

Innovative Learning Environments and Student Experience (ILE+SE): The Scoping Study Draft Research Protocol (April 2021).

University of Melbourne, in collaboration with Edith Cowan University

Overview¹

The Innovative Learning Environments and Student Experience Scoping Study (from here called the Scoping Study) will be a one-year exploratory study leveraged off more than a decade of findings from a suite of research by the host group (LEaRN) and other key centres, industry R&Ds, and individual researchers around the world. That research has built a body of knowledge concerning the architectural and pedagogic design of innovative learning spaces, how to evaluate their effectiveness, and how to assist teachers to utilize those spaces for positive impact on student learning.

Results from those projects indicate the next logical step is gathering quality data around students' actual experiences in these spaces. However, this assumption requires testing; if we are to continue to build a logical, comprehensive research base that supports ILE design and effective use, the next project must have international relevance, must encompass the needs of education and allied industries, and must create data that directly informs infrastructure development and best practices in learning spaces.

The Scoping Study will use international experts across three domains (academe, education, and industry) to identify future key research issues to be addressed through major projects. It will use input from many Regional Team members to validate and analyze these responses. From that outcome, the Scoping Study will publish a white paper on this topic and use those data to draft major research grant applications for lodgment in the first quarter of 2022.

Additional benefits include the creation of a network of multi-disciplinary, cross-sector ILE specialist groups from SE Asia, Australasia, Europe, and the Americas; and an unprecedented capacity for Scoping Study Regional Teams to benchmark policies, space designs, acoustic designs, furniture designs, ICT implementation and use, curricula, pedagogies, research methods etc. across a myriad of situations and international settings.

¹ A short video overviews the Scoping Study concept and the proposed approach (<https://youtu.be/aN2FnillwSY>) (7 minutes)

A short video overviews the Scoping Study structure and process (https://www.youtube.com/watch?v=ioePS7cW_4) (4.5 minutes)

A website provides additional Scoping Study detail (www.ilesescopingstudy.com.au)

Research questions

Given these broad Scoping Study goals, the following questions will guide its design, implementation and analysis:

Where has existing international ILE research led us? What is the critical research that now must be done? How should such research be designed?

This set of questions will provide the Scoping Study with data to make the following claims:

- *Expert opinion is that X, Y and Z must be the foci of the next generation of ILE research.*
- *These issues are consistent across education, allied industries and academic researchers working in ILEs.*
- *These issues are consistent across a wide variety of geographical and socio-economic sub-groups, and across developed and beginning ILE programs.*
- *The types of evidence that is required for maximum short- and long-term benefit is X, Y and Z.*
- *X types of research designs are required to gather that body of data.*

Method

Design

This study falls within the scope of an explanatory design (Creswell & Plano Clark, 2011). In comparison to exploratory designs that seek to understand an under researched field (and if within that field a research question exists), explanatory designs accept the existence of relevant data but also recognize a lack of cohesion in that knowledge. Explanatory designs seek to formulate a hypothesis to drive understanding to the next level of research. Explanatory designs help researchers collate and organize previously disparate knowledge and reach consensus on a new agenda for research.

This protocol recognizes that previous quality research must inform future research directions. Thus, and within the nuances of an explanatory approach, the antecedents of 'innovative learning environments' and 'student experience' are accepted as pre-existing parameters for the study.

To reach consensus on the myriad directions research can take under these headings, the study will utilize a mixed-method explanatory design, comprising (1) a large-scale expert elicitation (Delphi study) as the primary method; (2) a cascading suite of regional team workshops to collaboratively design and analyze these surveys; and (3) a set of end-of-project roundtable sessions to collaboratively disseminate the findings into future research.

Delphi survey. Delphi studies serve the purpose of reaching consensus between acknowledged experts, in a specific field, about issues where information is incomplete (Winkler & Moser, 2016) and that predicts future directions of knowledge generation (Nowrie, 2011). They allow the collection of opinions from a broad range of experts without the need to bring them together. This approach is usually done across multiple

stages, typically two to four depending on the nature of responses. Each round of surveys is collated, a summary analysis prepared, and from this a new survey developed for the next round until it is felt a consensus is reached (see Figure 1 in *Data Collection*).

Online Workshops. The workshops seek opinion from members of Regional Teams, who in themselves were selected as leading researchers, educators, administrators, and industry experts in ILEs. Workshops will run as required throughout the Scoping Study. Time differences and the possible size of the full Scoping Study consortium may require these to be conducted by Geographic Regions, but would not necessarily be limited to people in those regions. The agenda for these workshops will vary as the Scoping Study progresses - from initial project planning, to commenting on each stage of the Delphi, to providing input for the white paper.

Regional Roundtables. If COVID restrictions allow, these face-to-face events will be organized for late in the project at a site central to each Geographic Region (see Table 1 in Appendix A). The agenda will be to give high-level feedback to analysis from the Delphi and Workshops. They will assist the development of the final white paper and final research grant applications. They will begin the process of drafting potential research grant applications from the Scoping Study data. The roundtables will allow Regional Teams to explore the final research question (*How should such research be designed?*), considering the data collected during the Scoping Study.

Sampling

The sampling for the Delphi survey requires consideration of three critical criteria: (1) defining 'expert,' (2) obtaining diversity of opinions, and (3) maintaining the anonymity of experts (Sackman, 1974).

The sampling strategy for Delphi 'experts' will be two-fold:

- First, Regional team members will be invited to submit nominations, which will create an initial pool. These nominations will be based on perceptions of expert knowledge (peer-recognition of expertise); and activity (accomplishments relevant to their discipline).
- Second, a project sub-committee will select a sample of experts from this pool. This final selection will be based on currency (discipline relevance); expertise (performance metrics) and knowledge (quality of contributions). A *Sampling Profile Checklist* (SPC) will be used to collate information that informs these three criteria; for example, time active in the field, inter/national repute, key opinion maker, stalwart practitioner, representative of professional organizations, associations and/or industries (Rajhans et al. 2020). Likelihood of full participation, and capacity to adjust opinions will be considered. The SPC will be used to make explicit the method utilized when sampling experts.

Sampling for diversity will recognize the overlapping range of disciplines embedded in ILE development. The initial pool will comprise nominees representing academe (researchers who specialize in this field), educators (education departments and leading schools focused on using space as one method of improving student learning), and allied industries (architects, engineers, acousticians, furniture designers and the like which seek knowledge to improve their products).

Maintaining expert anonymity will be achieved by (1) restricting the aggregate list of initial pool nominees to the sub-committee; (2) omitting any nominations of sub-committee members; and (3) restricting the task of recruitment of the final expert list, and subsequent circulation of surveys, to the sub-committee.

There exists no proven optimum sample size for Delphi surveys. Past effective studies range from an n of 7 experts, to over 1000. Practicality suggests the sample size needs to be large enough to accommodate attrition, and because of this study's use of subgroups, include enough breadth to collect a valid set of opinions from each group. Also of consideration is data analysis; if statistical analyses are to be conducted (including for potential comparison between groups), a larger - rather than smaller - sample will be required. For these reasons, the intended sample size is 20 experts from *each* of the three fields: academe, education, and industry.

Data collection

As stated, three types of data collection are planned: (1) a large sample Delphi study; (2) a cascading suite of team workshops; and (3) a set of end-of-project roundtable sessions. The first two activities will be conducted online, while the third (COVID permitting) will be face-to-face in each region.

Stage 1 and 2 of the research includes the Delphi survey and workshops. The planned Delphi survey procedure involves three rounds of data collection, with workshops between each of the rounds to comment on the progress of the Delphi based on the data provided. The Delphi survey aims to seek expert opinions to answer the following research questions: *Where has existing international ILE research led us? What is the critical research that now must be done?* A brief overview of the interaction between the survey and the workshops is detailed in Figure 1.

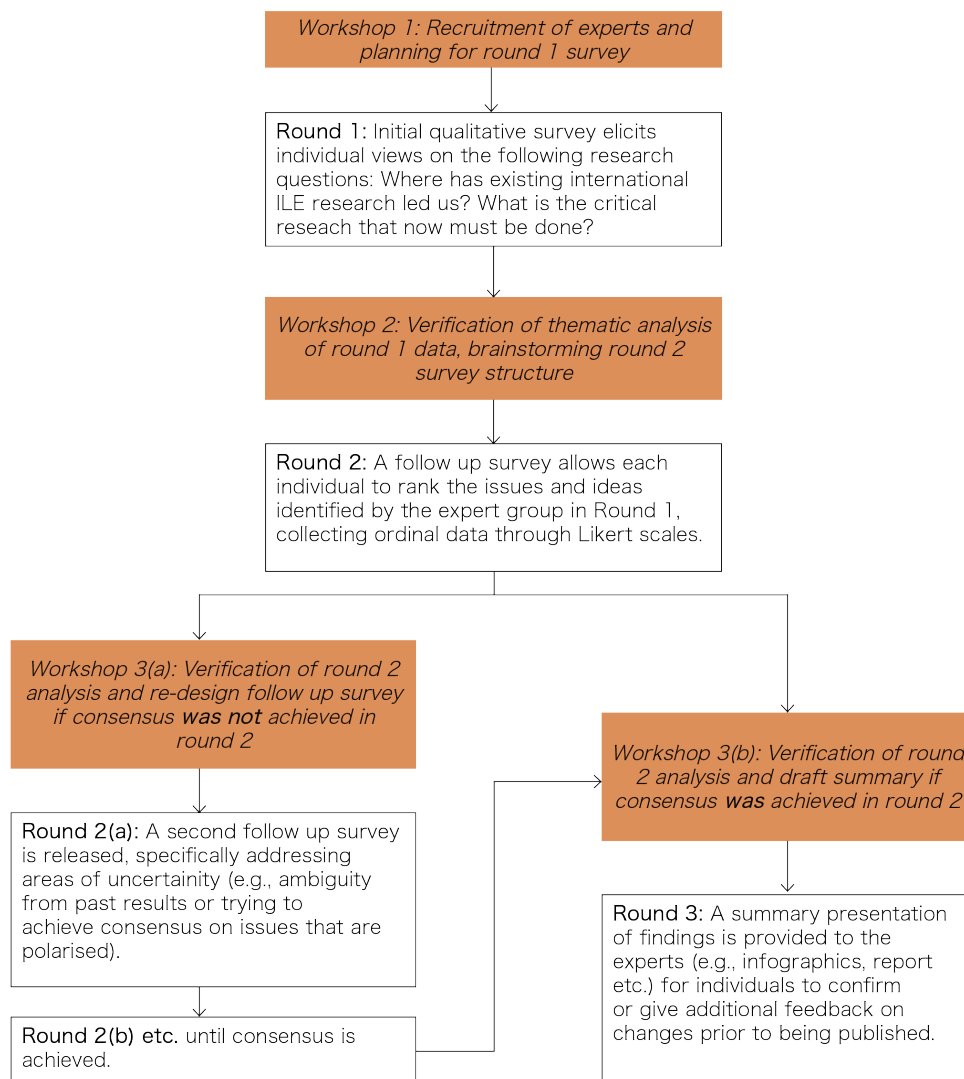


Figure 1. An overview of Delphi rounds and Scoping Study team workshops for the Scoping Study.

It is important to note that the role of the workshops is for Regional Teams to comment on the Delphi data emerging and the next steps in the process, not to alter individual opinions but rather to verify the initial analysis conducted by the Management Team.

Once consensus has been reached from the Delphi study, Stage 3 will comprise a series of regional roundtables. These roundtables will assist in the preparation of the project’s white paper and subsequent grant applications from the project. They will address the design of future research (in response to the final research question: *How should such research be designed?*), considering the data collected during the Delphi survey and from the workshop discussions.

A table of the preliminary data collection timeline can be found at Appendix B.

Data analysis

Brainstorming from Workshop 1 will be summarized by the Management Team. Common themes that emerge from the brainstorming will be used to build qualitative questions for the first round of the Delphi survey.

An inductive thematic analysis will be conducted after round 1 of the Delphi survey. The purpose of this approach is to narrow down and categorize the full range of ideas presented in the round 1 survey. This analysis will be shared at Workshop 2 so that Regional Team members can verify and comment on the initial interpretation of results.

The round 2 Delphi survey asks individuals to rank the issues and ideas summarized from round 1. These responses are gathered through Likert-type scale items and rank order items. Analysis from this survey will primarily be conducted using Kendall's Concordance Coefficient, which indicates whether ordinal response data have no agreement (0) to perfect agreement (1). It is envisaged that this analysis will be conducted on each panel separately (i.e., education, academe, and allied industries), as one strength of the Delphi is the different perspectives it can capture from each panel of experts.

Workshop 3 will unpack the round 2 Delphi data and will look at comparing the responses from each panel of experts. Feedback about the level of consensus and next steps (round 2a or round 3) will be devised and qualitatively recorded.

Kendall's Concordance Coefficient will continue to be used to establish consensus from each Delphi panel, with a general acceptance of .70 as a cut-off for panel consensus (Okoli & Pawlowski, 2004). Once consensus has been reached, dissemination materials (e.g., report, infographic etc.) will be produced and sent out to the experts one last time for validation (round 3 of the Delphi). Panel members will have a designated period in which to give final feedback on these materials. These qualitative data will be retained and (depending on the frequency of feedback) may be thematically analyzed.

Throughout the stages, Regional Team workshops and Regional roundtables are likely to generate rich qualitative data. Records of these activities will be retained for inductive/deductive thematic analysis depending on the stage of the project.

Participants

The Scoping Study has three levels of participation.

1. A Management Team.
2. Several Regional Teams.
3. Several Delphi participants.

A Management Team, based at the host university, will be responsible for the project's administration, governance, and compliance. It will secure contracts, ethics, lead development and implementation of the research design, perform initial analysis of the

data, produce the initial draft of analysis and outputs, and organize findings dissemination. It will organize and co-host workshops and regional roundtables. It will manage the project's website. It will facilitate a collective voice within Regional Team members across the regions.

Regional Teams, are solicited from LEARN's network and subsequent snowballing. While not necessarily country-based, these are expected to present regional opinions on the data being generated through the Delphi study. Each will have a Sponsor (who holds the contract), a Leader who acts as a conduit for information, and a group of team members. The size of these groups is not an issue providing (1) they represent the views of the study's cross-disciplinary groups (academe, industry, and education); and (2) the size does not hinder each from providing the independent voice this study requires.

The Regional Team members are all considered co-researchers in the Scoping Study. These people or organizations form an international cross-disciplinary co-research consortium.

Delphi Experts, who will provide their input independent of the Regional Teams. Delphi Experts may be part of a regional Team, but the design calls for their anonymity - a condition of recruitment. These participants will be recruited through the sampling method previously described.

Procedure

Figure 2 describes the procedure, relevant to the input of each of the participant groups. A strength of the proposed design is the ongoing interaction between each of the participant groups for the duration of the project. In brief:

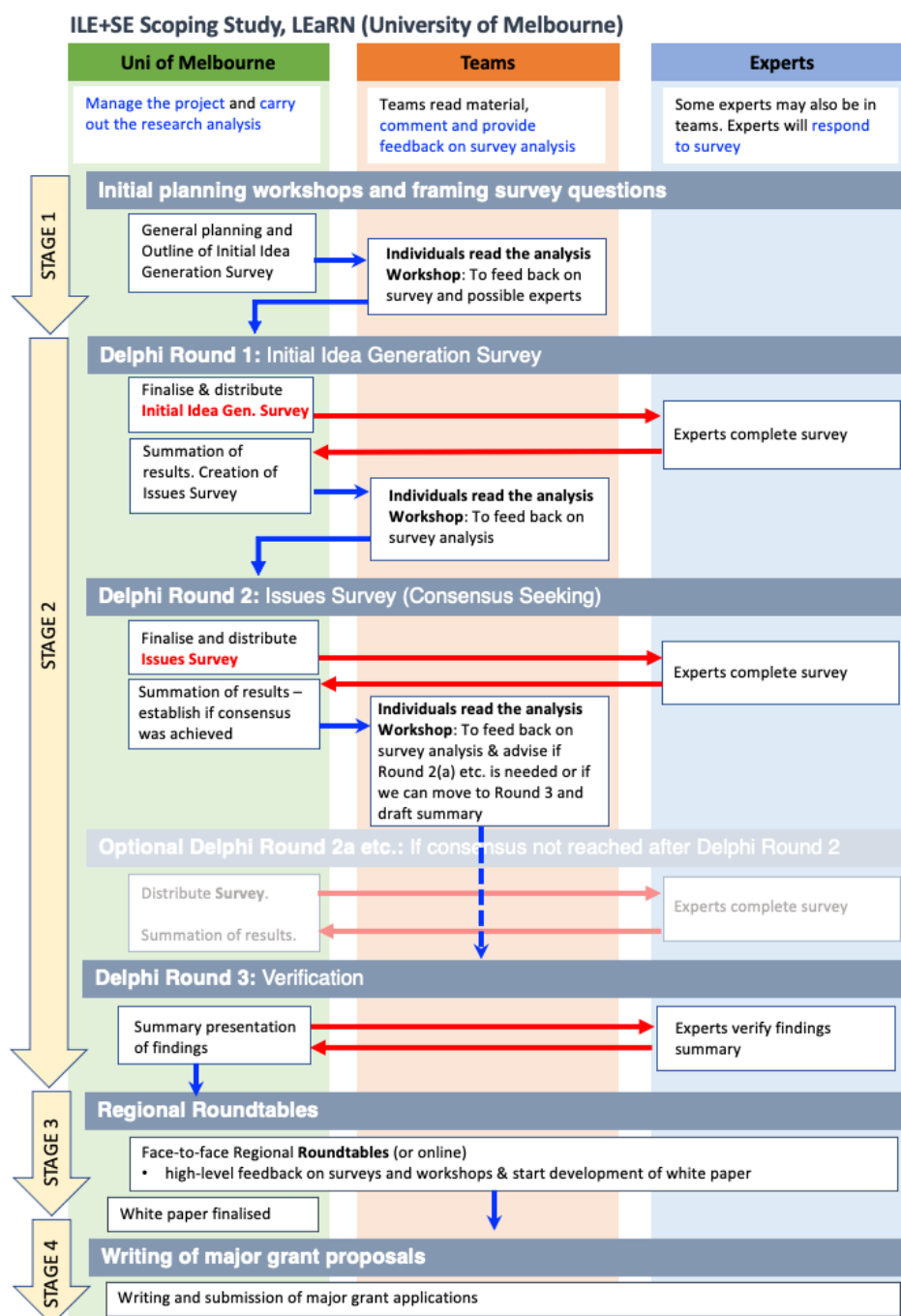
Stage 1. Initial project planning is undertaken, including recruitment of Delphi Experts, and (through Workshop 1) the design of Round 1 Survey.

Stage 2. Ideas generation and consensus seeking is conducted through Regional workshops and the Delphi study. Delphi Experts will identify the broad range of issues inherent to the research questions. This involves implementation of the Round 1 Survey, initial analysis by the Management Team, then discussion and validation by the Regional Teams in Workshop 2.

In the Round 2 Survey(s), the Delphi Experts rate the issues identified from the previous survey. Analysis of the Round 2 Survey by the Management Team measures level of consensus across the three discipline groups and Workshop 3 examines these results. If consensus is reached by all three discipline groups, Workshop 3 allows Regional Teams to summarize results for validation by Experts in Round 3 Survey. If no consensus is reached, a subsequent Round 2a Survey is designed through the workshop and sent to the Delphi Experts. This process is repeated (Round 2b Survey, Round 2c Survey etc) until consensus is reached.

Stage 3. Regional roundtables will take all preceding data (Delphi survey and previous workshop material) as Regional Team and the Management Team work together to construct the white paper. The Management Team will finalise the white paper for dissemination.

Stage 4. Drafting of grant proposals will follow from the roundtable discussions and white paper, and a number of grants that are regionally-driven may be drafted.



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Figure 2. An overview of participant group interaction during the four stages of the Scoping Study.

Publications

The main publication produced from the study will be a white paper that addresses the three proposed research questions. It will provide a summary of findings from each Scoping Study stage, constituting a blueprint for advanced research into innovative learning environments. As much as is possible, the white paper will account for the perspectives of the industry/academe/educational body partners, explain where needs are unique to one or more of these participant groups, and overview unique contextual needs as part of advancing a research agenda in this field. This output will constitute a unique and powerful outcome. No similar large scale, international, multi-disciplinary, cross-sector, leading-expert study has been attempted. Its findings will represent a convincing expert-led focus on the direction of research into ILEs.

Stage 4 of the project also allows for the development of major grants to act on the research areas proposed in the white paper. It is envisaged that multiple grants may be written and submitted across the participating Regions, including an Australian Research Council grant. These major grants will likely target specific Regional issues identified in the white paper, although they may be international in scope.

Due to the breadth of data collected by the international Regional Teams, there is scope for additional publications to be produced in consultation with the Management Team. These publications may include, but are not limited to, peer-reviewed academic articles, professional publication articles, blogs and online articles etc.

Intellectual Property (IP)

By the terms of the contract (which all team members will endorse at the commencement of the project), IP that is generated through any of the Scoping Study activities will be acknowledged as being created by all team members, but is technically owned by the host university. The project will permit all reasonable use of the data for non-commercial activities at the end of the project, including for use in further studies and for publication purposes; however permission for further use must be obtained in writing by the lead Chief Investigator and endorsed by the Management Team.

The project encourages the ongoing use of the data created by the project, providing that permission is granted and appropriate acknowledgement is given.

References

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Appendix A

The table below briefly outlines the possibility for four regional roundtable events, but these groupings may change during stages 1-3 of the project.

Table 1. Proposed grouping for Regional Roundtables

	Regional group
1	Americas
2	Australasia
3	Southeast Asia
4	Europe + Africa

Appendix B

The table below details a proposed timeline for the Scoping Study activities. It highlights the flexibility that is required across the stages in order to coordinate the number of regions that are participating in the study.

Table 1. Overview of data collection activities and personnel involved. (NOTE - WILL BE REFINED)

Month	Personnel	Activities	Additional information/notes
April - May	Management team	Finalize protocol, lodge ethics, finalize contracts, launch study.	
	Management team and Regional teams	Workshop 1: Scoping study teams to give input into what should be included in survey 1 for the Delphi.	
		Compile list of experts across 3 categories (academe, education bodies, allied industries)	
June-July	Management team and Regional teams	Round 1 of Delphi survey	<p><i>Length of round 1 Delphi is going to be affected by holiday breaks across Northern Hemisphere.</i></p> <p><i>Minimal interaction from parts of US/Canada during this time due to</i></p>

Month	Personnel	Activities	Additional information/notes
			<p><i>holiday break (June-August).</i></p> <p><i>Also, mid-June-mid-July break for South Africa.</i></p>
August	Management team	First thematic analysis of Round 1 Delphi	<p><i>Minimal interaction from parts of Europe during this time due to holiday break: Italy, France, Germany, and England are off much of August. Scandinavia, Scotland, Ireland are July and start at the mid end of June.</i></p> <p><i>China is likely to be on holiday July-August.</i></p>
September	Management team and Regional teams	Workshop 2: Unpack the initial thematic analysis from Round 1 Delphi survey and design Round 2 survey.	
October	Management team	Round 2 of Delphi survey	
November	Management team and Regional teams	<p>EITHER</p> <p>Workshop 3(a) (If consensus is not achieved in Round 2 survey): Verify no-consensus and identify issues to be re-presented to Delphi Experts.</p> <p>OR</p> <p>Workshop 3(b) (If consensus is reached): Verify consensus and prepare a draft summary.</p>	

Month	Personnel	Activities	Additional information/notes
December	Management team	<p>EITHER</p> <p>Round 2a etc. of Delphi survey if consensus hasn't been reached, then Round 3 of Delphi.</p> <p>OR</p> <p>Round 3 of Delphi if consensus was achieved: Expert verification of findings summary.</p>	<i>Minimal interaction from Australia late December-January due to holiday break.</i>
February-April 2022	Management team and Regional teams	<p>Regional roundtables to respond to research question 3: <i>How should such research be designed?</i></p> <p>Feedback will also be sought on the final white paper.</p>	<i>Round 3 of Delphi may be included during this time if consensus is not reached prior to 2022.</i>

