HOW CAN 20ᵀᴴ CENTURY CLASSROOMS BE MODIFIED TO ACCOMMODATE THE NEEDS OF 21ˢᵀ CENTURY LEARNERS?

Primary Principals' Sabbatical Report

Winston Churchill is reported to have said

> "We shape our buildings and afterwards our buildings shape us".

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Acknowledgements

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I acknowledge the Ministry of Education for making sabbatical leave available to principals. The opportunity to be able to take time out and look in depth at an aspect of our practice, to indulge in uninterrupted reflection and to have a period of refreshment is invaluable.

My last acknowledgement is to the schools I visited, twenty in total. The principals, or in several instances their DP or AP, gave me a large amount of their time in a generous and open manner, taking the opportunity to share what their schools were doing with passion and pride.

Purpose

Like many schools around the country, our school was built in the middle of the last century. It was built to the old Industrial Model, "Factory like efficiency and standardization", a one size fits all approach to produce obedient and hard working citizens. During the last few years we have been modernising our classrooms, a few at a time. Until recently a facelift seemed sufficient; nice new Autex walls, fresh paint, perhaps a teacher's bay carved out of the adjoining cloak bay. Nothing too ambitious. Then in 2008 we ran a series of staff workshops looking at our beliefs about teaching and learning in the 21st century. We asked the following questions;
What does a 21st century learner look like?
What does a 21st century teacher look like?
What does a 21st century *classroom* look like?
While we had a lot of fun with the first two questions, surprisingly it was last question that brought about the most change. The workshop that addressed these questions was just before the end of a term. During the holidays a number of teachers set about changing their classrooms, setting up caves, camp fires and watering holes, throwing out furniture. Obviously the influence of ICTs was also a strong factor, especially the introduction of Interactive Whiteboards. The constraints of outmoded classroom design and the demands of the new technologies created a ferment of discussion and demand. This re-awakened my own personal interest in alternative learning environments, which had been lying somewhat dormant since I ceased being a classroom teacher.

I also felt a strong curiosity about the impact on learning and teaching, of the physical environment. I suspected that a term's sabbatical was not long enough to reach any conclusions about this, and that I would probably reach the end of the 10 weeks with more questions than answers. This has proven to be very accurate and there appears to be very little research about the relationship between physical environment and

learning outcomes.   However I can report back to my school on what I have seen and learnt. My staff can take on board any ideas that fit in with our current circumstances and when we modernize from now on I hope our decisions can be based less on budget and more on pedagogy.

Methodology

My method of collecting information was predominantly to visit schools. I selected schools based on a very unscientific process, mainly because I found it very difficult to find out where innovative alterations or modifications had taken place.
I spent time asking colleagues, contacting everyone I could think of in my existing network, especially if they were located in another part of New Zealand. I rang Ministry Offices and spoke to Network Officers as well as Bruce Sherrin in the MOEs head office who has been instrumental in leading the Learning Studio Project. I also had a long and very fruitful conversation with Michael Deaker who has been contracted to make reports for the MOE website on new schools and school upgrades around New Zealand.
I made a decision to visit a small number of new schools, because they would presumably represent the ultimate in learning environments. I also contacted several schools who have a high reputation for their pedagogical practices and their innovative use of ICTs rather than for any building modifications. This was based on the premise that I might see some interesting classroom layout and furniture adaptations to make learning more effective.
It goes without saying I was also going to soak up anything else I could while visiting schools. In many ways this is what proved to be the most valuable and left me with a strong belief in the value of collegial visits.

From here I set about contacting these schools and making a plan of attack based on geographical clusters and spacing my visits out over the 10 week term.

I also spent the first couple of weeks doing an information search on all related topics online, as well as re-reading a number of texts to support the beliefs that underpin the 21st century model of teaching and learning; Guy Claxton, Mark Treadwell, Daniel Pink and Ken Robinson. It is the *vision* of <u>The New Zealand Curriculum 2007</u> that provides the best possible justification for seeking a better way to design classrooms to produce young people who are "Confident", "Connected", "Actively Involved", "Lifelong Learners".

This research gave me a good sense of the questions that needed to be asked, and while I didn't stick rigidly to these questions, they were always at the back of my mind.

 - ➢ What can be done to modify existing classrooms built to the 20th century industrial model to make them effective 21st century learning environments?
 - ➢ How can other school spaces (libraries, withdrawal rooms etc) also support this 21st century model?
 - ➢ How can classrooms be modified to allow for greater flexibility?
 - ➢ How have ICTs been incorporated into learning environments to maximize their use as learning tools and to support the current pedagogy?
 - ➢ How have ICTs been incorporated across the school? (The rationale behind the BIG picture)

➤ What has been done to increase a teacher's ability to cater for personalized learning, different learning styles and multiple ways of learning?
➤ What consideration has been given to environmental matters?

What are 21st century classrooms expected to deliver?

"A pressing question is whether the traditional school as we know it will even exist in the next 50 years, given the emergence of a media rich learning environment in which learning can occur anytime and anywhere."
> School Design and Student Learning in the 21st Century: A report of findings
> American Architectural Foundation

Let's start with The New Zealand Curriculum document:
In order to be **confident** learners, it is expected they be "motivated, resourceful, enterprising and entrepreneurial."
To be **connected** our learners must be "effective users of communication tools, members of communities, connected to land and environment, international citizens."
Actively involved students are described as "Participants in a wide range of life contexts, contributors to New Zealand – social, cultural, economic, and environmental".
And **Lifelong Learners** are described as "Literate and numerate, critical and creative thinkers, active seekers, users, and creators of knowledge" as well as being "informed decision makers".

It doesn't take much imagination to see the huge constraints a rectangular classroom, crammed with 30 old fashioned lid lifting desks, can impose on the exciting and diverse range of attributes and skills outlined above.

Let's have a brief look at the ideas and theories of some of the "experts".

Prakash Nair and Randall Fielding of Feilding Nair Consulting are recognized internationally for their creative and innovative school design. As well as winning many awards for school architecture, they also publish widely on the subject and present at conferences. They talk of the four major and simultaneous realms of human experience - spatial, psychological, physiological and behavioural. There is a need for all of these four realms to be working well in a successful building. This has considerable implications for classroom design. Nair and Fielding also make some comparisons between the older model of classrooms that they call the "Cells and Bells" (Ford) model, and what schools need in our "conceptual" age. The cells and bells model was based on the idea that schools exist for the "transmission of knowledge". These single rectangular cells were the most efficient from the standpoint of space and provided the adults with the most "control", especially when there were a series of them coming off one corridor. They are not quite as useful when trying to develop competencies such as "Managing Self" and "Relating to Others" and absolutely hopeless for developing the "Thinking" competency. This was exactly the design I saw in many of the older schools around the country. I also saw these schools doing all sorts of innovative things to modify these classrooms.

Nair and Fielding state "Under the new learning paradigm, we are looking at a model where different students (of varying ages) learn different things from different people in different places, in different ways and at different times." They suggest there are 18 learning modalities that a school should provide for -

1. Independent study
2. Peer tutoring
3. Team collaborative work in small and mid-size groups (2 – 6 students)
4. One-on-one learning with the teacher
5. Lecture format with the teacher or outside expert at centre stage
6. Project based learning
7. Technology-based learning with mobile computers
8. Distance Learning
9. Research via the Internet with wireless networking
10. Student presentations
11. Performance and music-based learning
12. Seminar style instruction
13. Community service learning
14. Naturalist learning
15. Social-emotional learning
16. Art based learning
17. Story-telling (floor seating)
18. Hands on learning – learning by building

Their solution to provide for these modalities is to have flexible, multi-functional spaces within the building. They borrow from David Thornburg the four "primordial learning metaphors" of Campfire (a way to learn from experts or storytellers), Watering hole (learning from peers), the Cave (places to learn from yourself) and Life (where you bring it all together and apply it as in the real world).

The last aspect of Nair and Fielding's work I intend examining is their idea that successful school design is dependent on there being a common design vocabulary that safeguards the translation of the school's shared vision into the built form.   I saw this in practice in some of the more successful building upgrades, rebuilds and new schools. It was successful where the school had done a lot of talking and clarifying of their vision before they started, where there had been strong consultation, where the designer had listened well to what the school was saying.

Another expert in the field of school design is Professor Kenn Fisher of Rubida Research. His international reputation in the area of educational architecture is extensive. Kenn Fisher talks about the Net Generation and the "traits" they display which he then links to "learning theory" and then on to "learning space application" and "IT Application" Many of us will be very familiar with some of these ideas as we come to terms with today's "Digital Natives".   I give one example

<u>Net Generation Trait:</u>   Group activity oriented
<u>Learning Theory Principle</u>:   Collaborative, cooperative, supportive
<u>Learning Space Application</u>: Small-group work spaces
<u>IT Application</u>:   IM chat; virtual whiteboards; screen sharing

Kenn Fisher, like Fielding & Nair, also talks about Modalities of learning. His are as follow -

BELONG: The need to belong; a sense of ownership; familiarity and security; a space
           that facilitates routine
RETREAT: The need for privacy & when privacy is needed; the ability to escape;

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Behaviour management
EXPLORE: To experience independence; to discover a sense of self; to build
relationships
SHARE: To feel validated by families and the wider community; to appreciate diversity;
To contribute

He takes this further and shows these modalities as apportioned differently at each age group, making the learning space needs slightly different for each age group. Eg: in the first two years at primary school, children have a greater need to "share" and "belong" than they do to "retreat" and "explore". However by Years 5 & 6 the need to "belong" and "share" is less and the need to "explore" and retreat" has increased significantly. Kenn Fisher advocates different learning settings for different modalities and group sizes: student home base; group learning area; presentation space; project space and wet area; display space; breakout space; individual pod (place to think); collaboration incubator; teacher meeting space; outdoor learning space; specialized focus lab; resources supply + store.

Both the works of *Nair and Fielding* and *Kenn Fisher* come from the specialist architecture for educational design perspective. I set their ideas alongside some better known "future thinkers" in the field of education.

Guy Claxton in his book What's the Point of School? Rediscovering the Heart of Education places some very deep criticism at the feet of schools. He claims that if it is the job of schools to be preparing students for the future, then they are failing. He also claims schools are turning children off education because a lot of what schools deliver is not seen as relevant by students. Claxton compares real life learning and school learning and in doing so says "Real-life learning usually happens in the context of getting something interesting done". He lists the ways people generally learn in real life, and his list fits comfortable alongside both Nair and Fielding's and Kenn Fisher's learning modalities. However they don't fit comfortably at all with the industrial model classroom where the teacher was expected to be the sage on the stage. Guy Claxton has eight qualities of powerful learners: they are *curious*; they have *courage*; they are good at *exploration* and *investigation*; they *experiment*; they have *imagination*; they also have the ability to use *reason* and *discipline*; they have *sociability*; and they are *reflective.* If he is right then we can see the purpose of the flexible and varied spaces mentioned above by our design experts.

Daniel Pink in his book A Whole New Mind: Moving from the Information Age to the Conceptual Age   talks about the different abilities people who want success in the future are going to have to possess. "The future belongs to creators and empathizers, pattern recognizers and meaning makers. These people- artists, inventors, designers, storytellers, caregivers, consolers, big picture thinkers- will reap society's richest rewards and share in its greatest joys." It is hard to imagine these abilities being developed in the Industrial design classroom built for efficiency of transmission of existing knowledge.

Sir Ken Robinson is well known for his work in the field of creativity. He argues a case in his 2001 book Out of our Minds, Learning to be Creative, for the importance of creativity and innovation for a successful future. However he also state "…….there is an insistent mantra that we must raise traditional academic standards. These standards were designed for other times and other purposes. We will not navigate through the

complex environment of the future by peering relentlessly in a rear view mirror." He accuses schools of failing to educate for creativity and innovation because they are still based on an economic model of *industrialism* and an intellectual model of *academicism*. Whist the above is a complex and possibly separate issue, I also reflect on the influence classroom design can have on creativity and innovation.

The last person I refer to in my research is New Zealand's own Mark Treadwell, fast gaining an international audience for his insight into education for the future. Mark Treadwell talks about the move from the book based paradigm to the internet based paradigm and the potential of this internet based paradigm to provide an education that is **AAA -** "**A**nyone can have access to learning at almost **A**nytime and from **A**nywhere".

What I saw

In my travels, I visited 20 schools, 19 Primary Schools and one Area School.
To further classify the schools visited: 3 were completely new schools; one school had been almost completely re-built; one school had a brand new 4 classroom block; one school was located in a multi-story building in a city centre; 2 schools were part of the Learning Studio Pilot programme but were still at the planning stage; several schools had undergone quite extensive classroom and administration upgrades and the other schools had carried out some modernization work, but on a lesser scale. One small rural school had suffered significant roll drop and was using its existing building in an innovative manner. All schools had in common a desire to see the buildings they occupy be as conducive to 21st century learning as possible.

I have attempted to make sense of what I saw in these schools by using a somewhat eclectic mix of ideas from the experts above.

> - How schools are providing for the "campfire", where the expert can occupy centre stage when needed, where the need to belong can be fostered and students can share or present.
> - How schools are catering for the "watering hole", spaces for collaboration and cooperation, to explore and develop relationships, to work in groups and learn to participate and contribute.
> - How schools are providing students with a "cave space" to meet their need for independent learning, somewhere to retreat to for privacy or to reflect, or even escape to should the need arise (I wonder how many classroom conflicts would be prevented if we had more "cave spaces")
> - I have also looked at how teacher's needs are being met in schools, because they must surely have some of the same needs as the students (and a few needs of their own).
> - ICTs must be considered in any analysis of the 21st century classroom.

It is noteworthy that very few classrooms I visited were set up for the old "full frontal teaching" model that the older classrooms were designed for. Almost all classrooms

had a free space where children could gather for a whole class conference or presentation. Often these spaces were softened by sofas, armchairs, cushions and sometimes beanbags. One recent ICT that has impacted on this "campfire" space has been the Interactive Whiteboard. A side-note here is how this technology is not as widespread as expected and the two main reasons given were expense and a fear that IWBs will see teaching methods slip back to more "herd" teaching and less teaching to individual needs. Of the schools visited approximately half had invested in some form of IWB and several were moving very gradually into this technology. One school had one teacher only as a form of trial run, another was trialing a whole syndicate and a couple of schools had IWBs in most classrooms. The other schools fell somewhere in between. The IWB did tend to be positioned at front centre of the "campfire" space. This was often because it was most conducive to technical considerations such as the mounting of the data projector and also the direction sunlight came into the room. One principal made the very thoughtful comment that he would be interested in IWBs and saw their potential but only when they were of a size that didn't dominate the room. My own observation was that when children grew used to their presence they were no longer distracted by the board and were able to work elsewhere in the room on a different task. I saw this in a junior classroom where the teacher was using the IWB with her maths teaching group, while the rest of the class were involved in a variety of different learning activities without so much as a glance at the IWB. I do acknowledge that the introduction of the IWB must be scaffolded very carefully with appropriate pedagogy as well as technical learning

One feature of the new schools that I observed with envy is the common space that is being incorporated into their design. Classrooms in these newer schools tend to be built in pods, with two or more (generally four) classrooms opening onto a common space. One school has called this the village green! These offer greater flexibility because they can be used for many of the learning modalities. They are ideal for the gathering of larger groups for presentation, performance and sharing. They also tended to have the traditional "wet" areas located in these communal spaces, enabling the classroom itself to be a little smaller. These wet areas can be shared (economy) and the associated creative or experimental activity can take place in this area as well. (This time serving as the "watering hole" function). I saw these common areas used for shared libraries (appropriate seating located here) with children from all classes able to come and use them. This was in a junior block where the space was also used for music, for physical activity such as dance, and for small groups to withdraw to for collaborative work. Frequently in these schools there was a strong emphasis on teachers working collaboratively.

The brand new area school I visited had a learning street, onto which the classrooms opened. This presented a wonderful area for many of the learning modalities and provided all-weather common space for the children to use. It was set up with outdoor style furniture and mobile cloak bay trolleys.

The shared spaces in the new schools mentioned above are something that existing schools are not easily able to create. An attempt is being made by eliminating interior cloakrooms and corridors and turning these into withdrawal areas. Lots of schools are doing this, and it is a bit of a turnaround for these cold, dark, inhospitable spaces to suddenly be seen as an asset and an opportunity! Another method of achieving flexibility is by opening up classrooms with big doors onto decks and courtyards. This latter innovation is especially useful where the weather is favourable. Nair and Fielding talk about designing for deliberate integration of indoors and outdoors. This not only provides more flexibility but can also broaden the range of learning experiences. One school in Auckland is putting big deep verandahs along the classroom blocks with big doors so children can spill outside while still getting protection from the sun. However many older schools are restricted in their attempts to integrate inside and outside by barriers such as cloakbays, toilet blocks and inhospitable structures immediately outside classroom.

Discovery1 School in Christchurch hasn't allowed this to deter them with several outside areas where they have play equipment and conduct fitness activities high up above the city streets. I saw other schools overcoming this problem in a variety of ways. Several schools visited have nice intimate courtyards with pleasant gardens in close proximity to classrooms. I saw decking being covered in outdoor carpet to make it a more hospitable surface for children to sit on, and in some schools outdoor furniture was positioned close to classrooms. One really great idea I saw in two schools was an outdoor stage. One was covered in a big shade sail providing a great area for children to perform or make presentations. Several principals talked to me about their plans for future development to increase the indoor / outdoor integration. All of these ideas help create more "watering hole" spaces and allow for a range of Nair and Fielding's learning modalities.

Probably the learning modality that has been least addressed in schools, is that of a space to withdraw to and work independently (The Cave). This has been partly addressed in the withdrawal spaces mentioned above, that can be used by groups or individuals. Schools seemed to have the greatest opportunity for individual learning spaces where they were the least constrained by space and conventional classrooms. A

school in Taupo has a New Entrant classroom in a recycled administration building with multiple spaces. It can accommodate the increasing numbers of both students and teachers. Generally one large room is used as an area for instruction and another room is set up with activities to support the learning. There are lots of nooks and crannies where children can go and work to suit their different needs and task requirements.

This same school has a double classroom opened up to accommodate a Year 7 & 8 class. The luxury of space enables varied individual areas for students to go and work independently. The rural school mentioned earlier in this report, is another learning environment that has capitalised well on the space available to provide flexible and varied spaces for individuals and groups to retreat to. However it was the alternative learning environment of Discovery 1 that appeared to cater for the widest range of learning modalities in the most natural, and closest to "real life" manner of the lot. Different spaces were available for a whole range of purposes and learning styles. Some areas almost resembled conventional classrooms, while others offered the comfort of a living room, or just the ability to perch on a set of steps.

Another way teachers are being innovative in their classrooms is through the use of furniture. One school has equipped classrooms with a number of specially designed carrels. These are for anyone to use when the need arises for independent work. They would no doubt be useful for children who need their own space to retreat to. The use of old armchairs, sofas, cushions and beanbags are common to create comfort and portability. Clever classroom layout in the rectangular "industrial model" classrooms was also seen extensively in the older schools, breaking up large spaces and providing for both "watering hole" and "cave".

Many schools are doing a great job in altering classrooms to provide teachers with their own work space. Of course new schools are able to do this in a manner that is purpose built and well appointed. One school, through the collaborative process, had decided all teachers should have their own lock up cabinet and area to store their professional resources, even though they had shared office areas. The shared office was a deliberate policy of several schools to enhance professional dialogue and give collegial support. Other schools have deliberately built single teacher workspaces and see this as desirable. A word of advice came from a school that has recently undergone major rebuilding, to keep the teacher workspaces close to classrooms. I saw the wisdom of these words in another school where the workspaces were distant from the classrooms so were not being used for this function at all, but were being used for as further withdrawal and resource space. A further luxury in the newer schools, and also evident where administration modernization had taken place, was light, attractive working areas for teachers on Classroom Release Time. These were often adjoining

staffrooms and enabled teachers to work uninterrupted away from classrooms.

Dedicated seminar rooms were seen in some schools although not many. More common were smaller meeting rooms that could be used for board meetings, syndicate meetings and small professional development sessions. One school had transformed an empty classroom into a professional development room with full tea and coffee making facilities. Of course this can only be done where there are spare classroom spaces. A number of principals saw the need for this and commented on the greater quality of professional development when it didn't need to be conducted in the staffroom. Another school in a recent admin addition, had fitted a small seminar or meeting room in the ceiling space provided by a higher pitched roofline. This was both cosy and attractive. In two of the new schools the principal's office had folding doors that opened into a meeting room. I noted the doors of both were open at the time of my visit. New schools have also been well catered for with smaller meeting rooms for parent interviews etc. How much more hospitable than expecting adults to perch on a child's chair to converse with the teacher!

The purpose of this sabbatical was to look at the impact of school design on learning. However it was noted how much more convenient, attractive and welcoming the newer staffrooms are. Also reception areas are being thoughtfully designed with sections of the office counter built for small children as well as adults. Most schools are putting a lot of effort into making their reception areas welcoming and attractive. These areas are also making bold statements about what the school represents. I noted a number of schools have large flat screen monitors in their reception areas with a DVD playing a slide show of recent school events and learning experiences.

One of the developments that is making the greatest impact on classroom design, is the use of ICTs. I have already mentioned IWBs above. It was of particular interest to observe how computers are being accommodated in classrooms and across whole schools. Only eight schools of the 20 visited still have a computer suite. A few of these schools used to have a suite and have dismantled it because of their beliefs about learning and teaching. They based this decision on their belief that computers (especially laptops) should be available as a learning tool AAA. Of course wireless access has made this possible. Schools present a wide range of ideas for providing computer access for their students. 15 schools visited use laptops extensively. Most schools also have some conventional computers in classrooms – how many, varied widely. I saw a range of ideas to make computer stations functional workspaces in the classroom setting. What I loved most was the entirely natural and casual way I saw children using laptops in many schools. I feel sorry for children who are denied the development of this attitude towards ICTs. In the small rural school I visited, children were walking around with laptops, in much the same way as they would with a book and pencil case. Of interest in these schools, well equipped with laptops, was the range of storage options. Security was the consideration as well as mobility where a set of laptops was shared by several classes. For computers such as PCs, the main consideration was setting them up so students had convenient access. Again the variations were many and varied, but

when classrooms have been modernized, having a bay off the classroom where a set of computers can be housed is a popular option. The preference is for these to be in sight range of the teacher, but tucked away for practical reasons. Some of the new schools

had their computers in the common spaces, and it is noteworthy that these schools had glass interior windows and doors onto these spaces.   An interesting count: 8 Apple schools; 12 PC schools! Even more interesting is the passion for their brand displayed by the Apple users!

In my travels I saw many more examples of innovative and clever design solutions to make the learning environments more conducive to the needs of 21st century learners.

I was absolutely green with envy at the stunning architecture of the new schools. No matter what modernisation we do to the 1960s buildings in my own school, it is never going to aesthetically "wow!" anyone. But buildings don't maketh the school. I was just as impressed with how strongly the culture, values and beliefs of the organisation came through in my short visits, regardless of age or architecture. This is partly conveyed by what the school presents visually (many schools "brand" themselves extremely well), partly in the passion of the principal as they showed me around, and significantly it was evident in the learning I saw the children engaged in as I walked though classrooms.

My thanks go to the following 20 New Zealand schools: Mt Pleasant, Waimaire, Discovery 1, Freeville and Fendalton schools in Christchurch; Selwyn Ridge School in Tauranga; Pongakawa School; Mountview, Taupo Primary and Hilltop Schools in Taupo; Papakura Normal, Pt England, Red Beach, Silverdale and Oteha Valley Schools in the wider Auckland area; Mananui School in Taumaranui; Taihape Area School; Peterhead, Mayfair and Frimley Schools in Hastings.

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