

“Investigating the effectiveness of modern learning environments on improving student learning and achievement”.

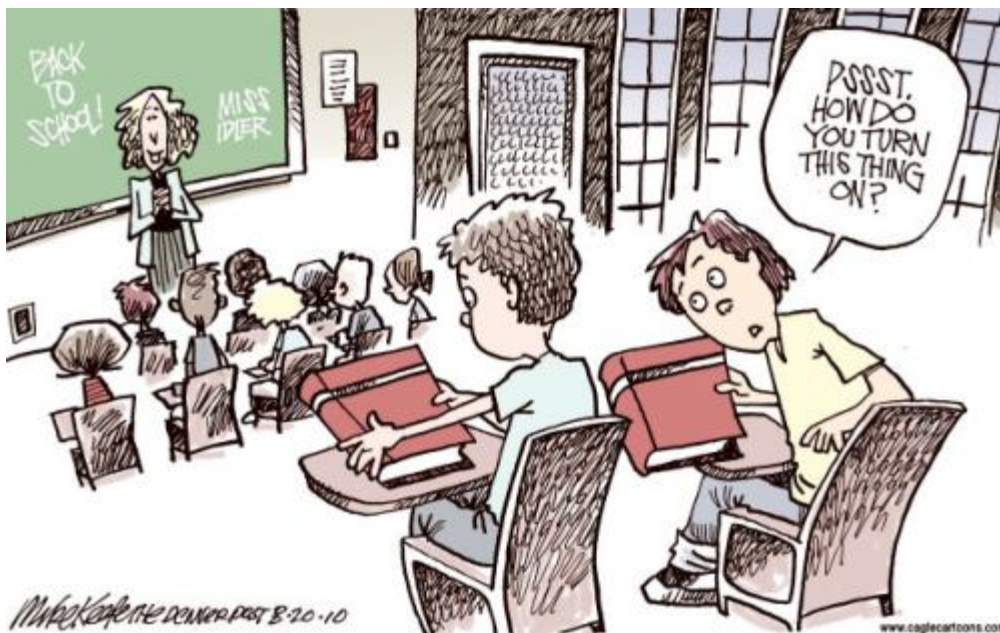


Image from: <http://digped2014.thatcamp.org/2012/09/27/hello-world/>

Sabbatical Report (20th April – 26th June 2015)

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Acknowledgements:

I have greatly appreciated the opportunity for this sabbatical, for a period of research, reflection and refreshment. It has also been very timely as our school is about to enter a new phase with the Ministry of Education's Educational Renewal Programme providing around \$20 million for the rebuild and redevelopment of our school after the 2010-11 earthquakes.

This sabbatical has only been made possible by the generosity and support of others, who I would like to acknowledge and thank.

- The Board of Trustees of Cashmere High School for their support with my application.
- My senior leadership team, especially Carla Smith who took up the role as Acting Principal in my absence.
- The continued funding and support provided by the Ministry of Education that makes these valuable principal sabbaticals possible.
- The many schools here in New Zealand and in Australia that generously made time to meet with me to discuss their environments and practices. I will not refer to any by name, as this is a public document and the purpose of my report is to critique their experiences and results to help guide the future direction of our school.
- I also greatly appreciated many individuals in the education sector who kindly met with me to discuss, debate and share information, research and evidence on this sabbatical topic. I believe that such open and robust professional discussion is a valuable feature of our education community and critical for making informed decisions on its future direction. Again I will not name these individuals, as the conclusions I have drawn in this report reflect my own thinking on these conversations.

Purpose:

The aim over my ten week sabbatical was to have time to read widely from the available literature and research on this topic; visit schools both in New Zealand and Australia, that have embraced aspects of Modern Learning Environments (MLEs), to critique their experiences and outcomes; and to speak to various colleagues in the education sector on this topic. The ultimate purpose was to be able to draw together some conclusions and recommendations that are specific to Cashmere High School for the next five to 20 years.

Methodology:

The literature on Modern Learning Environments (MLEs) is growing substantially, reflecting the increasing interest and emphasis it is gaining in the education sector. I gathered a wide range of reading material which related to this topic from academic literature, published books, and through the internet. It was more challenging sourcing material and studies on the effectiveness of MLEs, while general commentaries on the state of schooling and advocates of new educational ideas are very common. Through reading this literature and research studies, I sought to better inform my own understanding and ultimately judgements around the effectiveness of MLEs.

Visiting schools is always important, in order to see the theory in practice. For the purpose of this report, I visited secondary schools which have all embraced Modern Learning Environments in some form – some as complete newly built schools and others with substantial redevelopments. The secondary schools I visited included seven in Auckland, four in Melbourne and one in Sydney. Here in Christchurch I visited three secondary schools and four primary schools. I am very grateful to all these schools who kindly made their facilities, staff and time available for me. Across all of these schools it was easy to engage in discussions around new pedagogical practices and gaining their rationale for why their school had adopted aspects of Modern Learning Environments. Tours of their facilities and watching students in action were easily arranged and valuable opportunities. However, it was frequently difficult to get any specific data from the schools on what difference the new Modern Learning Environments were making for student learning and achievement. About half of the schools only provided verbal summaries of their results, some debated the value or need of such data, while most preferred to talk in broad terms about how it was making a difference to developing attributes and engagement with learning. As a result, for New Zealand schools I found it useful to access data from other sources like the websites of the Ministry's *Education Counts* and Education Review Office.

The various meetings and conversations I arranged with people in the education sector provided valuable time for me to share, debate and evaluate ideas and information I was obtaining and reflecting on. I appreciated how these meetings helped direct me to new sources of information, as well as new ideas to consider. Time for such professional dialogues are unfortunately so rare in our busy daily lives within schools.

Executive Summary:

The following key findings were developed out of my investigations:

- Over recent decades New Zealand has responded positively to changing educational trends and needs to shift schooling practice – such as our less prescriptive 2007 national curriculum (NZC), flexible NCEA qualification system, and digital technology developments (e.g. Tela laptop scheme and SNUP).
- The origins of Modern Learning Environments (MLEs) comes from Ministry of Education Property planning – aiming to meet new design and quality standards (DQLS). The MLE term is uniquely a New Zealand label, in Australia they refer to this educational pedagogy and environments as ‘21st Century Learning’.
- In understanding a whole schooling system, teaching pedagogy must continue to shift in response to future learning needs of students (e.g. blending in use of digital technologies, using authentic and relevant contexts and greater use of student ‘voice’). In other words none of these aspects can be viewed in isolation – they are all linked/interrelated.
- MLE’s key features include spaces with greater flexibility, more openness and access to resources (especially digital technology). Complimenting these new spaces, is a MLE mindset towards teaching practice – based around more active student involvement, a focus on collaboration and emphasis on inquiry learning approaches.
- Research studies consistently show that improvements in quality of physical spaces (e.g. sound, temperature, light) clearly improves educational outcomes. However, there is no consistent evidence that the use of open learning spaces make any positive difference to student achievement.
- Digital technologies have become an integral part of modern living, with youth expecting to be digitally connected “anytime and anywhere”. Research shows positive outcomes with effective use of digital technologies in student achievement as well as engagement. However, such technology must be used appropriately (e.g. how and when), with supportive teaching practices, and mindful of managing negative issues (e.g. shallow learning and dependence).
- Despite new labels like “digital natives” there is no evidence this generation of students learn any differently to other generations, and that proven traditional teaching practices are still effective pedagogy (e.g. direct instruction). It is critical one set of pedagogy is not simply

abandoned in favour of the new based around ideological arguments of what a '21st Century Learner' may potentially benefit from.

- The influence of digital technologies and new teaching practices on literacy development can show mixed results from studies in schools. The critical issue is how the digital technology is used by teachers, as a tool to support learning. There are very positive effects when used appropriately, however it can be detrimental if poorly managed or understood. The technology does not replace the need for quality of instruction and good teacher practices (e.g. scaffolding writing tasks). Without good teaching practice the technology can create shallow learning (e.g. levels of comprehension) and a deterioration of writing skills.
- As Hattie (2009) confirmed, quality teaching has much greater effect on student learning and achievement than other factors, such as school structures or class size. However, research confirms there are more effective student-teacher ratios (e.g. around 16-26). Combined open learning spaces associated with MLEs create concerns around increasing student numbers per teacher.
- Timetables are often perceived as restrictive and MLE advocates push towards less structures and controls (i.e. more self-management). Longer timetabled periods support MLE practices, and can show broader benefits. Research reveals concerns around how much autonomy for students is really effective for 'independent' learning (e.g. distractions and natural tendencies to avoid or minimise), therefore supportive structures for students are necessary (e.g. clear frameworks and close monitoring/mentoring).
- Strategies such as integrated curriculum do not show any real benefit in secondary schools, other than philosophical ideas around fostering greater collaboration or showing cross curricular links. 'Discovery learning' or 'learning style' programmes are not well supported by research evidence, but based upon ideological perspectives.
- Convincing the wider public of the merits of MLEs is yet to be achieved, with common concerns identified around excessive noise levels and distractions, and a perception MLE is just an 'alternative' pathway.
- A critical issue still to be addressed is around what and how we assess/measure and report educational outcomes – as formal assessment influences what the community values and therefore how we teach (e.g. recall of knowledge as opposed to competencies).

Background:

Over the last few decades with the rise of globalisation, growth of digital technology and a new 'knowledge economy' there has been increasing criticism of the relevance of our education system. There is a common claim that our schooling system is based on an industrial model, no longer relevant for modern times. Neil Postman (1995) describes an educational crisis with schools' inability to be effective for contemporary students in his book *The End of Education*, while Guy Claxton's (2008) book, *What's the Point of School?* laments how schools today are doing more harm than good with their emphasis on regurgitated knowledge and stressful exams. While both Robert Kiyosaki's (1992) best-selling book, *If you want to be Rich and Happy don't go to school* and more recently Yong Zhao's (2012) book, *World Class Learners* don't see schools educating the creative thinking and entrepreneurial mindset needed for the modern global future. Highly esteemed Canadian educationalist Michael Fullan (2014) condemns schools as "outmoded" with bored students, declining teacher satisfaction and principals increasingly under stress.

In response to these international shifts and concerns in education, the Ministry of Education commissioned a team from NZCER to undertake a research project, to draw together findings on current practice and futures-thinking in education. This report called *Supporting future-oriented learning and teaching - a New Zealand perspective* (Bolstad et al, 2012) outlined emerging principles for future learning, how these are currently expressed in New Zealand educational thinking and practice and what they could look like in future practice. The proposed solution for our besieged schools is the need for a dramatic system shift, which includes changing not only the pedagogy of how schools operate and how they connect with other organisations, but also changing the physical environment that supports learning – with the aim of creating Modern Learning Environments (or MLEs).

Most of New Zealand's school buildings were built in a time when direct instruction with its strong emphasis on memorisation was considered the only pedagogy that resulted in effective learning. Traditional teachers wanted dependent learners. Although this "factory-style learning" where all students learn the same things, at the same time, in lock-step fashion is gradually disappearing from our classes (Osborne, 2013). However, the actual classrooms largely remain as they were originally designed, and so still retain the suggestion of the factory-style learning. As Winston Churchill said: "We shape our buildings, thereafter they shape us".

Traditionally, learning has been an ambiguous term, often used to describe a wide range of cognitive phenomena. Much of what we know about teaching and learning was implicit and tacit (i.e. operated instinctively) and we did not articulate what we did or why we were doing it. Previous attempts to describe 'learning' was like trying to describe some mystical 'shangri-la'. However, over the last twenty years, what we know about learning has increased dramatically. MRI scanning that allows us to see inside the brain as learning occurs, and landmark studies such as John Hattie's *Visible Learning* (2009) mean that we now have a much better idea of how learning occurs.

As a result of these developments and others, we know that quality learning is a combination of the following elements:

- The 'Effective Teaching Profile' developed out of Te Kotahitanga and the research work of Bishop and Merryman (2006), shows learning and achievement improves when teachers put aside deficit thinking and focus on building positive relationships and setting high expectations.
- The teaching effectiveness is determined by the quality of inquiry into the relationship between teacher actions and student learning. Effective teachers inquire (reflect) into what they do (style) and what happens for students (outcomes), and then they take actions in relation to what they do to improve the outcomes for students (Aitken, 2007).
- Differentiated learning (Bloom, 1974) recognises the prior knowledge we all bring to a task, and that individuals require different levels of challenge, pace, content and context.
- Hattie (2009) clearly presents the evidence that teachers who are passionate about making a difference are more likely to make a difference. Teachers who act as 'activators' and provide quality feedback for students are far more effective than when teachers act as 'facilitators'.
- The four most effective strategies teachers can employ according to Hattie's (2009) effect size analysis are: feedback, instructional quality, direct instruction and remediation/feedback.

The future pathways which schools need to help prepare students for are now far more varied and diverse, requiring schools to make connections with other organisations (e.g. Polytechnics). The employment landscape the youth of today face is vastly different from the one their parents encountered. No more job for life, no more free tertiary study, no more linear career. Currently

over 75% of jobs require training beyond secondary school, students will have several careers in their lifetime, and being tech-savvy is obligatory (Anyan, 2008).

Here in New Zealand our national curriculum document, the New Zealand Curriculum (NZC), was initially introduced in 1992, and was a less prescriptive curriculum, with underlying principles, values and key competencies and a pedagogical focus on teaching as inquiry. It is a framework rather than a detailed plan and schools develop their own curriculum and teaching programmes from it. The traditional education model based around transmission of information was something 'done' to students, rather than something that is interactive and co-constructed. Community input into education is recognised as essential in families/whanau working together with schools to achieve the desired outcomes for students. While growing professional learning communities is vital to share responsibility.

Standards based assessment was formally introduced into our national qualifications with the government's 'Achievement 2001', and then evolved into our National Certificate of Educational Achievement (NCEA) managed by NZQA. NCEA provides a more flexible assessment model to create various qualification pathways for students to pursue their interests. In 2000-01 the NZC was reviewed and then formally revised in 2007, with the NCEA standards then re-aligned to the NZC and these revised standards rolled out from 2011 until 2013. This new National Qualification Framework (NQF) provides the flexibility required to support Modern Learning Environment programmes – supporting greater personalised and differentiated learning (e.g. wider choices and control over timing), the ability to link learning and assessments to authentic contexts (e.g. fieldtrips and experiments), and students to work collaboratively (e.g. assessed group work). By 2020 NZQA plans to have all appropriate qualification assessments being undertaken online "anywhere, anytime".

With digital technology becoming key to education delivery, the government has prioritised schools to receive ultra-fast broadband (e.g. through SNUP) and it is being rolled out across New Zealand. In addition to this commitment all state and state-integrated schools will receive a fully-funded connection to the fibre being rolled out in their area and offered a fully-funded connection to the Network for Learning (N4L) managed network. All schools will have been offered connection by 2016. The *Future-focused learning in connected communities* report (2014), from the Associate Education Minister Nikke Kaye's 21st Century Learning Reference Group, sets out the ten strategic priorities for equipping learners with 21st century skills and digital competencies. Schools, as self-

managing Crown-owned state entities, have already been developing their internal infrastructure (e.g. servers) and provision of ICT hardware (e.g. computers, data projectors) to support this shift towards providing stable and reliable ICT networks, school management systems (SMS) and learning management systems (LMS).

Defining the Modern Learning Environment (MLE):

The Origins of MLE:

The origins in New Zealand of the Modern Learning Environment officially date to 2010 when it was introduced as part of the Ministry of Education's changes to the 10 Year Property Plan (10YPP) process and Five Year Agreement (5YA) funding. The Ministry of Education's (2015a) Property Tool Box website outlines the three government priorities that guide the new changes around 5YA funding to ensure well-managed school property:

- Priority one: Health and safety
- Priority two: Essential infrastructure and projects
- Priority three: Modern learning environments

Schools are required to progressively upgrade their teaching and learning spaces to complete all upgrades by 2020. The first step is to assess school property against the MLE standard using the "MLE school assessment tool". Schools are to upgrade classrooms to the Designing Quality Learning Spaces (DQLS) Standards which includes adequate acoustics, lighting, heating and ventilation. The Ministry website provides MLE questions and answers, examples and further readings which links to some international research on pedagogy and physical spaces. The term 'Modern Learning Environments' is unique to New Zealand, although the same educational concepts and principles are found in Australia's '21st Century Learner' focus.

Establishing a Definition:

To get some form of official definition of Modern Learning Environment, there is a new website by the Ministry of Education (2015b) called Modern Learning Environments, which provides the following...

"A learning environment may be understood to be the complete physical, social and pedagogical context in which learning is intended to occur.

The use of the word modern implies characteristics that are contemporary or ‘fit for purpose in the current time’ – the original Latin being modo, or “just now”. Thus, a modern learning environment is one that reflects and supports what is current in terms of pedagogical practice.

When considered this way, a modern learning environment is one that is capable of evolving and adapting as educational practices evolve and change – thus remaining modern and future focused.

The term MLE is commonly used to refer to school classrooms but may include any designated place of learning such as science laboratories, distance learning contexts, libraries, tutoring centres, teachers’ staffrooms, gymnasiums, and the interaction between these spaces. These might be better referred to as modern learning spaces.”

Ministry of Education, *Modern Learning Environments* (2015b)

Clarification of this Definition:

This new Ministry website emphasises that physical infrastructure is only a small, albeit costly, element of the total education system. This is done with reference to the OECD (2013) published report on *Innovative Learning Environments*, and another representation of the total system with the *Educational Positioning System* (EPS) developed by Core Education and Dr Julia Aitken. The website aim appears to be to show examples of MLE to assist schools to understand these new methods and keep up with the pace of change throughout the world. This website does stress the importance *“to constantly remember that the spaces exist to support an educational purpose. Good spaces, enable, but do not guarantee, good educational outcomes. Poor spaces will adversely impact educational outcomes.”* (Ministry of Education, 2015b).

As a generalisation, learning spaces have traditionally been built to respond to an approach to teaching that saw a teacher with a designated class teaching from the front of the room. A number of these individual spaces were served by a central corridor. This works well for class/workshop type instruction but lacks adaptability for use for other learning settings. It also results in large, dedicated circulation spaces (i.e. corridors) which might otherwise be incorporated into more space for learning. The following diagram illustrates the traditional spatial typology (on the left) and three examples of more adaptable spaces more suitable for MLE (on the right).



Traditional school plan
separate box shaped
classrooms opening
off long corridors



Large, open
undifferentiated
space



Classroom spaces
linked to shared
communal space



Multi-option space
made up of many
diverse, discrete but
connected spaces

The following diagram illustrates how physical environments could be designed to accommodate a variety of spaces required for different types of learning situations.

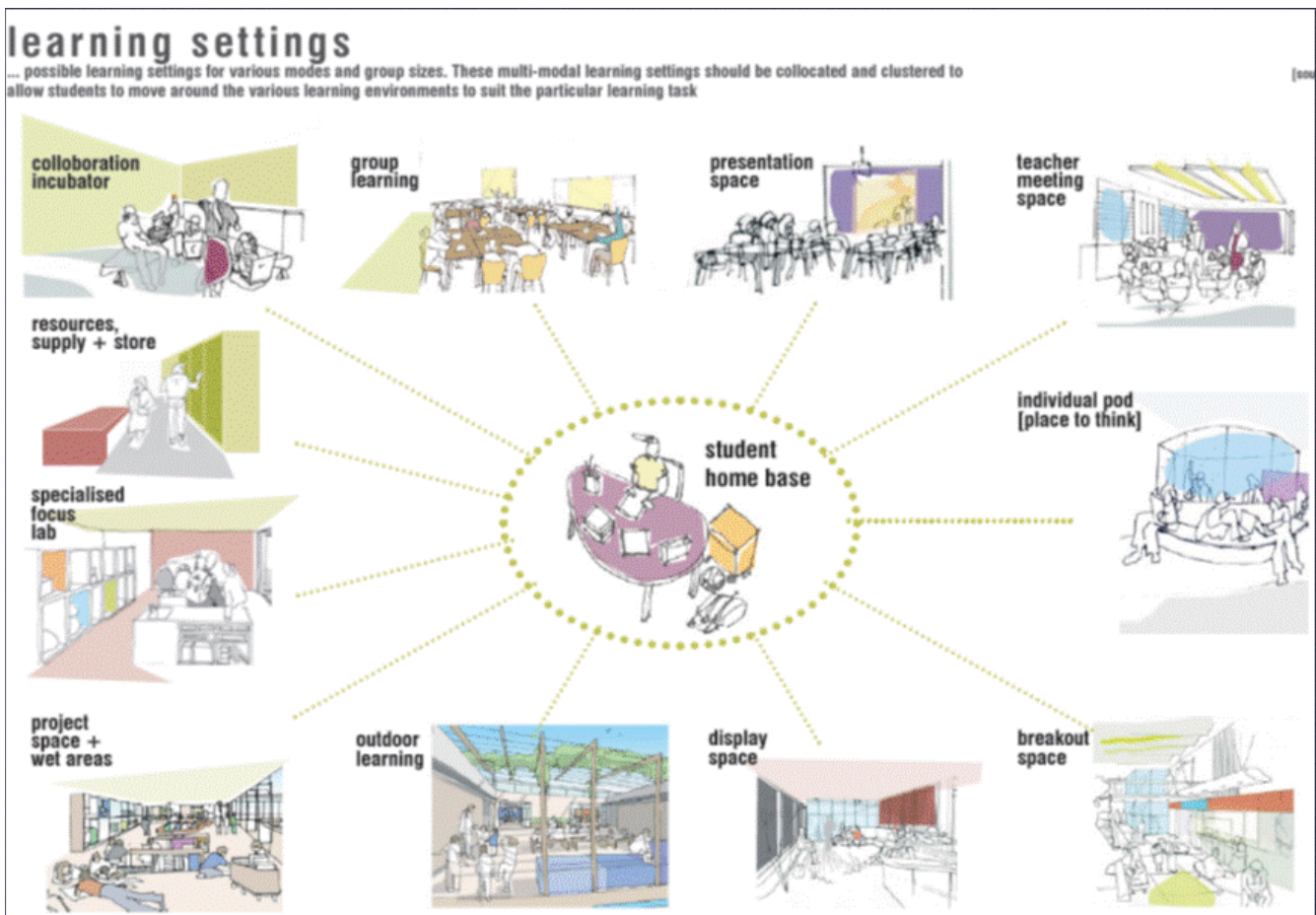


Image from: <http://mlenviron.blogspot.co.nz/>

Key MLE features:

Osborne (2013) argues that Modern Learning Environments better align with what we know about the brain and student learning, can facilitate traditional pedagogies such as direct instruction if needed, but typically offer students and teachers much more:

- **Flexibility:** the ability to combine two classes into one for team-teaching, split a class into small groups and spread them over a wider area or combine different classes studying complementary learning areas.
- **Openness:** modern learning environments traditionally have fewer walls, more glass and often use the idea of a learning common (or hub) which is a central teaching and learning space that can be shared by several classes. They provide opportunities to observe and learn from the teaching of others and be observed in return. They also provide access to what students in other learning areas and level are learning, so that teaching and learning can be complemented and enhanced.
- **Access to resources (including technology):** typically a learning common is surrounded by breakout spaces allowing a range of different activities, such as reading, group work, project space, wet areas, reflection, and presentation. There is often a mixture of wireless and wired technology offering access as and when students need it, within the flow of their learning.

These three laudable key features of MLE, as outlined by Osborne (2013), seem to have been embraced and are increasingly evident in primary and intermediate schools. However, with limited government funding and limited floor space areas for schools taking on board these features, compromises must be made. Classrooms are effectively turned into open learning spaces with combined classes to allow for the desired flexibility. Multi-spaces are very appealing for teaching, but not when the compromise is that these spaces have to then be shared with three or four teachers and over a hundred students.

The important role of Digital Technologies:

Learning for the 21st Century is intrinsically linked to the use of digital technologies. For MLE schools digital technology is an integral part of their programmes, although arguably no more so than more 'mainstream' schools. Integrating the use of digital technology in schools is strongly supported by the Ministry of Education, with their visionary theme: "*Learning without limits*" and stated intent of

having e-learning to help enable students to learn “anywhere and anytime” and in ways that suit individual skills/interests/needs (Ministry of Education, 2015c). Digital devices and internet connections are resources that have the capacity to transform teaching and learning. It will not be possible for teachers to simply integrate the use of digital technology into their traditional pedagogy and programmes. Providing students with access to digital devices will open up learning pathways and enable students to take more control as independent learners.

Across almost every type of school there is generally widespread acceptance and adoption (to varying levels) of blending in the use of digital technologies into teaching and learning programmes. School administrations are run largely on computer networks (SMS), and teaching programmes are being gradually developed on LMS. Increasingly schools are requiring parents to have children ‘Bring Your Own Devices’ (BYODs) to school, partially so schools don’t have to fund all the computer hardware increasingly being needed for classroom activities. However, there are still some traditional schools opposed to students having BYODs in schools – such as one Auckland Headmaster who recently publically called such devices ‘Bring Your Own *Distractions*’.

The use of digital technology and devices supports the pedagogical approach of MLEs, and these tools will be the greatest factor in shifting ‘mainstream’ teaching practice closer towards MLE pedagogy. This is because students are able to be more autonomous learners, and teachers become the facilitator rather than the instructor. The technology reduces a teacher’s ability to control and determine the pace and access to learning. There is also a shift to learning skills rather than simply acquiring knowledge. Teachers are increasing allowing social media tools like Facebook and Twitter to be used within lessons, such as forums for students to share and debate ideas. The advocates of the use of this technology argue it engages students more in learning, making it more relevant and meaningful for their generation. Used correctly as a tool to enhance learning, digital technologies provide potentially powerful multi-media opportunities to improve educational outcomes. However, the alternative arguments over the use of such technology and the evidence of the impact on student achievement will be outlined in the following sections of this report.

My observations on some key features of MLEs:

- *The designs and physical environments:* I personally struggled with some of the brand new MLE schools with their single block design. The schools appeared unusual for here in New Zealand, and seemed like they would be more at home in North America. The fully

contained buildings provided excellent control over entry and exit (ideal for any lock-down situation) and despite plenty of windows there was often limited access or options to be outside. The large internal open planned areas certainly appeared cheaper in their construction costs, with steel and concrete stairwells and ceilings with exposed cabling and pipes as part of a minimalist industrial design. I could understand why some cynics of MLE schools have nicknamed such schools as “carpeted barns”. While the buildings are new and include vibrant colours, I was left feeling concerned over how well these buildings and their infrastructure will wear and age over time. Overall they gave me a feeling of being confined in an institution as opposed to the traditional schools where staff and students walk freely outside between rooms.

- *The de-privatization of teaching:* This is strongly supported by Fullan (2008), who argues in favour of making teaching transparent, creating a more supportive and collegial environment, where it is normal for all teachers to observe and be observed in order to improve practice, and to encourage collaborative practice (e.g. planning, shared teaching). The open learning spaces certainly provides the physical environment to achieve these goals. It will expose poor teaching practice and create more opportunities for collaboration which should build greater capacity amongst the teachers. Although, research studies (Hattie, 2009) show such ‘team teaching’ approaches have little to no positive effect on student achievement. In most MLE schools this de-privatization extends to the work spaces for teachers, with open planned work areas. Traditionally teachers were keen to protect their classroom autonomy and aspire to get their own private office.
- *Modern workplace trends:* There is an increasing employment trend in large cities, as Knight (2015) outlines, for office work spaces to get smaller and be open plan – especially in the public service. The average size of work stations are decreasing, and this is driven by cost cutting measures. Although the claim of these “contemporary workspace designs” is that they promote “modern ways of working” (Knight, 2015). This means the shared spaces aim to foster interactions between staff, sharing practice and ideas, and reducing confined and isolating spaces. Knight (2015) reveals that the pros and cons of such modern work spaces are very debatable – with negative claims around noise levels, spreading illness, lack of ownership in keeping spaces clean, and staff feeling overwhelmed with increased stress by the constant interruptions and distractions. Businesses justify the spaces around cost savings and that they are meeting Generation X and Y apparent expectations around

wanting more social opportunities in workplaces. So it seems these open and shared work space environments will continue to be common place across businesses for many years to come.

- *Safer learning spaces:* The open learning spaces claim to create safer environments for students. Certainly any form of bullying or unacceptable social behaviour is more likely to be identified and dealt with. It would take a very confident young person to misbehave and disrupt learning in these open learning spaces with three teachers present and at least 75 students. However, the larger spaces can create more distractions, such as when I observed one class discussion on sexual health which clearly got the attention of the other two classes sharing the large open space. One school I visited installed retractable glass walls to divide up their open learning space due to issues with noise, distractions and parental complaints. The high noise levels in open spaces is continuous – and arguably could become a work place health issue. The ability of students to move into break-out spaces or even corners of open spaces provides plenty of opportunity for students to be unsupervised and get themselves off-task and disengaged with their learning activity. The lack of display space for student work in open spaces is recognised as an issue, as is the lack of ownership of shared spaces with teachers not always taking the responsibility for keeping areas looking attractive and tidy.
- *Telling your school story:* An impressive feature I appreciated with some schools redevelopment of existing property was around their inclusion of aspects of their school's history and values into the design. This included artistic features added into paved walkways, and embedded in structural walls on buildings. The buildings were able to help 'tell a story' and contribute to the culture and heritage of the school. However, such 'extra' designs costs can often be outside the Ministry's allocated budgets and require additional financial contributions from the schools locally raised funds.
- *Schools within schools:* Another positive feature I saw in action across several schools I visited was the 'schools within schools' (SWiS) model, with students based in vertical House structures (usually referred to in New Zealand as whanau groups). These schools were consistent in their overall structures with around 300 students per House, allocated staff leaders, strong colours/symbols for each House and dedicated spaces. These provided very effective ways of creating a strong sense of belonging within the school, practical shared spaces and genuine team teaching groupings. These schools were all purpose built or had

been rebuilt, to provide the physical buildings required to achieve this model. This model is dependent on having House (whanau) groupings physically based in buildings. Without this physical school design this model would be very difficult to effectively implement. Both the New Zealand and Australian schools commented that this model would not be replicated in future as they are more expensive to design and build.

MLE vs MLP – the pedagogical focus:

There is a growing emphasis on talking about Modern Learning Pedagogies (MLPs), as opposed to 'Environments', due to concerns MLE is too heavily focused on physical environments and not addressing the shifts that need to be made in teaching pedagogies. However, for the purpose of my sabbatical research I will continue to use the term Modern Learning Environments (MLEs), and will continue to integrate the pedagogical discussions into the features or aspects of MLE.

The quality of teaching matters more to students learning than anything else about the school. Hattie (2009) identified what makes the biggest difference for student achievement is the quality of feedback teachers give their students and the quality of feedback they coax out of those same students about what they learnt. Traditionally people thought good teachers were the ones who get up there and explained things really well, but the essence of their enormously important job is to provide the opportunities for students to think, and understand how they learn themselves.

On the Virtual Learning Network (2014) open discussion forum it is outlined "that MLE is a change in mindset, and a change into a much more meaningful educational pedagogy that engage pupils and teachers more." The real benefit of MLE is seen to be "around developing the [NZC] Key Competencies, especially in Managing Self". It is not just about changing the environment, but "so much of it comes down to how the environment is used." The MLE approach seeks to give teachers more opportunities to use pedagogies that "make a difference".

I sincerely believe all teachers seek to make a positive difference for students and their learning, the issue is what type of difference you are aiming to achieve. In other words what is your educational purpose. This is where teaching pedagogy can become heavily influenced by your values and philosophy. Schools must be able to articulate what priorities drive their practice. For example which of the following outcomes are their greatest priorities: helping students achieve their national qualifications, developing the NZC key competencies, fostering particular values, sharing a passion for a specific curriculum area, or developing a love of learning. With limited time

and resources where schools choose to place their emphasis will shape their vision, educational philosophy and therefore their teaching pedagogies. The MLE pedagogies are driven by a philosophy that supports fostering independent learners, who are active in decision making, and learn through collaboration and making connections across learning areas. Teachers are facilitators in this process to help guide and support the students in their personalised learning journey.

What evidence is there that Modern Learning Environments (MLEs) make a difference to student learning and achievement ?

As author Christopher Hitchens once said “*What can be asserted without proof can be dismissed without proof*”. The following section seeks to openly explore the available evidence for and against the effectiveness of MLE in making a difference to student learning and achievement.

Do the physical buildings make a difference?

I was very grateful to be provided with copies of five research reports authored by Dr Gabrielle Wall, which were commissioned by the Ministry of Education’s Education Infrastructure Service (EIS) and the Christchurch Schools Rebuild (CSR) programme as an attempt to give some MLE design guidelines to schools and designers. The intention of these reports was very much to look at MLE’s from a property point of view. Therefore, these reports largely focus on meeting property standards (e.g. heating, lighting, acoustics), flexibility and adaptable spaces, use of supporting technology, creative use of furniture, value for money, and demonstrate the value placed on language and culture of priority learners (e.g. cultural visibility).

One of these research reports, particularly relevant to my sabbatical topic, was called *Modern Learning Environments: Impact on student engagement and achievement outcomes* (Wall, 2015). The conclusions Wall (2015) collated from available studies clearly show there are strong links between the inadequate provision of overall facility quality and design features (e.g. lighting, heating, ventilation and acoustics) and low student achievement. There were clear improvements with student achievement when facilities are improved to meet adequate standards. Although one study concluded that achievement decreased during the period of renovation. There was less convincing evidence to show that student performance continues to occur when facilities are improved from adequate to excellent.

Over the last few years, our school has funded a number of property refurbishments and renovations around (e.g. classrooms, library, outside courtyards). Our school's experiences would certainly confirm the research of Wall (2015) that enhancements of poor quality property certainly does have a positive impact on students and staff (e.g. desire to be and work in spaces, improving morale and general wellbeing, and raising pride). Although, as Wall (2015) noted also, it is difficult to try and directly attribute specific student achievement to property improvements alone, when there are often numerous strategies and factors that can contribute. We therefore need to be careful that we are not simply 'captured' by flashy furniture catalogues, such as one I received from a New Zealand company selling "MLE *compliant* furniture". Furniture alone does not contribute to deeper learning. Yet the positive link to enhanced physical environments certainly does contribute to making a real difference to the learning and achievement outcomes. So we need to understand what good learning looks like and ensure our new buildings can best support this.

The findings by Wall (2015) are endorsed by the research work of Barrett, Zhang, Davies and Barrett (2015) from University of Salford, who studied 27 primary schools across the United Kingdom. Barrett et al., (2015), looked at the three factors of naturalness (e.g. light, temperature, air quality), individualisation (i.e. ownership and flexibility) and stimulation (i.e. complexity and colour). Their research concluded that simple changes in classroom design can account for 16 percent of a student's progress over the course of a year. The factor of particular influence was naturalness – accounting for at least half the learning impact. Whole-school factors (e.g. play grounds, size, specialist facilities) had virtually no significant impact on student achievement compared to the quality of the individual classrooms.

The same conclusions as Wall (2015) and Barrett et al. (2015) are evident in an earlier meta-analysis research by Schneider (2002) for the National Clearinghouse for Educational Facilities. This research collated American studies to reveal how 'Do School Facilities affect Academic Outcomes?' Like Wall (2015) and Barrett et al. (2015) this earlier analysis by Schneider (2002) concludes that improving school physical facilities does positively affect student learning. Studies consistently show that spatial configurations, noise, heat, cold, light, and air quality all obviously bear on students' and teachers' ability to perform. Like Wall (2015), Schneider concludes there is no hard evidence to prove that student performance rises when facilities improve well beyond adequate standards.

In the second report by Wall (2015) called *Modern Learning Environments: Open Learning Spaces*, (part of the Ministry commission series of five publications by Wall, 2015), the following relevant conclusions were made:

- There are no consistent findings whether open learning spaces influence student achievement or engagement either negatively or positively. This lack of conclusive empirical evidence is due to the variety of teaching and learning programmes being delivered within open learning spaces.
- Open learning spaces can accommodate a range of different learning activities and groupings, allows flexibility in instruction or learning style, and supports student-centred pedagogies.

John Hattie's *Visible Learning* (2009) meta-analysis of research studies supports the same conclusions as Wall (2015), in that too often classroom architecture may be open but that is no guarantee that the principles of open learning teaching are present. So while MLE open plan education programmes are based on common underlying philosophical assumptions, they can vary widely in their implementation. In terms of overall effect size, Hattie (2009) concluded open classrooms made little or no real difference to student learning outcomes. Studies showed that in traditional classroom structures students performed slightly better in achievement tests, while slightly worse in creativity tests. Open education programmes also showed slightly higher performances with student self-concept and positive attitudes.

Despite the flexible benefits of MLE open learning environments there is growing criticism of these spaces from other sectors of the community. Wellington audiologist Richard Bishop, who specialises in working with children with Auditory Processing Disorder (APD), has commented that modern open learning spaces are "hostile auditory environments" for students (*The Press*, 15th January 2015). He acknowledges that collaborative learning spaces may have their advantages, but are poor listening and working environments. APD sufferers, which could be up to 10 percent of children, in particular have difficulty listening, concentrating and therefore learning in such open spaces. This was supported from one school I visited who acknowledged issues for students with Asperger syndrome (AS) not coping in the MLE open learning spaces.

Learning with Digital Technology:

The integration of digital technologies into schools have been rapidly growing in the last decade. In 2012 a Ministry of Education survey found 25% of schools already had a BYOD policy and most of

these required pupils to have their own devices. The Ministry's "Head of Student Achievement", Rowena Phair, says it is "increasingly important that school leavers have the skills to succeed in the digital age" and with these devices they can "learn anytime and anywhere and connect and collaborate" (Dudding, 2014). The use of digital technologies in teaching and learning is having profound shifts in teaching practices, how students are able to learn, and even how our school environments are physically arranged.

Describing the students as "digital natives" was mentioned on numerous occasions in schools I visited. However, along with this new label came some concerning assumptions that students are changing the way they learn and their brains are making faster cognitive connections. These are myths with no evidence to support such claims. Developing digital skills are critical, but how students learn hasn't changed nor are they better at learning (Hattie & Yates, 2014). Nicolas Carr (2010) outlines his concerns in his book *The Shallows: what the internet is doing to our brains* (a finalist for the 2011 Pulitzer Prize). He concludes that the internet can encourage shallow thinking and learning. Teachers certainly need to be mindful of how such technologies are used in schools if they are going to make a positive difference to learning and achievement. For example, recent British studies (Philp, 2008) identified concerns with this new generation of "digital natives" working less with their hands, revealing deficits in young engineers' skills at conceptualising straightforward mechanical problems. It seems there is too much software and not enough screwdriver (i.e. insufficient practical experiences).

American researcher John Schacter (1999) analysed the largest studies to date on the impact of technology on student achievement, with over 700 empirical research studies. He summarised the negative and positive impacts on student achievement, and acknowledged that the impact of technology on learning is in its infancy. It reports some inconclusive findings and negative impacts, but overall these studies showed positive gains in student achievement. It did stress that achievement was highest when the technology is used to support clear learning objectives, rather than cases when people were putting the technology first and education later.

Our own school trialled e-learning classes in Year 9 and 10 over the last two years, with the students required to use their own BYODs. This involved considerable professional work by the teachers taking these classes to explore how to best integrate digital devices into their programmes and how to change some of their teaching pedagogy. Each year our school conducted surveys, and the feedback from both parents and students in these classes has been overwhelmingly positive

around their engagement and enjoyment in learning and the perceived benefits in achievement. The results of digital technology can look great. For example, devices are highly motivating for reluctant boy readers, some students benefit from the “gamification” of learning because of the instant feedback and reward, and collaboration between home and school that devices enable has been shown to improve learning.

Everything is clearly not all positive on the impact of digital technology on student achievement. The sheer speed of the current rollout and with devices and apps themselves constantly changing all means research often can't keep up – it is as if we are building the plane as we fly it. There are concerns around the addictiveness of the devices, which can make it difficult to get students to learn any other way. A report by New Zealand psychologist Dr Aric Sigman (2014) outlines alarming concerns around the potential growing negative impacts on the increasing amount of screen time children are being exposed to – including physiological changes, medical conditions, sleep disturbances, attention problems and impulsiveness, and developing long-term dependency on technology. The concerns of this New Zealand study are reinforced by research work by the Oxford Internet Institute, whose British study showed “excessive” exposure to digital gaming were significantly more likely to have negative effects such as being hyperactive, getting into fights and switching off at school (Przybylski & Mishkin, 2015).

The need to integrate digital technology in modern teaching and learning is simply an essential requirement for helping to best prepare students for their future. So schools need to focus on ensuring their professional development programmes raise teacher confidence and capabilities in how such tools can most effectively support student learning and achievement. Schools also need to review their school policies, to ensure that teaching practice seeks to make the use of the most appropriate tools to improve student learning and achievement – which should not always be through digital technology (i.e. tools most ‘fit for purpose’).

The influence of MLE on Literacy Development:

In MLE environments students tend to have greater independence around how they learn, and a high level of use of digital technologies. This MLE teaching practice has some significant implications for how literacy skills are developed amongst our students. For example, the new generation of students may be confident users of digital technology, but their “search and seize” approach to reading is perceived to be weakening their reading comprehension levels. Another concern is that the skill of reading and writing is seen as intertwined, with important sequential

development necessary for cognitive development. The fine-motor skills of hand writing is linked to not only the development of writing but also reading development (Spear-Swerling, 2006). Learning to write is believed to be a critical developmental pathway, especially for students with Learning Disabilities (LDS). Being able to write grammatically correct sentences still matters, as illustrated by the University of Auckland increasing its literacy requirements as from 2016 for undergraduates, citing poor English standards among students. A 2010 report commissioned by the Ministry of Education, by Professor Judy Parr, found New Zealand students were underperforming in writing, and in 2014 a third of primary students were not meeting the government's national standards in writing.

A 2013 Norwegian study of 10th grade students found their comprehension of a text was poorer when read off a 15-inch LCD screen than off paper. A 2008 study in the United States showed people reading long text such as a novel found it harder to understand in ebook form than on real paper. While in 2014 American researchers published a study showing university students who took lecture notes on laptops performed worse on conceptual questions than students who took longhand notes (Dudding, 2014). A 2014 study into the impact of the internet on reading behaviour by Dr Val Hooper of Victoria University, revealed concentration, comprehension, absorption and recall rates were all lower when engaged with online material. Hooper concluded the internet is changing how people read – for example people are increasingly reading faster (scanning), being more selectively (skimming) and material is less likely to be remembered.

However in contrast, Massey University undertook research with a Palmerston North primary school to see what difference technological devices made to student learning and achievement – specifically reading comprehension. This revealed technological devices, along with changes to the teachers pedagogical approaches, made a positive difference to student achievement. The technology classes reported significantly better progress in reading comprehension based on the national e-asTTle testing (Poskitt, 2014). Other researchers have also shown that digital devices can lift achievement in schools.

Education comes in waves. There was a philosophical shift when grammar was side-lined as the enemy of free expression, in a backlash against old “chalk and talk” classroom drills. Schools used to teach handwriting and award “pen licences” to children. While we don't want to revert to the past as classrooms of the future embrace the tools of the future such as iPads, video clips, 3D printers, robotics and filmmaking. But everyone needs a level of confidence in their writing and ability to

communicate. The writing contexts must also be authentic and meaningful, in other words be relevant to the modern world the students operate within. It is also no longer enough to simply be reproducers of information as required in the old School Certificate examinations, our future generation must be able to clearly communicate across whatever discipline they study or work in. It is highly likely that this change in how students are assessed using this technology will be realised in the future examination that students will be sitting as part of NCEA as from 2020.

The concern MLE will lead to larger class-sizes:

Despite the endless bickering about whether the benefits of smaller class sizes are “evidence based” it is hard to argue against it, especially with parents. While Hattie (2009) noted studies show little effect on student achievement related to class size, he did confirm what most parents and students already knew, that the quality of the teacher makes the greatest difference. Hattie (2009) did go on to acknowledge that a teacher with fewer students would be able to give each child more attention and feedback. In his international bestselling book *David & Goliath*, Malcolm Gladwell (2013) convincingly presents evidence from research studies that reveal a type of inverted-U curve trend, which illustrates that student achievement declines not only with too many students, but also with too few. That in fact the evidence shows there is an ideal ‘goldilocks’ number of students per teacher that is most effective for improving student achievement. This ideal number is around 16 and 26.

The issue of student ratios to teachers is a hot topic for parents – as the New Zealand National-led Government discovered in 2012 when hostile parental reaction forced a back down on Budget announcements around increasing class sizes. As a result, MLE’s are being cynically perceived by some in the community as the government trying to re-sell larger class sizes as a virtue, with open planned mega-classes supervised by multiple teachers. This view is reinforced with the belief MLEs are simply re-introducing the failed “open learning spaces” of the 1970s and early 1980s. The touted benefit is that around 75 children of varying ages and attainment levels can learn from one another, while three teachers chime in to keep them on-task. With the perception that this open plan model failed in the past, there is a real concern from some that it is only being reintroduced again now as an economic saving related to reducing staffing levels.

In response to these critical concerns the advocates of MLEs point out that the key reason why the open learning spaces model failed prior to the 1990s was the difference in our national curriculum. Our new New Zealand Curriculum (NZC) is less prescriptive and focused on more inquiry-based

teaching practice necessary to make any open learning spaces operate effectively. There is also now more awareness of the skills and attributes (e.g. NZC Key Competencies) our students need for the modern world and these are more conducive to being taught in a MLE. However, a negative perception remains in the wider community, that MLEs are a pathway to increasing student to teacher ratios.

MLE effect of timetable structures in schools:

A common practice in MLE schools is having fewer but longer timetabled periods of learning. This provides more time for practical work, and for students to engage in their own inquiry based studies. The advantages of longer lesson times (e.g. 100 minutes) is supported by research from Rosemary Hipkins (NZCER) and Lynda Shanks (Ministry of Education), and include the following key points:

- Less pressure, less rush, fewer transitions and lower stress for teachers and students.
- More time for in-depth learning and thinking, and using a greater diversity of learning activities.
- There is more time for student-teacher interactions, develop better relationships, opportunities for personal assistance, and less chance of learners slipping ‘under the radar’.
- Teachers have longer blocks for preparation, to think and plan lessons to teach higher order concepts. This will force changes in pedagogy, as teachers will not be able to deliver long boring lectures for the duration of a lesson, and so include a greater variety of activities.
- More opportunity for students to see the point of learning rather than just cover material. Shorter lessons force teachers solely into direct instructional practices to cover the content.
- For practical work (e.g. experiments) there is time to do the task, write it up, review and reflect in one lesson. There is also more time for use of digital technologies, and opportunity for including off-site trips or activities.
- It allows for greater inclusion of student voice, sharing ownership of teaching/learning with students

However, if students miss a lesson they can miss half the learning time for that week. Longer lessons also require greater self-control, as mental tiredness for people kicks in after about 10-15 minutes. High achievers have often developed the capacity to maintain focus and self-control to keep on task, although low achievers have not (Hattie & Yates, 2014). The ability to cut out

distractions is critical. However, when students are provided with greater independence and access to digital technologies, avoiding the distractions of social and multi-media can be a significant challenge for some people. The MLE schools generally have a more open philosophy and approach with internet access for students (i.e. few filtered restrictions). Teachers I spoke to in MLE schools said these were lifelong self-managing skills their students needed to self-develop, acknowledging there was less teacher 'policing' of this compared to more traditional schools.

There is the contrasting view that timetabled lessons should be shorter, not longer. This aims to reduce downtime in lessons, and ensure teachers and students maximise their allocated time. Shorter, sharper, more frequent and more focused lessons – to maximise learning. Advantages of shorter lessons of around 35 minutes are advocated by Heather (2014) and others, and include:

- When you see your classes more frequently in a week teachers have many more opportunities to recap and revisit concepts at spaced intervals (e.g. information that is presented repeatedly over spaced intervals is learned much better than information that is repeated without intervals).
- With short lessons you waste much less time on extraneous activities added to give pupils a breather or buy their flagging attention.
- It is much easier to keep track of missing homework, pin down recalcitrant pupils and feedback promptly when you see students more frequently.
- There is much more unavoidable use of formative assessment as you adjust each lesson in the light of the last (i.e. if a lesson goes badly not so much damage).
- Short lessons create a flexible timetable model. You can create more balanced timetables. It is possible to have doubles for art and technology, and singles for languages and maths.

However, longer lessons require more planning time compared with short lessons, resulting in positive changes to teaching practices. This can be a good thing, because it is more of a challenge to keep students on-task and focused for longer times, and variety must come through changing activities, rather than just moving to a new subject in a new classroom. With shorter lessons teachers can get away with less time planning diverse or interesting lessons, rely solely on direct instruction, and still not maximize the limited time they have with their students.

Integrated or Cross-curricular Learning:

At least half of the MLE schools I visited were either moving towards, or had already implemented an integrated curriculum model. As typically explained to me, they were seeking to break down the subject silos and foster greater collaborative practice between teachers. Internet searches reveal strong support for teachers using integrated curricular approaches, especially utilising digital technology. I had explained to me at these schools I visited that students enjoyed the integrated teaching approach more, and gained more from it. I could see how it required greater collaboration amongst teachers and could lead to some engaging activities.

My investigations into this aspect of MLE revealed that integrated curricular seems to be a very philosophical approach. Although I did see and appreciate some effective teaching practice using cross-curricular learning in some primary school settings. However, I believe there can tend to be a greater emphasis on one curriculum over another (e.g. distinct lack of science substance in many cross-curricular activities). Research studies also show that this cross-curricular approach (e.g. thematic instruction) were more successful in primary and middle schools, but had a very low (if any) effect in secondary schools (Hattie, 2009). Integrated curriculum teaching can miss teaching certain dispositions required for specific subjects, and fail to provide the specialist knowledge students need to get the depth of learning and higher achievement in the senior curriculum. Students require specialist instruction in senior secondary (especially at Year 12 and 13), and an integrated curriculum approach would seriously ‘water-down’ the depth of learning, especially if the teachers are generalists. I believe that the limited time and resources would be much better spent in a large secondary school context fostering greater teacher collaboration *within* faculties and learning areas rather than across them.

The debate on can students’ learning actually be measured ?:

Most MLE advocates appear to endorse the idea that to put a number against a child’s ability is flawed and dangerous. It is argued that labelling children by ability leaves some trapped by low expectations. As a result, MLE schools seem less inclined to be driven by achievement data, nor inclined to offer testing programmes such as the International Competitions and Assessments for Schools (ICAS) standardised assessments offered through the University of South Wales, or the international qualifications offered through the Cambridge International Examinations (CIE) or the International Baccalaureate (IB). On the Virtual Learning Network (2014) discussion forum it is argued that “teachers in MLEs work to develop skills that are not easily measured, such as

discovery areas to develop curiosity, or withdrawal spaces to promote reflection, or individual study spaces to develop self-reliance and motivation.” It is claimed that traditional classroom environments do not provide the opportunities for this same diverse range of learning opportunities, nor the appropriate teaching pedagogy to support it.

This view is further reinforced by New Zealand educationalist Derek Wenmoth, who curates a page on “scoop.it” focused on modern learning practices. He says “the use of standardized measures to label learners is a vexed issue and often works against the principles of modern learning practice”. In a linked article (from *The Guardian*) about a UK school who is not using such assessments, Wenmoth shows “what can be achieved when you have the courage to ‘buck the trend’ and implement an approach that is aligned with your beliefs and values.” This illustrates the philosophical divide that exists between the idealistic MLE supporters and the traditional practitioners who prefer their practice to be informed by measurable outcomes (i.e. standardised assessments). An example of this was apparent at one of the new MLE schools in Auckland I visited. They are not providing the Level 1 NCEA qualification for their students – in preference for their own programme of learning modules (Amos, 2015).

My personal concern here is around how some MLE advocates seek to measure or account for their intended educational outcomes. Parents are expected to trust that the teaching professionals know best, even though they are reluctant to provide assessment data on their students. My experiences confirm that parents will generally act very conservatively over decisions on what they perceive will be best for their children. So they will be reluctant to simply accept new teaching practices espousing development of 21st century skills without easily understood evidence of progress and achievement.

In our increasingly complex and competitive modern world there has never been such strong appreciation for the importance of formal education, not only to prepare and equip our young people for their future but also open up perceived opportunities (e.g. higher education) for a more secure and ‘better’ lifestyle (e.g. higher income and standard of living). This is why I would argue that, despite strong opposition from most primary and intermediate teachers, the National-led Government gained the majority support of voting parents to successfully introduce our national standards (literacy and numeracy standards for Year 7 and 8 students). The main reason why so many of our schools offer international qualifications and standardised testing programmes is due to their need to fiercely compete for student enrolments. Put simply, parents typically want to

know how well their students are doing, and standardised testing provides a much more credible and valid measure of educational outcomes.

In terms of evidence based outcomes of the full MLE schools I have visited (e.g. who have embraced open learning environments), they are still to reach their projected rolls, despite the rapid growth of the city's population and demand for schooling. The more traditional schooling models are still attracting much higher numbers of student enrolments, and generally boasting much higher academic achievement rates. My examination of MLE school's NCEA pass rates across Levels 1-3 (on NZQA website) and School Leavers achievement data (on Education Counts website) reveal that their achievement trends are generally below their decile school comparisons.

Critique of other issues around Modern Learning Environments (MLEs):

Chronological Snobbery:

When visiting a school who passionately promoted the MLE approach I was concerned about the manner of the response when I asked about homework. I was told, in a very forthright manner, they had moved beyond such traditional and boring activities of the past. While I acknowledged that the effectiveness of homework is very dependent on what and how it is set, Hattie (2009) revealed for secondary schools it has a very positive effect on assisting student achievement – especially in maths and science. I was concerned with the manner in which such evidence was brushed aside, leaving me wondering if the new education approach is commonly being grasped and applied so uncritically.

Being perceived to be defending the traditional practices is not a trendy or popular thing to do. One can quickly begin to be made to feel that you are out-of-touch, or an obstacle to school improvement. In trying to engage in critical discussions and debate on this topic, I did on a number of occasions experience how people can be made to feel like they are unfit for their positions if they don't believe what everyone appears to believe – just as the old tale *The Emperor's New Clothes* by Hans Christian Anderson beautifully illustrated. C.S. Lewis also brought up the point in his writings that people of the modern age can struggle with a 'chronological snobbery' – assumptions that modern ideas and trends are better than those of the past, and therefore new ideas can tend to be easily accepted without critical thinking.

Myths and assumptions on effective learning and achievement:

I have developed major concerns about common assumptions made within the MLE educational approach around assuming all students intrinsic desire to learn, ability to work hard and ability to set their own learning programmes. John Hattie and cognitive psychologist Greg Yates new book, *Visible Learning and Science of How we Learn* (2014), outlines that children aren't born to learn in ways we want them to. Our brain is primarily a social machine and learns by watching, imitating and interacting. We try to avoid thinking, such as solving problems by using our memories. Learning proceeds quickly when it builds upon what is already secured. Learning is a grind, so no surprises some who struggle can give up quickly, especially when they compare themselves to others. Hattie and Yates (2014) advocate for more focus on automaticity – knowledge that you can build up through more traditional forms of learning like rote learning (e.g. timetables). New approaches, such as the Numeracy Project, which focus too soon on “why” questions and fail many students who have not yet gained the basic knowledge (Hattie & Yates, 2014). This criticism has been endorsed by a research report by the New Zealand Initiative (Patterson, 2015), which strongly condemned the Numeracy Project approach for moving teaching too far from rote learning and basic facts. This provides a cautionary example of how the best of intentions can cause more harm than good in education. Any traditional repetitive ‘drill-and-repeat’ type of activities are usually shunned under MLE. The importance of traditional hard work and repetitive practice to achieve success is emphasized by Malcom Gladwell’s popular book *Outliers: The Story of Success*. Gladwell (2008) quantifies this to 10,000 hours as the time needed to put in to achieve excellence in any given field. Gladwell (2008) argues that natural talent won't float effortlessly to the top without the hours of deliberate practising.

Highly regarded American researcher contracted by our Ministry of Education, Benjamin Riley, reinforces the work of Hattie and Yates (2014) when he argues that our brains are not designed for thought but the avoidance of thought – the reason why television can have a greater call than a novel (Jones, 2014). So giving students control of the pace of learning invites them to avoid new and unfamiliar tasks. Students do need to be pushed, which means we should approach claims about learner self-regulating the pace of their learning with extreme caution. I therefore conclude the evidence into how we learn clearly shows that while learning will be more meaningful and engaging when students have more involvement in helping to co-construct it, there still remains a

need for the role of a teacher to help direct and control in order for successful learning and achievement.

The concept of “discovery learning” was evident in MLE schools, including dedicated “discovery learning spaces” as well as the general theory that students should set their own goals and plan out their own learning programmes. However, research analysed by Hattie and Yates (2014) argue that people tend to move to a position of least resistance, setting lower goals and taking more time than required to achieve them. This was reinforced by a 2014 research study by Sutton Trust and Durham University, which showed no improvements in student progress through “discovery learning”, while more traditional styles which did produce improvements in student learning included approaches that reward effort, used class time efficiently and insist on clear rules to manage pupil behaviour (Adams, 2014). Donnelly (2014) also argues the “enthusiasm for discovery learning is not supported by research evidence”.

The role of academic mentors to identify and work with students is a strategy that is increasingly being taken up successfully by schools, especially with at risk students. With well scaffolded support for students around goal setting they can take on ownership of their learning, increase engagement and raise achievement. Most of the MLE schools had some form of personal goal setting that was monitored by a teacher (or “learning facilitator”), and reported that these were a key reason for student engagement and success in their school. This personal mentoring and guidance appears to be very effective in helping to support student learning and raise their achievement.

Amongst the schools I visited, a common comment justifying their MLE programme was that it catered for each person’s unique “learning style”. Hattie and Yates (2014) have disputed many unhelpful myths about learning, such as this popular idea that each of us have a specific “learning style”. While there is valid theory around different learning styles, some frightening assumptions can be made categorising and potentially setting low expectations of students into just one “type” of learning style (e.g. kinaesthetic). This doesn’t dispute the important need for teachers to use a variety of teaching strategies and ‘learning style’ approaches to help keep students engaged and make learning more easily understood.

There appears to be a commonly held belief among many MLE advocates that traditional ‘direct instruction’ is bad and any form of constructivism or co-operative learning is effective for learning. This belief overlooks the research evidence. The results of the meta-analyses presented by Hattie (2009) reveals that “the underlying principles of Direct Instruction place it among the most

successful outcomes for students” (p.205). Direct instruction also proves effective with lower ability groups and special education students. It is particularly effective when teachers make learning intentions and success criteria very clear to students, demonstrate processes with modelling and evaluate the students understanding. Direct instruction can of course be done badly, such as dull and prolonged ‘stand and delivered’ content – hence why it has gained a negative view.

To argue that some teaching and learning strategies are ineffective does not mean that there is only one correct way to teach. Teachers need various strategies. I found some great advice in the work of Anna Sfard (1998) who presented the case for the need for two approaches or teaching models: acquisition learning metaphor (“AM”) and participation metaphor (“PM”). Just as the day is split between morning (AM) and evening (PM), there also needs to be a balance between the learning approaches provided to students. While there is a place for the new process focused, self-directed inquiry based approach (PM) there will always still be the need for imparting of knowledge and skills as done through the more traditional mode of teaching instruction. This framework perhaps offers a more manageable transition from one pedagogical approach of teaching practice to another, with minimal loss of the best of both.

Community engagement in MLE:

Any fundamental shift in teaching practice in our schools must include not only changing the teachers understanding, but also that of the parent community. Parents choose the schools for their children, and are naturally cautious around ‘new’ and untried educational programmes. Parents are familiar with their own schooling experiences, and typically think “they came out alright” so it should be ok for their children. I have certainly detected some significant unrest from parents whose primary schools have launched enthusiastically into removing internal walls and created open planned collaborative teaching spaces. While some of these primary schools acknowledge the withdrawal of students from their school by disgruntled parents, they don’t, or won’t, relate this to their inability to communicate and convince their community of the validity of these changes.

The idea that parents should simply trust teachers as the professionals goes against many of the engagement principles of MLE. Schools principals I have spoken to perceive a push towards making their school a MLE, coming from the Ministry of Education and the educational community (e.g. consultants and academics). However, schools need to ensure that they clearly communicate and bringing on board their parent (and student) communities, so such changes are not only

understood but accepted. Some MLE schools have established very effective regular community evenings to answer questions and open workshops to show the benefits of what they are doing.

Future thinking and focus:

There is a growing industry promoting various ideas on how our schools need to change to meet the perceived future needs of our young people. The vast majority of schools are already broadening their teaching practices, and integrating the appropriate use of digital technologies. It is important the latest innovative thinking and research keeps informing this development. However, with the variety of ideas being espoused it is vital schools reflect and think carefully on what would make real and effective difference to the learning and achievement of their community's students. The following are examples of new initiatives and ideas from credible groups, researchers and advocates, all seeking to ignite debate and change in our 21st century schools:

- The internationally recognized NMC Horizon Report series, established back in 2002, seeks to identify and describe key trends, significant challenges and emerging technologies likely to have a large impact over the coming five years in education around the globe. The sixth volume called *NMC Horizon Report: 2014 K-12 Edition* (Johnson et al, 2014) examines emerging technologies for their potential impact and use in teaching and learning. This report is very positive about the potential of new technologies to engage more with students and make learning more relevant and authentic. The key findings argue the need to rethink the roles of teachers, to act more as guides and mentors for students. How schools work needs to be reviewed, around the organisation of the classroom and timetabling of a school day as learning becomes increasingly fluid and student-centred. The author's believe that increasingly new models of schools will emerge which will challenge formal education.
- The British based "Innovations Unit" is a group seeking to influence public debate to transform the delivery of public services. They have produced some innovative resources including "*10 Ideas for 21st Century Education*" (Hampson et al., 2014), which provides simple and well-presented arguments to think outside of the traditional box around school timetables and structures, make learning more personalised, make greater use of digital technologies (including social networking), and help make the students become their own teachers. Hampson et al. (2014) also emphasise the need to review how and what we assess – as it influences how we teach. A subsequent publication by the same author's called "*10*

Schools for the 21st Century” provide case studies of alternative schools from around the world that model the education they argue is needed for the 21st Century.

- Tom Bennett’s book *Teacher Proof* (2013) is an example of the voices of caution against those advocating 21st century learning and the MLE approaches. Bennett (2013) criticises the new pseudo-science in education, the “voodoo teaching approaches” of discovery learning and learning styles, and the sham of speculative rhetoric around teaching 21st century skills empty of any evidence. He cites research which shows what makes successful schools and teaching is simply: strong educational leadership, emphasis on the acquiring of basic skills, an orderly and secure environment, high expectations of pupil attainment, and frequent assessment of pupil progress.
- There is a new global partnership project called “New Pedagogies for Deep Learning”, based on work by Fullan and Langworthy (2014) on how new pedagogies can create deeper learning for students. This project identifies a “crisis” in public schooling and the need for an alternative model to develop “deep learning” through the development of six skills (or competencies) and “accelerated by technology”. These six skills are: character education, citizenship, communication, critical thinking and problem solving, collaboration and creativity and imagination. A cluster of primary schools in Christchurch along with CORE Education are part of this global project to implement this new model. The six skills in this project are very similar to our New Zealand Curriculum Key Competencies, and many of the strategies seem to be similar to current practice in New Zealand (e.g. blending in digital technology). A strength of this project is in seeking to improve schooling through greater collaboration in sharing and developing good practice.
- The focus on collaboration to improve schooling and learning is a popular idea across countries and amongst academics. Fullan (2014) argues this strongly, claiming principals and schools must step outside of their own school to make schools better. That schools will learn from each other, and as schools get stronger the districts and other schools get stronger. This concept has been embraced with the National-led government’s latest educational policy of Investing in Education Success (IES), which is providing funding for communities of schools to collaborate together to improve learning and student achievement. This is further reinforced by the government’s “Youth Guarantee” programme, which aims to have schools collaborate with other institutions (e.g. Polytechnics, training institutes, community groups) to keep students engaged in education and gain new

pathways to attain their qualifications. This collaboration should also extend to schools working together in student interests (e.g. shared instruction), rather than solely competing against each other. For New Zealand schools this will require a fundamental shift in the traditional competitive model that schools currently operate in, and towards a new collaborative approach. The government's proposed new changes to the Education Act and their Investing in Education (IES) Community of School's policy will seek to provide the conditions for such wider collaboration.

Conclusions for Cashmere High School:

The following recommendations have arisen out of my research and thinking during this sabbatical, and are specific for Cashmere High School as it begins its master planning as part of the Ministry of Education's Educational Renewal programme:

- The school and Board have already identified with the Ministry of Education urgent priority areas for the start of our repair and rebuild programme (brought forward to April 2016). These include the completion of stage 2 of our gymnasiums (to provide adequate toilets and changing facilities), repairing the leaky school hall and learning support building, and repairing damaged underground infrastructure.
- Further redevelopment work will be limited due to funding constraints, so we will need to both repair the existing buildings and also seek to make better use of existing spaces. Teachers and students will benefit from more adaptable/flexible spaces, but not at the expense of reducing current teaching spaces. This means that areas such as corridors should be reviewed to see how they could be redesigned into additional functional learning areas (e.g. break out spaces).
- There is no evidence around improving student outcomes in moving towards open planned learning environments. Open plan teaching is not conducive to specialised curriculum teaching. This approach should not be implemented, based on concerns with noise levels, distractions, class sizes and absence of evidence it has any effect on raising student achievement.

- Further repair and rebuild work must consider integrating into the designs the school's values (COVE) and heritage, to ensure the physical environment accurately reflects the school community. This includes gauging community ideas (e.g. sculptures, story boards).
- The school should seek advice on how the various learning faculties could possibly be more physically centralised together. Creating common and shared work spaces for each faculty would increase the ability for collaborative and supportive practices. Planned staff meeting times needs to also prioritise opportunities for faculties to be able to collaborate together (e.g. planning, analysing data, reviewing and sharing effective practice).
- Greater use of glass, such as classroom walls, would be an effective means of de-privatising teaching practice, fostering more collaborative practices, and support a transparent and open school community. Continued use of our school's organised Learning Walks and frequent lesson observations also supports the de-privatising of teaching.
- Our school needs to implement our BYOD programme across the whole school, requiring all students to have their own devices. This is to help resolve unmanageable demand for computer access and the school using its limited resources on other infrastructure rather than provision of individual hardware. This should also result in the freeing up of some of our dedicated computer rooms for alternative teaching and learning space.
- The school's timetable should be reviewed during 2016, to consider the ideal length of class lessons, structure and best options in using BYODs and our specialists learning spaces. This also needs to consider how the school can more flexibility respond to creating alternative pathways with other external learning organisations (e.g. tertiary institutions).
- An integrated curriculum approach to teaching and learning should not be implemented, as it lacks evidence to prove it would make any real difference to student achievement, and there are too many other more urgent demands on teachers (e.g. BYOD programme).
- In support of our school's vision and mission statement, the teaching of our school's COVE values and NZC Key Competencies need to be more explicit and intentional within classrooms through the teacher planning and practice. This could include scaffolding for students how to self-manage their inquiry project, citizenship values in action within class or group work, or personal excellence in all aspects of their life (e.g. appearance, behaviour, worth ethic).

- The existing classroom spaces need to be inspected and assessed against the Ministry's new DQLS, to ensure they meet these standards (e.g. acoustics, lighting and temperature). This is likely to require some substantial investments to bring rooms up to these standards.
- The use of quality furniture to support learning is an issue that needs to be considered – as students increasingly use BYOD in classrooms. Seats and desks that help support good posture will be essential in future classrooms. Other types of furniture needs to be considered (e.g. beanbags for encouraging individual reading).
- The school should seek strategies to off-set likely additional increases in electricity consumption (e.g. increased digital devices and heatpumps). This includes extending strategies already undertaken by our school's ecoDriver programme (e.g. switch-it-off campaign and LED lighting), as well as other options such as installing solar panels.
- It is critical that 'student voice' is included in helping to develop and review programmes across the school – from whole school physical environments and BYOD through to faculty teaching programmes to individual teacher planning and appraisals. This can be from formal questionnaires, student focus groups and Student Council recommendations, but also as a natural part of the school's usual operations (e.g. classroom feedback, student choice in contexts studied, responsive teacher planning).
- The school should continue to foster strong and meaningful collaborative relationships with other organisations beyond our school to support student learning and achievement. This includes maintaining current practices, such as international language teaching in contributing schools, our school's Music Outreach programme, Gateway opportunities and STAR funded courses. There are further links that could be made with tertiary organisations to support alternative pathways for student achievement (e.g. other models with the CTC Trades Academy).
- The major property rebuild works should be planned and staged over several years to minimise the disruption to the school community. This is to reduce the potential negative impacts on student learning and achievement, as well as harm to wellbeing for staff and students (e.g. managing stress levels). This would also allow for time to keep the school community involved and kept well-informed about developments, and potentially modify ideas in response to developing needs (e.g. BYOD roll out).

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