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Introduction to Part III: Measurement



Wesley Imms and Kenn Fisher

Abstract ‘Measurement’ of the impact of learning environments has occurred for quite a long time, but its role in driving and guiding reforms in ILE design and use has not been as effective. This is due to a lack of common terminologies, too wide a scope of what constitutes ‘learning environments’ and too often the use of very poor methods. This section presents a number of evaluation initiatives, playing a part in exploring new approaches to ‘good’ evaluation.

Not enough has been said about the paucity of solid evidence needed to inform ILE development. LEARNs many projects have helped a small international band of researchers highlight the perilous state of research conducted to date, and within ILETC it has focused specifically on what is known and needs to be known in terms of ILE impact on student learning outcomes (Byers, Mahat, Liu, Knock, & Imms 2018), teacher use of space (Bradbeer, Mahat, Byers, & Imms 2019), and student deeper learning. A critical argument has been the need to build an evidence base that breaks the cycle of fads and bandwagons that have plagued ILE development since the 1960s (Imms, 2018). But this message must be followed by action—the active pursuit of robust evidence that shows where ILEs succeed and where they fail—and why this happens.

ILETC is an example of that work, but still more remains to be done to provide a substantive causative link between pedagogy and space. This package of chapters considers how the materiality of the built form provides effective affordances to support the activities therein. Reading between the lines, we also see how much work of this ilk is required; grand statements about success have limited usefulness, whereas the small projects described here constitute the fabled research ‘bricks in the wall’, which over time cumulatively create the robust knowledge base we need.

Byers used an observational metric to track the practices of over 20 secondary science, mathematics, and engineering teachers in a variety of spaces. His focus was on mapping and identifying practices, perceptions of student learning, and correlating

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these to qualities of the various built environments in which those practices occurred. This logical, replicable, analytical approach allowed him to identify trends in practices consistent with various learning space types. While Byers' earlier work isolated learning space types as variables when assessing impact on learning outcomes (Byers, Imms, & Hartnell-Young, 2018), the more sophisticated study presented here tackled the often-ephemeral phenomenon of teachers' actual practices. As a study, it identified useful concepts that are likely even by now to be superseded by newer thinking, but the core message in this chapter is of designing robust ways of capturing data to build foundational knowledge.

A collaborative Danish research team—Imke Wies van Mil, Olga Popovic Larsen, Karina Mose and Anne Iversen—takes an innovative look at how lighting affects behaviour in non-school spaces to then leverage this into informing school design. The team moves outside the school sector to see developments around lighting and how they may be re-purposed into school design, which is a very worthwhile and under-researched exercise. We all understand the use of lighting, for example high-lighting heritage buildings in the evenings, focus lighting for restaurant table settings, and even disco lighting to take an extreme viewpoint. What the authors focus on is the contrast between light and dark and shades between that lighting can be offered in built environments. They argue that architects should focus as much on artificial lighting as they do on natural lighting, a concept highly evolved in Scandinavia countries. If design for health and well-being (Hughes, Franz & Willis, 2019) is explored, then it makes eminent sense to curate a variety of learning settings for a variety of activities to support a variety of differentiated teaching. The team compared six different learning environments to evaluate the cognitive impact of the different lighting arrangements. Teaching staff were invited to review the results with a distinct preference emerging for a particular lighting arrangement. This approach offers significant opportunities for 'precision' school design as innovative learning environments evolve (in adapting the emerging 'precision medicine' dialogue).

Ji Yu explores potential links between the learning environment and student learning outcomes through the lens of Chinese learners. She differentiates 'surface' approaches to learning and 'deep' approaches to learning in comparing various taxonomies across the three factors: cognitive processing activities, affective or motivational learning activities, and (self-) regulative activities. Ji Yu notes that Chinese students tend to focus on combining memorising with understanding, although in Hong Kong some Western approaches are gaining traction. Generalisation is difficult given the 56 ethnic groups and disparate educational systems across the country. Four themes emerged from the study of two contrasting learning environments with two contrasting pedagogies: learning space and students' conceptions of learning, learning space and cognitive aspects of learning, learning space and affective aspects of learning and, finally, the learning space and the (self-) regulative aspects of learning. Ji asserts that space can shape learner behaviour and particularly singles out the contrast between instructor led (formal) and self-directed (informal) student behaviours. To this could be added the social aspects of learning completing a triad of learning (spatial) modalities (Fisher, 2003).

Jane Zhang compares the creative process in learning through a dual approach of ‘flaring’ and ‘focusing’. Focusing is the notion of concentrating on a specific subject or task, whereas flaring is adapting the knowledge gained to problem-solving. At one extreme, applied to kindergarten at MIT, there are four factors which may support creative learning: projects, peers, passion, and play.¹ In studying at Harvard—and moving to the alternate end of the learner age spectrum—Zhang is able to engage in case studies with two learner typologies: one at the Harvard Graduate School of Design and the other being the Harvard Innovation Lab. The former uses a design studio-based pedagogy having its origins in the Bauhaus, while the latter has a variety of spaces to support incubators and student-led start-up projects in a cross-faculty manner similar to MIT’s D-Lab. Students completed online questionnaires to support observational studies. The findings reinforced the idea of alternately focusing (narrowing) and flaring (or broadening). In some respects, this resonates with Nonaka’s (1998) modes of knowledge construction and management, although these iterate across four developmental activities—internalisation, socialisation, externalisation, and finally, combination. Zhang’s creative learning spiral—with the quadrants of ‘sparking’, ‘making’, ‘grazing’, and ‘socialising’ across four associated domains of focus, flare, objects, and people—is an interesting and innovative ‘take’ on Nonaka’s. Above all, Zhang found a strong correlation between pedagogy/activity and space/affordance in the two examples.

One cannot underestimate the importance on the type of material created and presented in this Section. Often considered ‘too hard’ to collect, with the mass of confounding variables that characterise the use of ILEs, ILETC, and Transitions conferences have steadfastly pulled together a range of quality researchers who are meeting this challenge. To reiterate, this Section highlights the diversity and scope of issues to be addressed if we are to ever confidently say we have a solid understanding of what works, when, and why.

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¹Sign on local primary school street display board: play is the highest form of research: Einstein. <https://www.earlylearninghq.org.uk/latest-resources/inspirational-quotations-albert-einstein/> Are.

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Wesley Imms (Australia) comes to learning environments research from a long period as a teacher, then through a Ph.D. in Curriculum Studies from the University of British Columbia in Canada. His teaching spanned art and design education, his practice for decades has included designing and building ‘crafted’ homes, and his art works have focused on bespoke purposeful furniture construction, which he exhibits annually. For the last decade these interests have conflated into applied research programmes, where he specialises in assisting schools conceptualise, inhabit, refine and evaluate learning environments. This work has focused extensively on large-scale collaborative projects that draw heavily on international industry participation, and with an emphasis on Ph.D. and Masters level input to this knowledge generation. He is a co-Director of the LEARN group, manages LEARN@MGSE, and through selected consultancies he works closely with schools in the Asia-Pacific region on improving the use of innovative learning environments. Wesley is currently an Associate Professor at The University of Melbourne, Australia.

Kenn Fisher (Australia) is recognised as one of the leading learning environment specialists practising locally, nationally and internationally for over three decades. He has practised in Australia, Asia, the Middle East and Europe and as a consultant to the OECD (where he held the post of Head of the Programme on Educational Building in Paris in 1997/8) and UNESCO. He is multiskilled in a range of disciplines having practised in all education sectors as a teacher and academic, a strategic facility and campus planner and as a project, facility and design manager. He has been engaged by more than universities worldwide, over a dozen vocational training and community college clients, a number of State and National Government Ministries of Education, many school organisations and Government and corporate entities. Kenn is an Associate Professor in Learning Environments at The University of Melbourne’s School of Design (MSD).

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