A SITUATIONAL PROFILE FOR LEARNING ENVIRONMENT EVALUATION

GRAEME OLIVER
THE UNIVERSITY OF MELBOURNE

ABSTRACT

This chapter reports on research being undertaken to develop a model to facilitate the evaluation of innovative education practices in innovative learning environments. The research is based on the premise that better judgements about evaluation tools, techniques and methods will be made if people are able to tailor evaluative approaches to meet a variety of purposes and needs. The research is developing a process that allows users to develop a situational profile of significant issues appropriate to their particular innovative education project in an innovative learning environment. The profile can then be aligned with the evaluation needs and purposes matrix developed by the E2ILE research project to help identify the most useful evaluation approach.

KEYWORDS: INNOVATIVE LEARNING ENVIRONMENTS, INNOVATIVE EDUCATION PRACTICES, EXPERT ELICITATION, SITUATION PROFILE, CLUSTER ANALYSIS, EVALUATION.

Graeme Oliver is studying a Doctor of Education at Melbourne Graduate Schools of Education. Graeme’s research is developing a model to facilitate the evaluation of innovative education practices in innovative learning environments. The model is making links between education and architecture perspectives in the ways innovative learning environments are developed and implemented. This research will complement a range of other activities within the E2ILE ARC project, especially in providing an interface with specific evaluation tools and techniques.

Graeme has extensive professional background in this area having been the deputy principal at the Australian Science and Mathematics School (an OECD Innovative Learning Environments global case study school) for over a decade from its foundation.
The need for further work in the field of learning environment evaluation has been advocated by a range of research papers presented through the Evaluating 21st Century Learning Environments (E21LE) project, an ARC Linkage project, conducted through the Learning Environments Applied Research Network (LEaRN) at the University of Melbourne. Cleveland (2016) suggests that the rich growth in a variety of new education facilities across Australia and internationally has created a need “to evaluate these learning environments to determine which are best supporting desired teaching and learning practices, activities and behaviours” (p. 92). Cleveland and Fisher (2013) suggested that evaluation of learning environments need to become more sophisticated and should include the following features: more rigorous methodologies and methods, an interdisciplinary approach that includes the perspectives of both educators and education space designers, and use formative evaluation methods that support the evaluation of educational facilities throughout their lifecycle (pp. 24-25).

Cleveland emphasises that the purpose of evaluating learning spaces is to assess the effectiveness of physical learning environments in supporting pedagogical activities (2016, p. 92). However work by Jill Blackmore and her colleagues (2012) highlights the complexities that exist within this relationship, and gives caution about the need to develop a more nuanced understanding of this complexity. She argues that learning spaces are social spaces as well as places of formal instruction and that a range of interactions constantly change the nature, use and experience of space. The relationship between learning space and practices of pedagogy are only one factor among many in the complex relationships of teaching that inform learning outcomes. Blackmore also argues that the relationship between learning spaces, their uses and student learning outcomes is not linear, and that learning spaces can create conditions and mediate relationships that will influence student learning along a range of indicators. Blackmore also proposed that there is a temporal dimension to the production, use and effect of learning spaces. When considered over time there are likely to be organisational changes as well as pedagogical changes that will influence the nature and outcomes of student learning.

Lee and Tan (2008) highlight that evaluation of learning spaces is not normally done by “experts” in the field and that evaluations of learning spaces have been “limited in depth, rigour and theoretical grounding, and heavily reliant on informal and anecdotal evidence” (p. 3). Imms (2016) suggests that recent work in the field has been “too particular in focus and method, and therefore being limited in its usefulness to practitioners” (p. 19). The E21LE approach recognises the existence of many effective evaluation strategies while also being aware of the field’s evident weakness in utilising these in real world circumstances (Imms et al, 2016. P. 13).

The research reported in this chapter is addressing the issues raised above by developing a model to facilitate the evaluation of innovative education practices in innovative learning environments. The model deliberately brings together the perspectives of architects and educators working in the field with an orientation to promoting pragmatic strategies for dealing with the particular situational profile that is described.

The model was initially developed through a review of literature in the field and has been informed and refined through an expert elicitation process. The outcome will be an interactive model that will allow people wanting to undertake an evaluation of the effectiveness of implementing innovative education practices in innovative learning environments to develop a situational map of the issues of most importance to them, to identify the evaluation tool or technique most appropriate to their situation, and to monitor how they conduct the evaluation.
This chapter will report on three key elements of the research: the initial development of the model, the research to refine the model, and strategies for the use of the model. The overall research approach being undertaken to develop and refine the model mirrors the possible evaluation approaches that could be taken to utilise the model by practitioners in the field. This concept, based on the work of Alkin & Taut (2003) and Carden & Alkin (2012), is represented in the diagram below. Alkin and Taut point out that research and evaluation proceed in a similar fashion but for different purposes and uses. In the case of research, the goal is generalizable knowledge that contributes to the body of knowledge in a particular field whereas for evaluation the purpose is context specific with the knowledge being intended for use by a particular group of people in a particular setting at a particular point in time (p. 3). Hence, while the project reported here is still in the research phase, it is modelling the likely approaches to be used in the evaluation phase that will follow.

![Diagram of the relationship between research and evaluation.](image)

**DEVELOPING THE MODEL**

The initial need for a model that could help provide a situated connection between the design of innovative learning environments, the use of innovative learning environments and evaluation of the effectiveness of innovative learning spaces in promoting and sustaining innovative education practices was identified in the E21LE ARC project. The development of the model relates to the overarching research question “How can we determine which learning environments best support 21st century pedagogies” (http://e21le.com/project/). The development of a model is to map the terrain so practitioners can best identify their particular situation and circumstances for evaluation of the complex field of relationships between learning environments, teaching and learning practices and learning outcomes. The approach does not develop or identify a specific evaluation tool or technique, but helps users identify what tool, technique or approach to evaluation from a known suite in the field would be most appropriate to their purposes.

The conceptual organisation and details of content for the model were developed from a literature review of the field. There have been a series of substantial literature reviews in the field published in recent years (Higgins et al, 2005, Temple, 2007, Lee & Tan 2011, Blackmore et al, 2012, Fraser, 2013, Cleveland & Fisher, 2014). The purpose of the literature review was to gain an overview of the field and an understanding of the specific issues that were being reported as significant in the field. An examination of the extant literature reviews was the starting point for this research as they each provided slightly different perspectives and foci through their studies.

The report “Research into the connection between built spaces and student outcomes” (Blackmore et al) used a methodology of declared database and website searches that was a useful model. The report identified 154 references of more than 700 initially located as being significant to their declared field. The report by Higgins et al was commissioned by the Design Council, UK, and although they commented on the “relative paucity of research on effective learning environments” (p. 03) they identified 174 references as relevant to their building design orientation. Cleveland and Fisher presented
a critical review of the literature and through this approach identified conceptual relationships between the 88 references they identified. Fraser built on the work of Lee, Tan & Tout and both studies presented extensively annotated bibliographies with 105 documents in the former and 114 in the latter.

These reviews provided an extensive overview of the field under consideration for this project; provided some significant critical analysis of the literature; helped identify literature that was seen as significant in multiple instances and helped in developing a model for organising and analysing the literature in a manner appropriate to this project. It should be noted though that these reviews did not have a strong orientation to evaluation theory and practice, and subsequently more targeted searches were carried around this topic for this project.

Four key concepts were derived from the literature review that formed the basis of the proposed model that was developed to facilitate the evaluation of innovative education practices in innovative education environments:

1. Such evaluation needs to be cross-disciplinary so that it can combine the perspectives of academics and practitioners in the fields of architecture and education
2. Evaluation needs to be carried out over a period of time in order to recognise the ongoing interactive developments that occur between space, its occupiers and its uses
3. The model needs to be able to organise the multitude of complex issues that interact in this field in a manner that allows users to make appropriate sense of their particular situation
4. The model needs to help identify approaches to evaluation that will be most appropriate to the particular situation identified by the users.

The model thus developed has the following elements:

- **PHASES** – Four phases in the cycle of evaluation (Design / Transition / Consolidation / Re-appraisal).
- **FOCUS** – Two foci for framing consideration of issues (Learning Environment Focus / Education Practice Focus).
- **PERSPECTIVES** – Key perspectives declared within each focus at each phase of the evaluation cycle. The perspectives represent the orientations of Learning Environment Designer / Education Leader / Education Practitioner / Education Consumer.
- **ISSUES** – The issues are the specific points for consideration flowing from each perspective at each phase of the evaluation cycle. There are 18 issues presented at each Phase of the framework for a total of 72 issues for the entire model.

The derived model is represented in figure 2; an overview that shows how the phases, foci and perspectives are situated, but does not give details of the issues that are a part of the model. The issues are presented in the subsequent figures that show the details for each separate phase (figures 3, 4, 5, 6 and 7).
The importance of addressing evaluation of learning environments over a period of time is highlighted in the more recent literature, especially that of Blackmore et al (2012) and Cleveland & Fisher (2014). The time phases used in this model are defined in the following manner.

Phase 1 – Design – is defined as the period of planning the physical and educational features of the new learning environment facility. This would typically focus on sound architectural principals, contemporary educational philosophies and principals and concepts of best practice from both architectural and educational perspectives.

Phase 2 – Transition – is defined as the period of first occupation and use of the new learning environment facility. In this phase there is a focus on moving in to and occupying a new facility, organising services and resources necessary for the use of the facility, and developing new organisational arrangements such as rules and protocols that will direct people's use of the facility.

Phase 3 – Consolidation – is defined as the period of implementing the ongoing education practices of the new learning environment facility. There is diversity of opinion as to how evaluation can best be implemented in this phase of the cycle as researchers move away from a deterministic premise that lends itself to traditional post occupancy evaluation approaches to more socio-spatial approaches that emphasise qualitative studies of how the uses of learning environments change through a range of iterations over time.

Phase 4 – Re-evaluation – is defined as the period of exploring future options for the educational use of the learning environment facility. While most literature in the field suggests that this phase looks at sustainability of practices that have developed in the new learning environment, this model proposes that there could also be a desire to deliberately change these practices. Such change could involve consideration of the capacity of the facility to be reconfigured in some significant way, and for education practices to be changed in response to internal or external pressures.

The conceptual framework for the model is drawn from a range of sources. Lee and Tan (2008) use design/build/occupation as the phases to organise their literature review. Blackmore et al (2012) use
design/transition/consolidation/sustainability & re-evaluation for their framework. The phases of
design/transition/consolidation/re-appraisal used in this model are elaborated with the consistent use
of a learning environment focus and education practice focus at each phase, each with declared key
perspectives. The nature of the foci and key perspectives in the model are derived from the model
presented by Gislason (2010) who proposed ecology/organisation/student milieu/staff culture as a
framework for researching school design, and the Innovative Learning Environments project of the
OECD (2013) that used resources/learners/content/educators as its core framework with a range of
iterations of the framework that were applied to different innovative learning environment perspectives.
The model presented here is significantly different from these sources in that its purpose is to facilitate
evaluation, rather than be a framework for descriptive coherence.

There are 72 issues presented in the model in a regular pattern derived from the key perspectives at each
phase. These issues were selected from a pool of over 300 issues identified through the literature review.
The criteria for selecting the issues presented in the model were the same as those for establishing the
overall framework for the model (i.e. they represent cross-disciplinary perspectives, they represent the
declared time phases of the model, they represent significant contemporary issues in the field, and they
lend themselves to meaningful evaluation). The 72 issues are not considered as a given set for evaluation
in every situation. The purpose of the model is to help a user group identify the set if issues that they
consider most appropriate to their circumstances. This individual profile of issues spread across the
phases and perspectives of the model will provide the basis for a user group to determine what evaluation
strategy will be most appropriate to their circumstances.

| LEARNING ENVIRONMENT FOCUS | Flexible design  
|                           | Future proofing  
|                           | Design standards  
|                           | Integrated technology  
|                           | Design brief  
|                           | Project management  
| [Key perspective] Design innovation |  
|                           |  

| EDUCATION PRACTICE FOCUS | Education principles  
|                         | Stakeholder engagement  
|                         | Community context  
|                         | School identity  
| Cultural alignment  
| Pedagogical development  
| Learning Styles  
|  
| Teaching approaches  
| Professional learning  
| Community of practice  
| Pedagogical coherence  
|  
| Learning styles  
| Collaborative learning  
| Inquiry learning  
| Virtual learning  

![Figure 3: Detail of Phase 1 (Design) of the model for the evaluation of innovative education practices in innovative learning environments showing detail of issues.](image-url)
Figure 4: Detail of Phase 2 (Transition) of the model for the evaluation of innovative education practices in innovative learning environments showing detail of issues.

Figure 5: Detail of Phase 3 (Consolidation) of the model for the evaluation of innovative education practices in innovative learning environments showing detail of issues.
IMPLEMENTING THE MODEL

The model is available for response through an online questionnaire in SurveyMonkey ©. The full questionnaire has 93 questions. The first five question gather respondent consent and identifier data. The following 88 questions relate to the 16 perspectives and 72 issues of the model. Respondents are asked to give their view of the significance/importance of the issues as it relates to the implementation of innovative education practices in a new learning environment development project. Responses are given on a Likert type rank of significance. The data gathered can be used to identify patterns of most significant issues for any designated user group through a cluster analysis process.

Trialling for refinement of the model was undertaken through a process of expert elicitation. The general concept of expert elicitation is a process of gathering information and data from qualified individuals that can be interpreted to solve problems and make decisions in the designated field of investigation (Meyer & Booker, 2001). Expert elicitation gathers responses from experts to a designated technical problem or issue. Experts are generally considered to be people who have a substantive background in the subject area and are recognised by peers or by those conducting the study as qualified to answer the questions. Expert elicitation is seen as gathering an expert’s best representation, or snapshot, in response to the question. While it isn’t generally considered as verifiable research, the process of collating multiple expert opinions can be valuable because it is an efficient method for obtaining wide ranging responses that can be compiled to reflect the most up to date consensus on the issue.

The expert elicitation for this research has a focus on looking to build common understanding and validity of the assumptions around designing and implementing 21st century learning environments and a framework for evaluating 21st century learning environments in relation to these assumptions. The methodology of expert elicitation is seen as most applicable to this scenario as it has the capacity to work across different disciplines – education and architecture in this case. It is intended that the use of expert elicitation will help clarify conceptual understandings, the use of language, and the procedures for evaluation in the field in a cross-disciplinary manner.
While this rationale for the research methodology seems well founded there do not appear to be any previous instances of such a methodology being used in this particular context for this specific purpose.

It is intended that this research will achieve two major outcomes: developing a new methodology for research in the field, and developing a new framework for understanding the evaluation of 21st century learning environments that has a truly cross-disciplinary perspective.

The analysis and interpretation of the data is a process separate from the elicitation. The particular processes of quantitative and qualitative interpretation of the data can be developed and adapted as patterns in the data emerge. Since this research has an orientation to situational analysis and model building the analysis of the data will have a qualitative orientation using non-parametric techniques for cluster analysis.

Cluster analysis will identify the most appropriate profile of significant issues for a particular group to work with in a particular situation. Cluster analysis does not ascribe a value to an identified profile. It is
up to the user group to identify parameters for the set of issues to be included in the profile. Nor does cluster analysis give meaning to the profile in its own right. It is the role of the user group to determine the meaning appropriate to their particular situation and declared evaluation purpose (Norusis, 1988).

An example of a cluster profile for a particular group is presented in figure 8. In this profile it was decided to cluster all of the issues that were rated as “extremely significant/important” by 80% of the respondents. This process reduced the initial set of 72 issues to 14 that are presented on the profile. For this profile it was decided to present one consolidated view of the time phases and to present one consolidated view of the respondents. It is possible to present profiles for different combinations of these variables: e.g. a profile for phase 3 only, or a profile for architects only as respondents.

The aim of this research is to develop an interactive model that will allow people to develop a situational profile of the issues of most significance to them in planning to undertake an evaluation of implementing innovative education practices in innovative learning environments. While the model describes the field in a particular way it does not define the specific profile that any group should see as most significant. The cluster analysis process allows a group to identify a profile most appropriate to their own circumstances.

Figure 8: An example of a profile of significant issues developed for a group of respondents to the questionnaire Evaluating Learning Environments.
The process at this stage does not prescribe a particular evaluation approach, technique or tool, either. The profile helps the users identify what approach to evaluation might be most appropriate to their circumstances. Strategies for helping refine this process of best fit evaluation are being developed through other research streams within the E21LE project and the follow up project Innovative Learning Environments and Teacher Change (www.iletc.com.au).

The profile will help the project team better identify the possible scope of their evaluation and to align this with the matrix that plots the purpose of evaluation in conjunction with the identified needs of evaluation presented by Imms (2016). This matrix, presented in figure 9 below, is being populated with specific tools, techniques and methods of evaluation through the work of the ILETC project. The profile of key issues in the implementation of innovative education practices in innovative learning environments developed through the cluster analysis modelling done by the survey tool developed in this research project will help get best fit alignment with the options presented in the evaluation matrix.

The aim of this research is to develop an interactive model that will allow people to develop a situational profile of the issues of most significance to them in planning to undertake an evaluation of implementing innovative education practices in innovative learning environments. While the model describes the field in a particular way it does not define the specific profile that any group should see as most significant. The cluster analysis process allows a group to identify a profile most appropriate to their own circumstances. This addresses the E21LE project goal of tailoring evaluative approaches to meet a variety of purposes and needs.

<table>
<thead>
<tr>
<th>The purpose of evaluation research is…</th>
<th>Meeting the needs of those who wish…</th>
</tr>
</thead>
<tbody>
<tr>
<td>To improve</td>
<td>Formative analysis (judgment)</td>
</tr>
<tr>
<td>To audit</td>
<td>Summative analysis (appraisal)</td>
</tr>
<tr>
<td>To generate theory</td>
<td>Predictive analysis (analysis)</td>
</tr>
<tr>
<td>(Aim)</td>
<td>To describe</td>
</tr>
<tr>
<td></td>
<td>(Through)</td>
</tr>
<tr>
<td></td>
<td>To classify</td>
</tr>
<tr>
<td></td>
<td>To identify causality</td>
</tr>
<tr>
<td></td>
<td>To determine value</td>
</tr>
</tbody>
</table>

*Figure 9: E21LE matrix of evaluation research ‘purposes’ and ‘needs’, (Imms et al., 2016, p. 11).*
REFERENCES


132

Minerva Access is the Institutional Repository of The University of Melbourne

Author/s:
Oliver, G

Title:
A Situational Profile for Learning Environment Evaluation

Date:
2016

Citation:
Oliver, G, A Situational Profile for Learning Environment Evaluation, Informing education theroy, design and practice through learning environment evaluation, 2016, pp. 121 - 133

Persistent Link:
http://hdl.handle.net/11343/191857

File Description:
Published version