' only in this narrow sense. However other views of evaluation were raised during the discussion sessions that find support in the papers.

Deborah Terry (UQ Deputy Vice Chancellor Teaching and Learning) argued strongly for proper evaluation techniques to be applied to projects in the proposal stage in order to facilitate proper competitive funding decisions. This kind of evaluation of space looks to not just answer the question of *how* we should design and build space but also *where* should we build and *if* we should build at all. This view found broad agreement with contributors pointing also to the role of projects such as UQ ACTS (Advanced Concept Teaching Space) and Stanford's Wallenberg Hall as experimental spaces whose ongoing evaluation was designed to inform the institution's decision making regarding pedagogy, space and technology design across a range of projects.

Mitchell, Winslett and Howell (Queensland University of Technology) present a comprehensive plan for evaluation in an evolving and experimental space (Lab 2.0) that takes this approach. Both Graves (Griffith University) and Lee (Swinburne) present perspectives on pre-build evaluation and Andrews and Powell (UQ) sought to illuminate the ways in which issues uncovered in evaluation were directly applied to succeeding projects of the same genre. Others argued for longer term evaluation of space to address ongoing environmental concerns. This prompts a broader question as to why mature teaching spaces were not subject to regular and sustained evaluation in the same way as more closely managed learning spaces such as libraries.

What should be evaluated?

- Usage amount and patterns
- Satisfaction
- Meeting Goals
- Efficiency
- Learning Outcomes

Before moving to the question of methodology, it is instructive to review the goals of the evaluation. There are a variety of motivators for undertaking evaluation. Some appraisals appear to have the goal of validating a newly completed project and by extension, arguing for the creation of similar spaces. Simpler measures such as head counts and multiple choice user satisfaction questions are often the mainstay of these surveys. By contrast, research projects or design studies aimed at informing ongoing development typically strive to uncover more detail, both by targeting empirical measures and probing with open ended questioning and focus groups.

Usage is of course a fundamental measure. It would be a brave or foolish project manager who would argue success in the face of meagre occupancy, so gate numbers will always have a place. However, understanding patterns of use over time is increasingly recognised as useful. Do patterns change hour-by-hour or shift notably between early, mid and later weeks of semester? Geographic patterns, such as understanding where users have been prior to entering the evaluated space and where they are headed can also be immensely useful in campus planning. Several of the studies presented attempted to gain a more sophisticated insight into the patterns of usage (the work presented by Jordan & Ziebell is an example) and this should be seen as an axis of study which is growing in importance.



It is debatable whether satisfaction surveys, while useful in the long term to plot changes over time, are valuable in a short-term or one-off evaluation. Questions such as “How would you rate the facilities of the space (Poor to Excellent on a 7 point scale)” would seem to offer little in the way of guidance to those planning similar projects. Satisfaction surveys, though commonly aimed at answering the question “should we build more?” don’t address continuous improvement. Open-ended questions are more valuable at uncovering issues that can be addressed.

The Pedagogy Space Technology framework gives more specific guidance, making explicit the contention that evaluation should be focused on measuring the degree to which the original goals, particularly the defined pedagogic goals, were met. Though overt in the colloquium design, relatively few of the studies presented made clear linkages in evaluation between the goals defined in the pedagogy and the outcomes. The PST framework asks: What types of learning and teaching are observed to take place? What is the evidence? In his summation, Professor Radcliffe (Purdue) asked the same questions in this context: What were we actually trying to achieve? What was the original intent? Surveys and statistics alone are not enough to measure success in this framework and observational studies are strongly suggested as we will see below.

Several threads in the forum addressed the desirability of evaluating spaces in terms of (improved) learning outcomes. Gallagher, Pearce and McCormack (Victoria University) argued strongly for this while noting the difficulties inherent in such an evaluation.

...a successful evaluation of the commons as a site for non-transmission forms of learning may depend to some extent on the success of the whole institution in moving away from transmission models and developing meta-cognition in its students

Learning outcomes are clearly dependant on a significant number of variables beyond the space and the task of evaluating a space with respect to these outcomes when so many other contributing factors typically remain uncontrolled is difficult indeed. While in no way denying that the goal of improving learning outcomes should be paramount, the PST Framework takes a step back from trying to evaluate this directly. The goals of the space are defined in terms of fostering particular modes or patterns of teaching and learning. The primary evaluation therefore, is to determine whether or not such behaviours are observed and which aspects of the space and technology are seen to enable, encourage and empower these types of teaching and learning activities. The task of determining whether the pedagogy improves student learning outcomes is left to a wider, possibly whole-of-institution based evaluation.

How is space evaluated?

- User Surveys
- Observation
- Empirical measures

Virtually all studies presented at the colloquium included user surveys in their actual or planned evaluation regimes. These varied from simple web-based questionnaires to structured interviews and focus groups. Evaluations of teaching spaces most commonly involved small sample sizes and often conducted separate surveys of student and teacher user groups. Learning spaces based on libraries showed the most consistency in surveys, with typically larger sample sizes though none of the studies presented attempted a statistically rigorous evaluation.

Analysis of open ended questions remains sketchy and anecdotal evidence suggests that inordinate weight can be placed on a single comment, particularly if it is pithy, humorous or particularly apt in its expression. These however remain the best source for understanding client needs and wants and are vital to the process of improvement. Several comments indicated that there is much

scope for co-operation amongst institutions in sharing survey instruments.

A very useful extension of this form is found in the paper by Gallagher, Pearce and McCormack (Victoria University) who used a combination of inputs from their casual staff (Library Rovers). The rovers are students employed part time and their reflections, blogs, journals and reports proved a rich source for feedback.

Observational studies hold considerable promise and are fundamental to the operation of the PST framework as already explained. Dane (in the Deakin Immersive Learning Environment study and later in contributions to the debate) argues strongly for observation as an evaluative tool and support for this technique can be found in evaluations by Randall and Wilson (Bond Pod Room) and Andrews and Powell (UQ CTLC) amongst others. The extension of direct observation to the review of time lapse

video footage holds promise as the technique can uncover unexpected patterns by repeated review of wide angle footage taken in the space under study. Mitchell, Winslett and Howell (QUT) put forward a number of interesting indirect observational methods for tracking student activities by undertaking an analysis of content left on the whiteboards.

Though not featured in the papers, facilities managers at the forum expressed a desire for empirical measures to be included in evaluation. Examples cited include energy efficiency and it is likely that environmental investigations regarding power, thermal effectiveness and so on are going to be increasingly important. Hovering always on the margins, but unspoken at this event is the quantity surveyor's measure of students/square metre. An observation emerging from the NGLS project is that innovative spaces such as Collaborative Learning Centres are inevitably

space hungry compared with high student density lecture theatres and seminar rooms. It is therefore doubly important to gather evidence of positive outcomes from these spaces to counter the inevitable (and understandable) questions of space efficiency.

Conclusion

Evaluation is an essential part of the cycle of continuous improvement in space design. The colloquium papers represent a cross section of practice that provides a useful snapshot of evaluation across a range of spaces. The issues of when to evaluate (from pre-design to post occupancy); with what purpose and using which tools (user surveys, observational studies, empirical measures) deserve full consideration whether planning new space or considering refurbishment.

