# The "state of play" concerning New Zealand's transition to innovative learning environments: Preliminary results from phase one of the ILETC project

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***Abstract***
*Driven by international trends and government policy, it is a requirement for all newly built schools in New Zealand to be designed as innovative learning environments (ILEs) with flexible learning spaces. These environments, celebrated by some for the "transformational" educational opportunities they may provide, also raise questions about whether the anticipated pedagogical value of these "non-traditional" spaces is based on idealised visions of teaching and learning rather than empirically derived evidence. Before such complex issues can be efficiently addressed, evidence of the actual "state of play" of ILEs is required. Drawing on New Zealand specific data from a large Australasian research project, this paper triangulates principals' opinions, teachers' perspectives, and the literature on some key preliminary issues: what types of learning spaces can be found in New Zealand schools; what teaching styles are evident in these spaces; what pedagogical beliefs are driving ILE teaching practices; and what types of learning activities are occurring in ILEs? The paper provides an evidence-based platform for further discussion about the opportunities and challenges surrounding the use and practice of ILEs in New Zealand.*

**Keywords:** *Innovative learning environments; teacher change; deep learning; teacher mindframes; New Zealand; evidence*

## Introduction

Set against a backdrop of global technological and economic transformation, education systems around the world are being provoked to provide more personalised and responsive education opportunities to students to prepare them for their future (Monahan, 2005; Zhao, 2011). Rapid shifts in information and communication technologies (ICTs), the rise of the knowledge society, and the drive for both individuals and communities to become lifelong learners have prompted the re-imagining of what may constitute optimal conditions for learners to acquire the dispositions, skills and knowledge required for them to thrive in contemporary society (Fullan & Langworthy, 2014).

The role that "space" can play in supporting teachers and school systems more broadly to meet emerging educational imperatives has become a highly relevant and topical issue. Escalating discussions about "innovative learning environments" (ILEs) – conceptualised as new and potentially better socio-spatial contexts for learning (OECD, 2013) – and "flexible learning spaces" (Ministry of Education, 2011) designed as architectural devices to support new forms of practice, represent a significant shift in educational discourses in New Zealand. With this shift, "space" has become a prominent consideration amongst leading educators and school principals seeking to embody their pedagogical beliefs in the day-to-day practices of schools. The common narrative suggests that ILEs and flexible learning spaces can more readily accommodate the needs of "21st century learners" than traditional classrooms (Ministry of Education, 2011) and therefore contribute to raising student performance and learning outcomes (Ministry of Education, 2016a, 2016b).

This, however, is largely conjecture. Internationally, few empirical studies have explored correlations between the pedagogical opportunities presented by flexible learning spaces and student learning outcomes, and only a fraction of those have addressed causality when investigating the relationships between students' academic performance and the design of the physical environment (Byers, Imms, & Hartnell-Young, 2014). Some studies have documented changes in pedagogies following shifts from traditional classrooms to flexible learning spaces (e.g. Newton et al., 2012; Woodman, 2011; Woolner, Clark, Laing, Thomas, & Tiplady, 2014), yet the widespread investment in flexible learning spaces in New Zealand brings with it a substantive requirement for the development of deeper understandings about the relationships between pedagogy and space within the New Zealand context, that can lead to future decision making based on research and evidence.

To address this need, the University of Melbourne's Learning Environments Applied Research Network (LEaRN) team has initiated an Australian Research Council Linkage project called Innovative Learning Environments and Teacher Change (ILETC). ILETC brings together researchers in education, architecture and design, along with 15 partner organisations including the New Zealand Ministry of Education, to examine the support required to assist teachers to realise the possibility of space as a component of their pedagogic practice, and examine the impact of this "change" on student learning. It works from the assumption that there exists a multitude of "best practice" in this regard, but gaps exist that require strategies to overcome. ILETC will build an evidence-base of "what works" in terms of teacher transitioning to ILEs, design additional strategies to fill perceived gaps, and test this suite of strategies for effectiveness and applicability across the widest possible array of Australasian schools.

The initial stage of this project, beginning in August 2016, was to define substantively the research parameters around which subsequent phases of the project will be shaped. It aims to build evidence of the current state of play in terms of ILEs: how many of them are in use; of what type are they; are teachers perceived to be using them as planned; and are students learning in the ways that were expected? The conjecture mentioned previously is built around assumptions, rather than fact, concerning these questions. Frankly, we do not know how ILEs are distributed, the types of spaces that schools define as ILEs, what teaching styles are most prevalent in these spaces, if it is felt teachers are using them well or not, and if school leaders think these spaces are changing the type of learning students exhibit. This paper discusses New Zealand-specific results from this early "baseline evidence" stage of ILETC, which provides some preliminary findings on these topics. As a result, these findings begin to inform the relationship that exists between ILEs, and (1) teacher mind frames (what informs teachers' pedagogies in these spaces), and (2) student deep learning (the anticipated learning these spaces are designed to facilitate).

This paper is limited to reporting on trends emerging from this early stage of ILETC. More focused analyses will occur in due time. However, this reporting of early trends is, of itself, a significant advancement of existing knowledge. It directly addresses what Blackmore, Bateman, Loughlin, O'Mara, and Aranda (2011) lament as a paucity of evidence concerning the effect of learning spaces on student learning (p. iv). It is New Zealand-specific in a research field where international studies lack sensitivity to that country's cultural uniqueness (Ministry of Education, 2016a). Finally, it is teacher-practice focused, providing some baseline data that addresses the need to support teachers "…to develop their pedagogic repertoire while also being encouraged to explicitly consider the role of the physical environment as part of the planning process" (Ministry of Education, 2016a, p. 39).

**Core concepts**

As mentioned, data collection for this initial stage of ILETC was organised around four key concepts – ILEs, teaching styles, teacher mind frames, and student deep learning. The research team believed that adequate interpretation of these concepts existed in the literature, and as will be explained further in the research procedure section to follow, could be adapted to suit the survey and teacher workshop data collection instruments.

***Innovative learning environments***

ILEs exist in a confusing array of designs, from huge open spaces to highly flexible arrangements of classrooms, corridors, student retreat spaces, "maker" spaces and much more. Dovey and Fisher (2014) conducted an international review of more than fifty award winning school designs, summarising their findings into five learning space design genres they labelled "types" (Figure 1). While no hierarchy is suggested, it is clear from Figure 1 that "openness" increases as one views the types from left to right. ILETC has adopted this concept for its study, noting that while they do not represent the entirety of learning spaces evident in all schools around the world (no summary could achieve this), these categories allow teachers and school leaders a framework for discussion of what would otherwise be a complex, ephemeral phenomenon.


Figure 1. Dovey and Fisher's (2014) learning spaces types, as adapted in Imms, Cleveland, and Fisher (2016).

***Teaching approaches***

Categorising styles of teaching is open to valid accusations of being overly prescriptive, of not accounting for changing practices over a period of time, and of attempting to simplify what is a very complex and ephemeral practice (Kolb & Kolb, 2005). For this study, however, the research question required only general perceptions and not detailed nuances of practice; the latter would be examined fully in later stages of the project. Figure 2 illustrates a typology determined to be suitable for this goal. It embraces activities ranging from whole-class to individual-student teaching practices, not dissimilar to the spatial types described earlier, and was supported by further research that focused specifically (like this question) on fundamental spatial settings for learning (Cleveland, Newton, Fisher, Wilks, Bower, & Robinson, 2016).

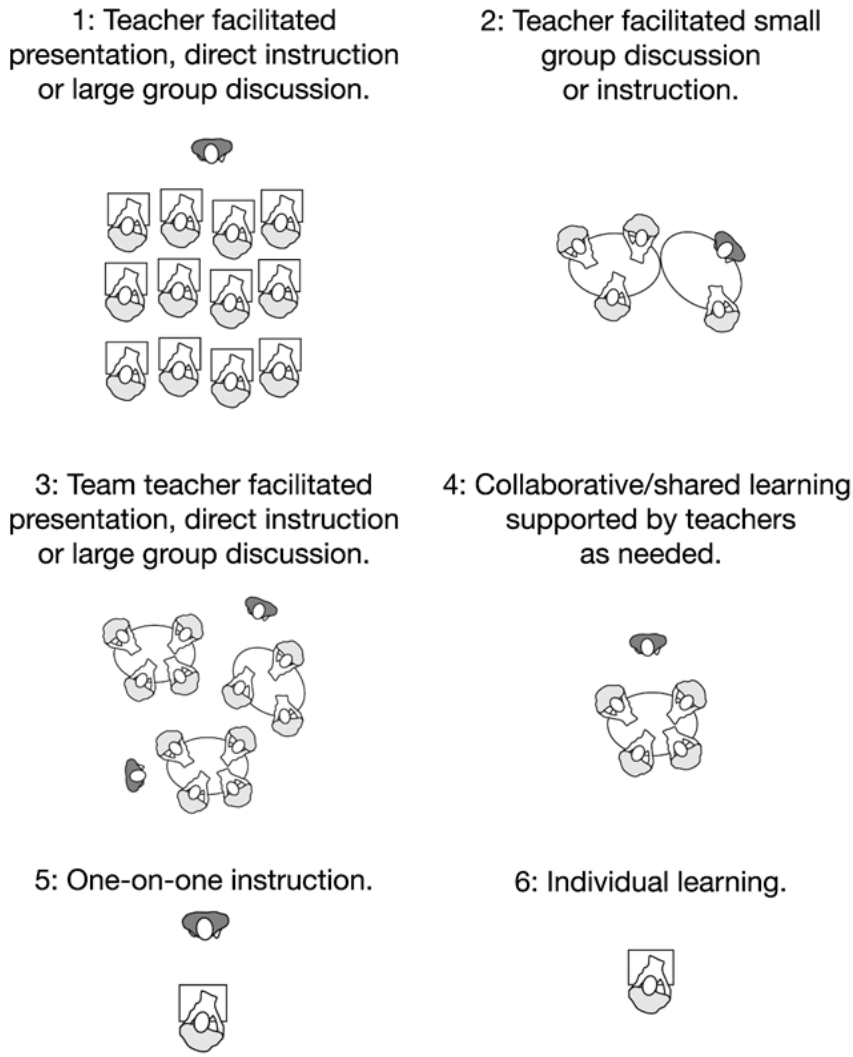


Figure 2. Typology of essential teaching approaches

***Teacher mind frames***

Hattie (2012) describes a teacher's mind frame as the mediating variable that directs how s/he (and school leaders) think and act when engaged in all aspects of teaching. As such, it provides a framework (but not a measure) for understanding the impact of a teacher's pedagogy on student learning. He presents eight mind frames, or ways of thinking, that underpin those actions and decisions of teachers and leaders which are likely to have significant impacts on student learning. The mind frames are drawn from the findings of his synthesis of over 800 meta-analyses (Hattie, 2009) and encapsulate the "belief that we are evaluators, change agents, adaptive learning experts, seekers of feedback about our impact, engaged in dialogue and challenge, and developers of trust with all, and that we see opportunity in error" (Hattie, 2012, p. 159). Participants were asked to respond to each statement (see below), reflecting their opinion on a four-point Likert scale of *Strongly agree, Agree, Disagree, and Strongly disagree.*

***In my opinion, teachers at our school:***

1. Believe that their fundamental task is to evaluate the effect of their teaching on students' learning and achievement.
2. Believe that the success of students is based on what teachers do (or don't do).
3. Want to coach and model different ways of learning, rather than teaching.
4. See assessment as feedback about their impact.
5. Engage in dialogue, not monologue.
6. Enjoy a challenge and never retreat to just "doing their best".
7. Believe that it is their role to develop positive relationships in learning spaces and staffrooms.
8. Inform parents about the nature of learning.

***Student deep learning***

Deep and surface learning approaches are established concepts in educational research literature (Beattie, Collins, & Mcinnes, 1997). Surface learning might be loosely described as "learning for a test", with arguably poor long-term knowledge retention or applicability to other concepts. Deep learning tasks, in comparison, are viewed as converging out of problem solving, learning based in authentic contexts, and accelerated by innovations in digital technologies (Fullan & Langworthy, 2014). The deep learning approach points towards learning for understanding. It is characterized by students who seek to understand the issues and interact critically with the contents of particular teaching materials, to relate ideas to previous knowledge and experience, examine the logic of the arguments and relate the evidence presented to the conclusions (Beattie et al., 1997). Learners employing the deep approach tend to join concepts, apply them to real life situations, or question conclusions (Lyke & Young, 2006), and are more likely to discuss and reflect upon the content as well as read related materials (Tait, 2009). Studies suggest that these students have better retention of information and apply it better than surface students do (Booth, Luckett, & Mladenovic, 1999; Ramsden, 1992).

The Learning Process Questionnaire (Biggs, 1987; Biggs, Kember, & Leung, 2004) measures deep and surface approaches to learning within the "systems theory" of student approaches to learning. Ten items from the Deep Approach Scale were selected for this study based on their relevance to the variables being examined. Because student approaches to learning are reported from the principal's point of view, one item from the scale (Item 19) was not included. For consistency with the teacher mind frame statements in the previous section, participants were asked to rate student deep learning characteristics (see below) on a four-point Likert scale of *Strongly agree, Agree, Disagree, and Strongly disagree.*

***In my opinion, students at our school:***

1. Find that at times studying makes them really happy and satisfied.
2. Try to relate what they have learned in one subject to what they learn in other subjects.
3. Feel that nearly any topic can be highly interesting once they get into it.
4. Like constructing theories to fit odd things together.
5. Work hard at their studies because they find the material interesting.

6. Try to relate new material, as they are reading it, to what they already know on that topic.
7. Spend a lot of their free time finding out more about interesting topics which have been discussed in different classes.
8. Try to understand what the author means when reading a book.
9. Come to most classes with questions in mind that they want answering.
10. Like to do enough work on a topic so that they can form their own conclusions before they are satisfied.

**Research approach**

The ILETC project's overarching research question is: "Can altering teacher mind frames unlock the potential of innovative learning environments?" Divided into three phases, the first exploratory phase (18 months) sought to gather baseline data that test assumptions embedded in this question, and to build robust definitions of its core terms. Stage 2 (12 months) will develop and test strategies for helping teachers make the most of ILEs. Stage 3 (18 months) will be a quasi-experimental study to evaluate the impact of these strategies on student deep learning. A full description of ILETC is available at www.iletc.com.au.

This paper describes data collected during the earliest stage (final quarter of 2016) of Phase 1 of the ILETC project. Two research approaches were utilised. The first was a short survey to school leaders (principals and leading teachers), which sought their perceptions of (a) the type and percentage of spaces that exist in their school; (b) the types of teaching approaches most prevalent in their schools; (c) the mind frames that informed those teaching approaches; and (d) the types of learning they believed was occurring in those spaces. The second approach was a suite of teacher workshops. Utilising a design thinking strategy, these addressed the same topics described above. Only data obtained from the workshops conducted in Auckland and Christchurch are used in this report.

***Sampling***

The survey drew on a population of over 6,000 schools (including the whole population of 2,529 schools in New Zealand) operating under the umbrella of ILETCs Partner Organisations. The teacher workshops, each limited to about 40 participants, utilised a convenience sampling approach that was significantly dictated by geographic convenience.

***Collecting data via the survey***

The survey was intended to obtain broad baseline data from school leaders. Their perceptions concerning affective variables such as teaching styles, mind frames, and deep learning were considered valid, in that over a wide sample these would indicate trends to either reject or affirm assumptions associated with the research question.

Five questions addressed the survey's independent variable, which were discussed in the introductory section of this paper. Table 1 lists those variables with their associated question to participants.

***Collecting data via the regional workshops***

The workshops were developed to gain an understanding of how teachers defined and understood the concepts of deep learning and teacher mind frames, and how these were seen to relate to their physical learning environment. For all the workshops, a "design thinking" strategy was used to build a suite of activities addressing these issues. Design thinking is increasingly being utilised in research scenarios where information is required from participants that moves them from the known to explore the unknown. Design thinking approaches involve team-based generative collaborative activities to test assumptions, explore beliefs and frame problems (Kimbell, 2009). While there is no consensus yet on the theory of design and the definition of design thinking, for the

purpose of the ILETC project design thinking is being defined as the connection and integration of useful knowledge from many domains in ways that facilitate insights into the problems and purposes of the present (Buchanan, 1992). In practice, this means linking theory and practice to develop creative, highly participatory activities with the intention of examining a specific research question relevant to the project. The development of the design-thinking format sought to capture the rich data of teachers' lived experiences and their insights, as revealed through reflective activities. The workshop format also provided a useful experience for participants by structuring activities that provided insights into the experiences of others, enabled individual reflection and prompted further contemplation of problems/solutions through group discussion and rumination.

Table 1. Survey questions

| **Variable** | **Survey question** |
|---|---|
| Type of physical learning spaces | Of the five types of learning spaces illustrated below, please indicate the percentage of each type that is prevalent in your school. Please ensure that your answers total 100 percent. |
| Teaching in these spaces | Of the six teaching approaches illustrated below, please indicate the percentage of time devoted to each approach in your school. Please ensure that your answers total 100 percent. |
| Learning potential | How well does the following meet the needs of student learning in your school, in terms of your school's desired pedagogy? (8 items: wi-fi, mobile devices, display technologies, physical 2D and 3D displays, hands-on resources, furniture, re-configurable floor space areas). |
| Teacher beliefs | Please indicate the most appropriate response for each statement, reflecting your personal opinion. (8 items. Four-point Likert scale, from strongly disagree to strongly agree). |
| Student learning approaches | Please indicate the most appropriate response for each statement, reflecting your personal opinion. (10 items. Four-point Likert scale, from strongly disagree to strongly agree). |

The central aim of these workshops was to test the research hypotheses and key assumptions of the project to inform subsequent data collections. Participants modelled classrooms with craft materials, organized ideas on "post-its", made mind maps, created and compared made-up teacher characters, and role-played with toy figures. These creative methods of making knowledge visible provided participants with a chance to personally reflect and create something tangible, that they could then speak to as a group. This provided a natural catalyst for the countless stories being shared, lessons learned and tips being discussed (see, for an example, McEntee et al., 2016).

The workshop in Auckland focused on *Mind frames and belief systems: Learning from ideals and teaching practices*. Participants worked in small groups to explore how teachers' beliefs about learning affect teaching. These small group discussions illustrated challenges teachers face, what they were doing to overcome them, and provided an opportunity to discuss what they need to support their ideal teaching practice.

The Christchurch workshop focused on *Deep learning and ILEs: Learning from deep learning experiences in the learning space*. Participants worked in small groups to describe what deep learning is and model the learning scenarios in which this takes place. This workshop encouraged participants to discuss what

deep learning is, inspired an increased awareness of how deep learning is supported, and allowed them the opportunity to share how their classroom space currently supports or could better support deep learning.

***Data analysis***

Survey data was collated into distribution and frequency tables. Further in-depth analyses including factor analysis, analysis of variances (ANOVA, MANOVA), t-tests and correlation analyses were conducted on subsequent data sets. The latter analyses are not fully reported in this paper; for the purpose of testing if the assumptions being carried into the ILETC project had any substance, and to indicate emerging trends in the data relevant to the New Zealand cohort, the non-inferential analyses were considered to be adequate. A more developed statistical analysis will be published in a forthcoming paper.

Workshop data utilised a traditional qualitative data analysis approach, including coding, identification of themes, triangulation, model building and theory linkage (LeCompte & Preissle, 1993). It should be noted that existing design thinking approaches required some modification to ensure that categorical data was collected from the sessions, to allow for this analysis. Collecting participant responses via coloured post-it notes, photographs of assemblages, and short written responses served this need.

## Findings

***Participants***

In regard to the survey, a profile of the 337 New Zealand schools that participated in this initial ILETC survey is provided in Table 2. This self-selecting sample represented 13.3% of all New Zealand schools.

In regard to the teacher workshops, a profile of the participants is provided in Table 3. Of the total of 99 participants, teachers and school leaders were approximately equal in terms of representation.

The method of sampling was not supportive of any claim that this was a representative sample of all New Zealand schools. However, the large sample size and relative distribution across regions allows for the reasonable assumption that the data is indicative of trends in this region.

***What learning environment types exist in New Zealand schools?***

Within the survey sample, Type A and Type B spaces (see Figure 1) account for approximately 56% and 12% respectively of the learning environments identified by 337 respondents. Participants who indicated that their school learning environments were predominately of these types were typically from well-established Primary or Contributing schools in primary urban areas (not surprising, given both these school types represented the highest proportion in this sample). These participants indicated that their schools had little or no spaces that reflected the arrangement of any other spatial types.

The sample indicated a small relative occurrence of Types D (8%) and E (16%) spaces. Schools with a significant proportion of Types D and E spaces were those recently constructed. Typically, the schools in this sample were either classified by the New Zealand Ministry of Education as either Full Primary, Contributing and Secondary schools, found in primary urban areas (but again, this stems from high participation in this sample). There was a small number of Secondary schools that indicated a significant predominance of Types D and E spaces. Like the Primary and Contributing schools, these were typically located in primary urban areas. Traditional classrooms with flexible walls and breakout space (Type C) accounted for the least of learning spaces (7%) in NZ schools.

*What teaching styles exist in New Zealand schools?*

Data collected from the sample of 337 schools showed that teachers spent most of their time in small group discussions (Typology 2 – 30%), followed by explicit teacher-led instruction (Typology 1 – 23%). Typology 4 (collaborative learning) and Typology 3 (team teaching) accounted for 21% and 7% of teachers' instruction

Table 2. Survey participant and school characteristics

| **Participants** | **n** | **%** |
|---|---|---|
| Principals | 286 | 85 |
| Teachers | 28 | 8 |
| Others | 23 | 7 |
| Total | 337 | 100 |
| **School Type** | | |
| Primary (Full)[1] | 138 | 41 |
| Contributing[2] | 109 | 32 |
| Intermediate | 20 | 6 |
| Secondary[3] | 56 | 17 |
| Combined (composite) | 13 | 4 |
| Special | 1 | ≈0 |
| Other | 0 | 0 |
| Unable to determine | 0 | 0 |
| Total | 337 | 100 |
| **School location** | | |
| Urban area | | |
| Main urban area | 218 | 65 |
| Minor urban area | 37 | 11 |
| Rural area | 59 | 18 |
| Secondary urban area | 17 | 5 |
| Not applicable | 6 | 1 |
| Total | 337 | 100 |
| **Type of Māori Medium Education School** | | |
| Māori medium school | 2 | 9 |
| Mixed Māori language in education school | 7 | 29 |
| School with some students in Māori medium education | 8 | 33 |
| School with some students in mixed Māori language in education | 7 | 29 |
| Total | 24 | 100 |

[1] Primary (full) – Up to age 12

[2] Contributing – Up to age 10

[3] Secondary refers to a compilation of years 7-10, 7-15 and 9-15 schools

Table 3. Workshop participant and school characteristics

| | Auckland | | Christchurch | |
|---|---|---|---|---|
| **Participants** | **n** | **%** | **n** | **%** |
| Principals (Assistant/Deputy) | 14 | 31.1% | 19 | 43.2% |
| Teachers | 25 | 55.6% | 17 | 38.6% |
| Other | 6 | 13.3% | 7 | 15.9% |
| Not given | 0 | 0.0% | 1 | 2.3% |
| Total | 45 | 100.0% | 44 | 100.0% |
| **School Type** | | | | |
| Primary (Full)[1] | 13 | 27.7% | 19 | 43.2% |
| Contributing[2] | 17 | 36.2% | 2 | 4.6% |
| Intermediate | 6 | 12.8% | 8 | 18.2% |
| Secondary[3] | 2 | 4.3% | 6 | 13.6% |
| Combined (composite) | 2 | 4.26% | 3 | 6.8% |
| Special | 0 | 0.00% | 0 | 0.0% |
| Other | 4 | 12.8% | 5 | 11.4% |
| Unable to determine | 1 | 2.1% | 1 | 2.3% |
| Total | 45 | 100.0% | 44 | 100.0% |
| **School Location** | | | | |
| Metropolitan | 45 | 100.0% | 36 | 81.8% |
| Regional | 0 | 0.0% | 2 | 4.6% |
| Unable to determine | 0 | 0.0% | 6 | 13.6% |
| Total | 45 | 100.0% | 44 | 100.0% |

[1] Primary (full) – Up to age 12

[2] Contributing – Up to age 10

[3] Secondary refers to a compilation of years 7-10, 7-15 and 9-15 schools

time respectively. Only a small proportion of class instruction time was spent on one-on-one (7%) and individual learning (9%).

*What teacher mind frames are evident in New Zealand schools?*

The survey asked participants to describe the degree to which teachers in this sample exhibited Hattie's mind frame characteristics (2012) as described earlier in this paper. These perceptions were provided by participants across a strongly agree to strongly disagree continuum. A combination of averaged responses with application of 95% confidence intervals showed a degree of consistency in the data (Figure 3), indicating that respondents perceive teacher mind frames as relatively positive in these schools.

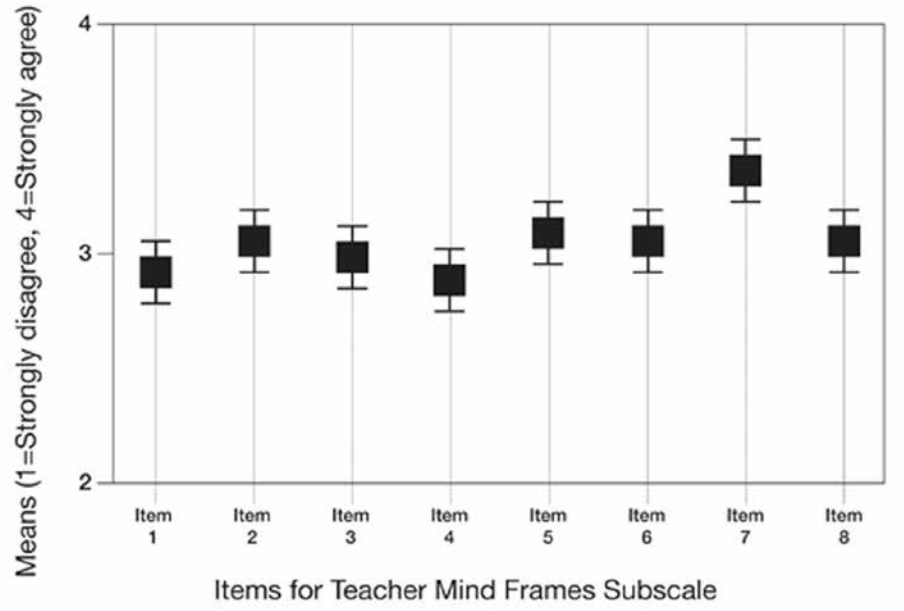


Figure 3. Teacher mind frames (n = 337)

At the workshop in Auckland, participants worked in groups to develop a teacher persona based on their past experiences. Following the group discussion, teachers worked individually to reflect on the belief statements of an exemplary teacher as well as statements that best describe their day-to-day teaching. Participants also reflected on the type of learning spaces which contribute the most and least to their teaching practices. Participants were asked to rate belief statements that represent what an exemplary teacher and practice statements that represent what he/she would typically do in the learning space. Each statement represents a possible belief or practice continuum within each of the eight mind frames articulated by Hattie (2012). There are no right or wrong statements.

In the main, participants' beliefs seemed to be aligned with their practices. Marked differences could be seen in participants' responses to the belief and practice statements for Mind frame 2, that is the belief and practice that the success of students is based on what teachers do (or don't do). One participant explained the difference as: "Yes, I believe all students can be challenged but when I teach I tend to think about how I can make it more engaging and fun. Putting it more on my way than the kids." The primary cause for this difference, according to the same participant is that: "My mindset – being in a single cell classroom – tending to go back to teacher teaching the kids."

***What deep learning characteristics are exhibited by students in New Zealand schools?***

The survey asked school leaders the degree to which they believed students in their schools engaged in deep learning, as defined by Biggs et al. (2004) and described earlier in this paper. A combination of averaged responses (within the 95% confidence intervals) revealed consistency within the participating sample. Across a strongly disagree to strongly agree continuum, school leaders perceived a positive prevalence of most deep learning characteristics. Overall, the sample agreed with the proposition that students in this sample of New Zealand schools experienced those learning experiences that made them "really happy and satisfied" and could "relate new material to what they already knew on that topic". The sample also agreed that their students often "work hard because they are finding the material interesting" and try to "understand what the author means when reading" text.

Similarly, participants were consistent in observing that students exhibited lower levels of deep learning in regard to independent and non-classroom learning characteristics. These included the characteristics "spent their free time finding out more about interesting concepts discussed in class", "constructing theories that fit odd things together", and "come to most classes with questions in mind". Not only were these responses at a lower level than others, the analysis revealed a slight increase in the variance, or discrepancy, in participant responses.

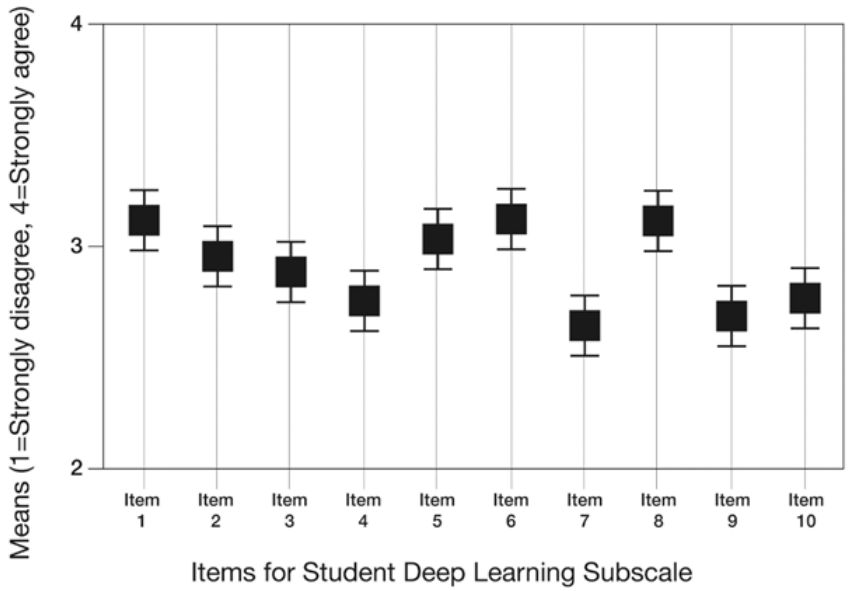


Figure 4. Student deep learning (n = 337)

At the workshop in Christchurch, participants were asked to model a deep learning scenario using craft material and Play mobile and Duplo figurines. They were then asked to discuss as a group the elements in their model scenario, which contribute and support deep learning. Participants identified several elements of the physical environment, which would contribute to enhancing student deep learning. These included:

- a range of spaces including mezzanine floor, reading nook, indoor and outdoor space, breakout space, quiet space, digital space, presentation space and "campfire" space;
- moveable furniture and fit outs such as walls, partitions, tables, create-a-space elements, cushions, furnishings, lighting, bi-fold windows and sliding doors;
- access to variety of tools including Information Technology (IT) devices, paper/pencil, books and music; and
- materials for hands-on activities.

According to participants, these elements of the physical environment could support deep learning through opportunities for increased "agency and choice", "collaboration" and "engagement" (in the classroom, with the community and globally). These elements would also support deep learning through offering a range of experiential learning experiences such as "personalised learning", "problem solving", "authentic learning", "reflection" and "discussion".

**Discussion**

A goal of this early phase of the ILETC project was to test some assumptions embedded in ILE conversations in New Zealand and across the globe. Are these ILEs really proliferating, and is it a case of "traditional" versus "open plan"? Is the "factory model" of instruction a myth or reality, and if reality does this impact our preparation of 21st century learners? Are teacher mind frames linked to the types of classrooms in which they teach? While the preliminary analysis of the data provided here cannot provide definitive yes or no answers to such complex questions, they provide enough evidence to move the assumptions surrounding ILETC from conjecture to probable fact.

ILEs are growing in number, but not proliferating with abandon. Within this large and well-distributed sample of New Zealand schools, more than two thirds of learning takes place in traditional classroom (Type A) settings. Open plan (Type E) designs are far from being the dominant alternative to the traditional space. In fact amongst ILEs, Type E designs are as equally represented as the types often described as "flexible" spaces – that is, those with operable walls, break-out spaces and a combination of large and mid-sized classrooms (Types B – D).

The dominance of the "factory model" of instruction is evident in this sample. For more than two thirds of the time, learning in this sample happens within a teacher-centric approach to instruction and more than three-quarters of this teacher-centric instruction occurs in traditional classroom (Type A) settings.

What is initially less obvious in this early analysis is the degree to which types of spaces are linked to the types of learning that happens within. Of those schools reporting some proportion of team teaching, most indicated they deployed a significant proportion of Types A and B spaces. Many of the schools engaging significantly in team teaching had a higher proportion of Types D and E spatial layouts. Interestingly, there was a discernible number of schools with fairly traditional Types A and B spaces which still identified that a team teaching approach was their school's dominant pedagogical approach. On first reading, therefore, it would appear that given the predominance of traditional classes in this sample, and the reasonably positive perceptions of deep learning that is happening in all the participating schools, the type of space does not really matter in terms of promoting desirable 21st century learning habits; it is happening across the board, including in traditional classrooms and under teacher-centric instruction.

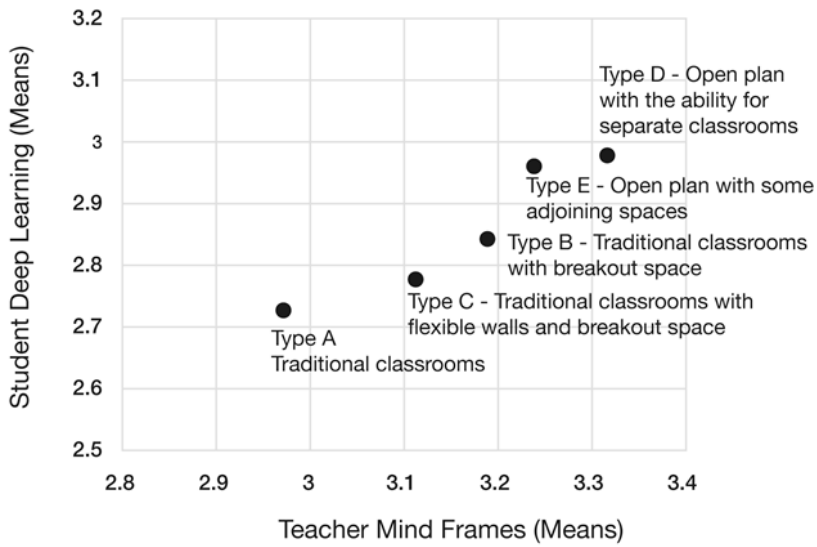


Figure 5. Mean teacher mind frames and student deep learning

Our broader dataset suggests otherwise. Preliminary correlation analyses of the full Australasian data (which a factorial MANOVA analysis has shown that there is no difference according to "country") are indicating trends suggesting that type of space does make a difference. While Types A and B, with team teaching as a pedagogical approach, may lead to positive student deep learning, the correlation analyses suggest that open plan learning spaces lead to even higher teacher mind frames and student deep learning. Represented in Figure 5, the data shows a strong relationship between teacher mind frames (x-axis), student deep learning (y-axis), and classroom type.

**Conclusion**

While significant investments are being made to deliver alternative learning spaces such as ILEs, the evidence has been absent to support the assumption that such spaces are better suited to accommodate the learning needs of 21st century learners. Without such evidence, it is difficult to justify the change in space designs and to equip teachers in such spaces to realise their potential.

This paper reports initial findings in a large research project that is designed to support teachers to succeed in this change. The data from the ILETC survey is beginning to indicate that traditional classrooms are associated with markedly lower characteristics of positive teacher mind frames and student deep learning. There is obviously a significant amount of teaching conducted in team modes that is taking place in spaces intended for didactic styles; that is, the spaces are not aligned with current practice but some success is evident in their outcomes. Conversely, all the types of ILEs are associated with the types of teacher thinking and student learning that is being sought by our community to meet the demands of a rapidly changing society.

As New Zealand moves from traditional to innovative learning spaces, evidence of the impact of this transition is required to direct meaningful and sustainable improvements in student learning outcomes. The Ministry of Education's participation in the large ILETC project is positioned to provide such evidence. With the participation of a significant number of schools in both New Zealand and Australia, the study should be able to provide robust specific recommendations to enable students in ILEs to prepare better for their futures.

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