# How does teacher pedagogy change through the effective use of technology and what impact does this have on student achievement?

# WHY DO SOME SCHOOLS MAKE IT LOOK SO EASY!

A Practical Leadership tool to assist school leaders to determine what needs to happen within a school to realise the effectiveness of digital learning and what technology types to pursue that fits with their school strategic goals.

# Acknowledgements

I would like to thank those that allowed me the privilege to take part in such a wonderful initiative as the Sabbatical Program. For those that know me, the sabbatical took a few turns that were unplanned, but the opportunity to step back from the intensity of daily school life was something that has made me a better school leader through the perspective that I have gained. In particular i would like to acknowledge and thank;

- My Family for allowing me the freedom to get out and about and both research what others were doing and also relax. They certainly appreciated having me home for dinner each night and noticed the obvious lack of stress I brought to the family.
- BOT of Leamington School - without their support this would not have been possible. They are a great example of a team who have high expectations and allow their people to fly and grow.
- Staff and leadership team - without the support of the team of educators at Leamington School, taking a sabbatical would not be possible. Many had to change their normal school roles to step up to allow me to step back. No one can succeed without others wanting them to, and the team I work with strive to allow everyone to succeed, often at their own personal sacrifice.
- School leaders from the schools I visited - their openness to sharing their journey and thoughts were critical in allowing me to conduct this research and identify patterns that were emerging. While my findings are honest, I did not want to ever appear critical of a school's journey. It is my hope that with these findings, along with the wealth of other educational wisdom / material available to school leaders, we can create the best educational experience for our children.

# Acknowledgements


- School Community - The Leamington Community were extremely supportive in allowing me to get out and step back from school for a time. It was confusing at times when I was still "around" in varying roles, but they (by and large) left me alone, I suppose knowing that upon my return, I would throw myself back into the pursuit of creating a legacy of educational excellence for our community.
- TeachNZ - sabbaticals are a Tonga which the education community need to greatly value. TeachNZ were very accommodating to allowing me to change the timing of my sabbatical, and made the whole task very easy. I will certainly be encouraging other staff members to apply for this opportunity.
- Garry Falloon - for taking the time to talk with me regularly, to challenge and clarify my thinking, and for the difference he is making to education in our country.
- June, Hamish and Tony for Proof Reading

# PURPOSE OF SABBATICAL

The purpose of the sabbatical I took in Term 3 of 2014 was to explore three threads which many schools and school leaders (including myself) were / are asking.

Thread Question 1 - How does teacher pedagogy and implementation of the curriculum evolve as a result of using mobile devices?

Thread Question 2 - How does mobile technology enhance achievement and engagement, particularly for children who have historically had difficulty assessing the curriculum?

Thread Question 3 - Explore the dominant types of technology schools are using / purchasing and the opportunity costs associated with each option

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Sabbatical Period - Week 8 Term 2 2014 to Week 8 Term 3 2014

# Executive Summary

- When School leaders had worked collaboratively with their staff and community in genuinely meaningful ways to develop a shared learner centred, Future focused vision and worked with them to develop this in a range of areas over time (including ICT) significant and purposeful changes in teacher pedagogy were emerging. This was seen particularly in the areas of collaboration, authenticity, creativity, developing skills over content, global connections, critical thinking, timely feedback and feed-forward , parent inclusiveness with learning, learner independence and teacher reflection about their practise.

# Executive Summary

- It is almost impossible to attribute any academic gains to ICT. However through the use of ICT, task design can be greatly enhanced. It is the improvement in task design that has the potential to improve the conditions necessary for accelerated learning to take place.

# Executive Summary

- There is no "one device does everything perfectly." Every device has opportunity cost associated with it. When a school carefully chooses a device; critiquing it against their school vision for learning, the device can become an enabler to facilitate improved task design.

# PURPOSE OF THIS REPORT

- As a school leader I understand how time scarce we are.
- I understand that many (most?) of the reports submitted from Sabbaticals are never read!?
- I wanted to create something that would be of use to the educational community, something that would be easy to pick up.
- Therefore, I have deliberately not included in-depth analysis, long paragraphs, quotes , etc. For those that want more, I have included links to places that I found helpful.
- This report is a summary of the key findings. The concepts in this report could easily be something that I return to in later years to base a doctorate on, but I wanted to produce something aimed at a different audience.

# Methodology

- Visited schools in NZ (Waikato, Tauranga, Auckland, Nelson, Blenheim, New Plymouth) and Australia and spoke with School Leaders
- American trip to California (contact Innes Kennard)
- Core Education Breakfasts
- WPA Catchup day with Mark Osborne
- Regular meetings with Associate Professor Garry Falloon - University of Waikato
- Readings - on line, books, Audio Books

# BACKGROUND

At the end of 2012 we were due to make some very important and long term financial decisions about ICT purchases in the next few years. Why?

- Our school fleet of PC desktop computers were getting to the end of their life.
- All computers across the school were running Windows XP and would need to be upgraded to Windows 7/8, but most of the computers would not be able to run Windows 7 or 8.
- Teacher laptops were due to all be replaced in the next few years.
- Many teachers had bought iPads and were using these in the classroom, particularly those who traditionally were reluctant users of technology.
- We had been gifted some old iMac computers which ran better (faster, required less maintenance) than our newer PCs.
- The uptake of mobile technology among our parent community (Decile 7) was high.

# QUESTIONS WE WERE ASKING...

- Do we replace all our old PCs with new PCs?
- Do we purchase new, second hand or lease?
- Do we explore the Mac option  knowing those computers have a higher up-front cost, but seem to have a much longer life expectancy and less ongoing maintenance costs?

# OBSERVATIONS WE WERE MAKING

- Our computer room has limited use in an authentic learning context.
- Children prefer to use mobile devices in their classroom rather than desktops and laptops (the children do not consider laptops to be mobile technology).
- Given the potential outlay of money in this area, we saw this crossroads as an opportunity to morph our school infrastructure over a number of years into what we would like it to be, rather than what we have inherited.

# QUESTIONS & THINKING THAT CHANGED OUR THINKING

- What device, mobile or otherwise would best meet the learning needs of the learners both now and into the future?
- "Classrooms are designed for teaching, we need to create spaces that are designed for learning." Mark Osborne (Core Education)
- What is Future Focused Learning and what does it mean for us?
- How does technology support this concept?
- What does a Modern Learning Environment really mean?

# BIG QUESTIONS WE ENDED UP ASKING... (AND CONTINUE TO EXPLORE)

- What is our pedagogical understanding of effective "Future Focused Learning?"
- How would the teacher be supporting student learning?
- What would the children be doing?
- What type of learning activities would the children be involved in?
- How would technology / the classroom environment / task design / leadership / structure of the school day leverage these beliefs?
- Will we choose our technology based on the needs of the learner or on a traditional "Word" and "Powerpoint" paradigm?

# SOME THOUGHTS BEFORE WE START!...

"We can't solve problems by using the same level of thinking we used when we created them." - Albert Einstein

"Leadership is the art of mobilising and energising the intellectual and creative resources of all people at all levels of the organisation." - S. R. Covey

# THREAD 1 - HOW DOES TEACHER PEDAGOGY AND IMPLEMENTATION OF THE CURRICULUM EVOLVE AS A RESULT OF USING MOBILE DEVICES?

- I was surprised at how strong the correlation in characteristics was between schools who were experiencing powerful changes in teacher pedagogy and the characteristics of those who were seeing little or no change.

# THREAD 1 - HOW DOES TEACHER PEDAGOGY AND IMPLEMENTATION OF THE CURRICULUM EVOLVE AS A RESULT OF USING MOBILE DEVICES?

- This Thread could easily be renamed "How does Teacher Pedagogy and Implementation of the Curriculum evolve as a result of ***Leaders collaboratively building a shared vision about future focused learning and what it will look like in our school.***"

# THREAD 1 - HOW DOES TEACHER PEDAGOGY AND IMPLEMENTATION OF THE CURRICULUM EVOLVE AS A RESULT OF USING MOBILE DEVICES?

**Key Finding**

- Those school leaders who were / are / had (this is a continual process) partnered with their teaching staff / community in a genuinely collaborative manner to develop a shared vision about how to best meet the needs of the students in their school with a "Future Focused lens" were seeing significant and continual shifts in teacher pedagogy.

# THREAD 1 - HOW DOES TEACHER PEDAGOGY AND IMPLEMENTATION OF THE CURRICULUM EVOLVE AS A RESULT OF USING MOBILE DEVICES?

- Covey (1989) in his book Principle Centred Leadership explores two main themes for success which paints a clear picture for school leaders to follow.
    - The Law of the compass
    - The Law of the Farm (or the Law of the Harvest)

# THREAD 1 - HOW DOES TEACHER PEDAGOGY AND IMPLEMENTATION OF THE CURRICULUM EVOLVE AS A RESULT OF USING MOBILE DEVICES?

**The law of the compass**

- The law of the compass is a metaphor for how important it is for schools to identify "True North."
- Schools that do not collaboratively define a "True North" centred around how to best meet the learning needs of their students and continually refer to it are almost guaranteed to lack a clear direction in what ever endeavour they pursue (in this case, it was ICT equipment, but it was clear they lacked direction in most areas!)

# THREAD 1 - HOW DOES TEACHER PEDAGOGY AND IMPLEMENTATION OF THE CURRICULUM EVOLVE AS A RESULT OF USING MOBILE DEVICES?

## The law of the compass

How to best meet the needs of our students in a Future Focused Environment?


Schools that had a clear True North were navigating successfully through the many pressures being placed on schools currently. i.e.

- ICT
- MLE
- National Standards
- Numeracy Project
- Engaging Families
- Priority Learners
- Literacy Initiatives
- Teaching as Inquiry
- Appraisal
- ERO
- Inquiry learning etc etc

# THREAD 1 - HOW DOES TEACHER PEDAGOGY AND IMPLEMENTATION OF THE CURRICULUM EVOLVE AS A RESULT OF USING MOBILE DEVICES?

**The Law of the Farm  (or the law of the Harvest)**

The Law of the Farm (or the Law of the Harvest) is the idea that things of worth have to be grown over time.  Covey suggests that you cannot "wing it" on the farm.  If you don't plant the crop, and look after it through different seasons, there will be no harvest.

# THREAD 1 - HOW DOES TEACHER PEDAGOGY AND IMPLEMENTATION OF THE CURRICULUM EVOLVE AS A RESULT OF USING MOBILE DEVICES?

**The Law of the Farm (or the law of the Harvest)**

- School leaders who imposed decisions or quick fixes, meaning they were not growing a "crop" with and through their teaching team were seeing little or no purposeful change in Teacher Pedagogy.

- School leaders who had developed a "True North" with their teams and were developing this over a sustained period of time were navigating successfully through each challenge / pressure / opportunity and were seeing purposeful and aligned change in Teacher Pedagogy (particularly with Mobile Devices).

# THREAD 1 - HOW DOES TEACHER PEDAGOGY AND IMPLEMENTATION OF THE CURRICULUM EVOLVE AS A RESULT OF USING MOBILE DEVICES?

## What changes in Teaching Pedagogy was happening?

Schools who had a clear learner centred vision enabled by ICT

Typical Responses

- Improved Collaboration between students.
- Improved Collaboration between students and teachers.
- Improved and more timely feedback and feed forward.
- Improved communication with home.
- Increased motivation for reluctant writers, resulting in far more work being produced.
- Tasks were able to be designed to allow for more revision / refinement due to being able to improve work easily resulting in more complex task design.
- Increased creativity (dependent on Task Design).
- Children continuing their learning outside of school time and interacting with other students, parents and the teacher in these times.
- Task Design could be changed to engage children in higher order thinking skills (SAMR, Blooms).
- Teachers were able to hand over considerable responsibility for learning to the learner because the learner wanted to take more responsibility for their own learning (the role of the teacher changed, this will be expanded later).
- Authentic learning contexts that made connections with a global community were more common.
- Greater independence from the teacher - teacher as the coach not the oracle.
- More personalised learning.

Schools who did not have clear a learner centred vision with ICT

Typical Responses

- No changes were happening.
- Not Sure.
- Teachers were becoming more confident with using technology.
- Easier for students to be able to do research.
- Children were able to produce attractive work much easier.
- Children able to rework their work much easier.
- Children did not lose their work as much.

# THREAD 1 - HOW DOES TEACHER PEDAGOGY AND IMPLEMENTATION OF THE CURRICULUM EVOLVE AS A RESULT OF USING MOBILE DEVICES?

## What changes in Teaching Pedagogy was happening?

| Question | Schools who had a clear learner centred vision enabled by ICT (Typical Responses) | Schools who did not have clear a learner centred vision with ICT (Typical Responses) |
|---|---|---|
| Who should be working together to make the decisions about ICT within your school | Teachers (both the passionate ones and the reluctant ones), working with the Principal (leadership team / BOT) to ensure alignment of vision, ambition and practicality regarding finance. | Principal<br>Technician |
| Who should not be making decisions about ICT within your school | Anyone working in isolation.<br>Principal by themselves.<br>Technician<br>Those with a Financial bias.<br>Non Educational people! | Teachers because they don't understand the bigger picture.<br>Technology providers who have a vested interest in steering you in a certain direction.<br>Parent helpers. |

# THREAD 1 - HOW DOES TEACHER PEDAGOGY AND IMPLEMENTATION OF THE CURRICULUM EVOLVE AS A RESULT OF USING MOBILE DEVICES?

## What changes in Teaching Pedagogy was happening?

| Question | Schools who had a clear learner centred vision enabled by ICT (Typical Responses) | Schools who did not have clear a learner centred vision with ICT (Typical Responses) |
|---|---|---|
| What research have you done to help make your ICT decisions? | Readings based on Learning Advantages - Yes.<br>Readings based on Technical issues - Yes.<br>On line Discussions (e.g VLN, Twitter, Blogs etc) - Yes.<br>Visiting other schools - Yes.<br>Reflecting on what you have learnt with others in your school - Yes.<br>Talking with Technicians to understand implications - Yes.<br>Future Focused Learning Research - Yes. | Readings based on Learning Advantages - No.<br>Readings based on Technical issues - Yes.<br>On line Discussions (e.g VLN, Twitter, Blogs etc) - No.<br>Visiting other schools - **No.**<br>Reflecting on what you have learnt with others in your school - No.<br>Talking with Technicians to understand implications - Yes.<br>Future Focused Learning Research - No. |
| What are the biggest challenges in moving forward with ICT within you school? | Finances<br>Letting go of the old structures - it takes time to change things and not mess it up.<br>Time - giving teachers time to assimilate new learning.<br>Being aware of educating our community in the process so they can partner with us. | Teachers<br>Don't know which path to follow because most of them won't work.<br>Finance<br>Lack of a vision about why we should be doing this.<br>Conservative attitudes - wanted any changes to fit in with what they know.<br>When key people leave. |

# THREAD 1 - HOW DOES TEACHER PEDAGOGY AND IMPLEMENTATION OF THE CURRICULUM EVOLVE AS A RESULT OF USING MOBILE DEVICES?

**Summary of Tread 1 - Key Finding**

When School leaders had worked collaboratively with their staff and community in genuinely meaningful ways to develop a shared learner centred, future focused vision (Law of the Compass and Law of the Harvest) and worked with them to develop this in a range of areas over time (including ICT) significant and purposeful changes in teacher pedagogy were emerging particularly in the areas of;

- Collaboration, authenticity, creativity, developing skills over content, global connections, critical thinking, timely feedback and feed-forward, parent inclusiveness with learning, learner independence, Teacher reflection about their practise.

# THREAD 1 - HOW DOES TEACHER PEDAGOGY AND IMPLEMENTATION OF THE CURRICULUM EVOLVE AS A RESULT OF USING MOBILE DEVICES?

## Thoughts for school leaders

- Our schools are not a reflection of the teachers we have employed, they are a reflection of the teachers we have developed.

- It is never too late to start to navigate towards "True North", perhaps the biggest mistake school leaders can make is to know where "True North" lies but never guide their school community towards it.

- "THE BEST TIME TO PLANT A TREE WAS 20 YEARS AGO. THE SECOND BEST TIME IS NOW". –CHINESE PROVERB

# THREAD 1 - HOW DOES TEACHER PEDAGOGY AND IMPLEMENTATION OF THE CURRICULUM EVOLVE AS A RESULT OF USING MOBILE DEVICES?

**Observation**

- Leaders who are seeing meaningful changes in teacher pedagogy have and continue to be proactive in researching different options that may benefit their school.

- Leaders who are seeing limited changes in teacher pedagogy do very little (if any) research.

# THREAD 2 – HOW DOES MOBILE TECHNOLOGY ENHANCE ACHIEVEMENT AND ENGAGEMENT, PARTICULARLY FOR CHILDREN WHO HAVE HISTORICALLY HAD DIFFICULTY ASSESSING THE CURRICULUM?

- The explicit purpose of education is to raise achievement.

- Everybody involved in education, no matter what the level (Parents, BOT, Teachers, School leaders , etc.) are looking for evidence to answer the question about the impact on achievement for those who are using technology.

# THREAD 2 - HOW DOES MOBILE TECHNOLOGY ENHANCE ACHIEVEMENT AND ENGAGEMENT, PARTICULARLY FOR CHILDREN WHO HAVE HISTORICALLY HAD DIFFICULTY ASSESSING THE CURRICULUM?

- There is a growing body of evidence about the educational benefits of technology use for students.

- Falloon 2014 has been researching this in depth and has a strong body of evidence to clearly show that when task design focuses on higher order thinking tasks and the technology is used to leverage the opportunities available to students to engage in these carefully designed tasks, the depth of student interaction is measurably enhanced.

# THREAD 2 - HOW DOES MOBILE TECHNOLOGY ENHANCE ACHIEVEMENT AND ENGAGEMENT, PARTICULARLY FOR CHILDREN WHO HAVE HISTORICALLY HAD DIFFICULTY ASSESSING THE CURRICULUM?

- The difficulty however is to attribute any gains in achievement to technology use.
- To be able to create a truly scientific study to answer this question is (virtually) impossible. To do so would require two groups to be established, one as the control group and one as the test group.
- The two groups would have to have two identical factors in place to make the study valid. These are:
    - 1. Children with identical needs and ability and
    - 2. Different Teachers teaching in exactly the same way.

# THREAD 2 - HOW DOES MOBILE TECHNOLOGY ENHANCE ACHIEVEMENT AND ENGAGEMENT, PARTICULARLY FOR CHILDREN WHO HAVE HISTORICALLY HAD DIFFICULTY ASSESSING THE CURRICULUM?

- There is regular dramatisation in both the media and political arenas about NZ's performance against internationally recognised measuring standards. I.e TIMMS, PISA.
- There is concern (by some) that NZ students, who not long ago featured in the very top of these results, now feature lower down.
- However, some context needs to be brought to this concern.

# THREAD 2 - HOW DOES MOBILE TECHNOLOGY ENHANCE ACHIEVEMENT AND ENGAGEMENT, PARTICULARLY FOR CHILDREN WHO HAVE HISTORICALLY HAD DIFFICULTY ASSESSING THE CURRICULUM?

**Bringing Context to the Crisis!**

- While not at the top, NZ students do not achieve poorly.
- The PISA report 2012 points to the fact that there are many countries who may be above NZ (and below) but that for many of these countries there is no statistically significant difference in achievement between them.

# THREAD 2 – HOW DOES MOBILE TECHNOLOGY ENHANCE ACHIEVEMENT AND ENGAGEMENT, PARTICULARLY FOR CHILDREN WHO HAVE HISTORICALLY HAD DIFFICULTY ASSESSING THE CURRICULUM?

## Bringing Context to the Crisis!

**Comparing countries' and economies' performance in mathematics**

Statistically significantly **above** the OECD average
Not statistically significantly different from the OECD average
Statistically significantly **below** the OECD average

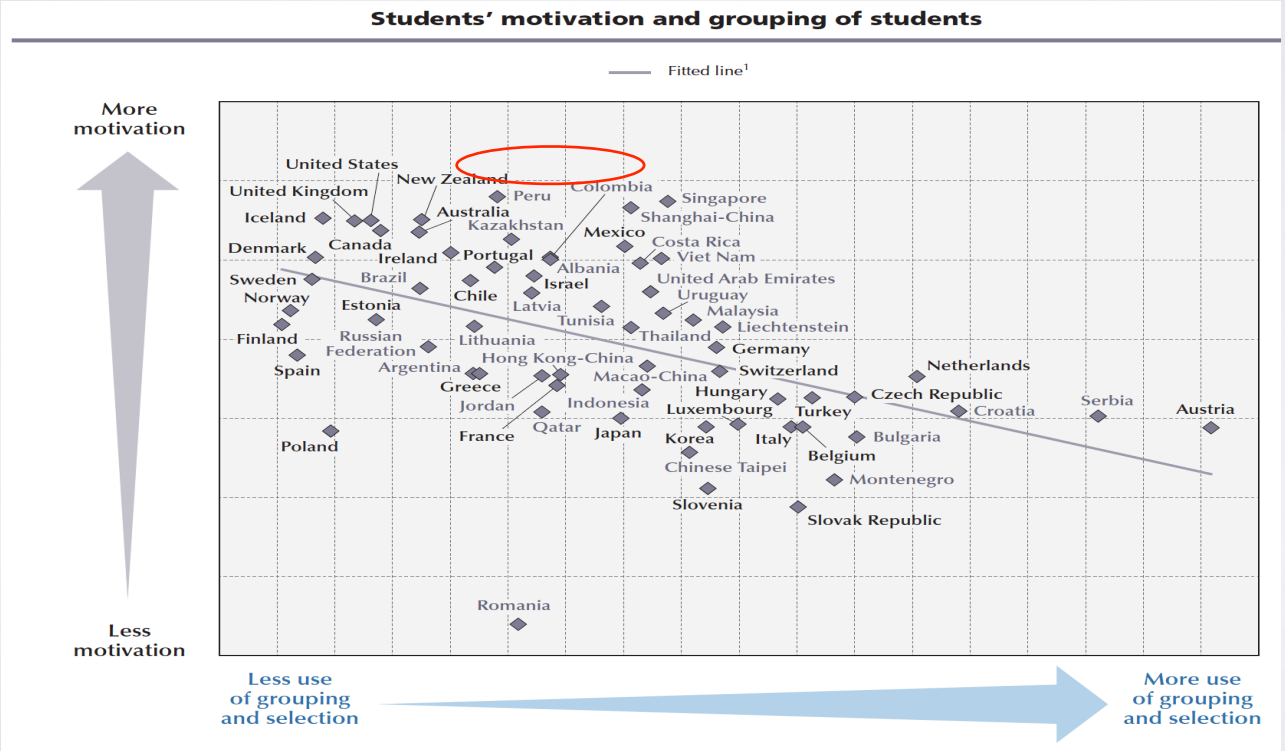
| Mean | Comparison country/economy | Countries/economies whose mean score is NOT statistically significantly different from that comparison country's/economy's score |
|---|---|---|
| 613 | Shanghai-China | |
| 573 | Singapore | |
| 561 | Hong Kong-China | Chinese Taipei, Korea |
| 560 | Chinese Taipei | Hong Kong-China, Korea |
| 554 | Korea | Hong Kong-China, Chinese Taipei |
| 538 | Macao-China | Japan, Liechtenstein |
| 536 | Japan | Macao-China, Liechtenstein, Switzerland |
| 535 | Liechtenstein | Macao-China, Japan, Switzerland |
| 531 | Switzerland | Japan, Liechtenstein, Netherlands |
| 523 | Netherlands | Switzerland, Estonia, Finland, Canada, Poland, Viet Nam |
| 521 | Estonia | Netherlands, Finland, Canada, Poland, Viet Nam |
| 519 | Finland | Netherlands, Estonia, Canada, Poland, Belgium, Germany, Viet Nam |
| 518 | Canada | Netherlands, Estonia, Finland, Poland, Belgium, Germany, Viet Nam |
| 518 | Poland | Netherlands, Estonia, Finland, Canada, Belgium, Germany, Viet Nam |
| 515 | Belgium | Finland, Canada, Poland, Germany, Viet Nam |
| 514 | Germany | Finland, Canada, Poland, Belgium, Viet Nam |
| 511 | Viet Nam | Netherlands, Estonia, Finland, Canada, Poland, Belgium, Germany, Austria, Australia, Ireland |
| 506 | Austria | Viet Nam, Australia, Ireland, Slovenia, Denmark, New Zealand, Czech Republic |
| 504 | Australia | Viet Nam, Austria, Ireland, Slovenia, Denmark, New Zealand, Czech Republic |
| 501 | Ireland | Viet Nam, Austria, Australia, Slovenia, Denmark, New Zealand, Czech Republic, France, United Kingdom |
| 501 | Slovenia | Austria, Australia, Ireland, Denmark, New Zealand, Czech Republic |
| 500 | Denmark | Austria, Australia, Ireland, Slovenia, New Zealand, Czech Republic, France, United Kingdom |
| 500 | New Zealand | Austria, Australia, Ireland, Slovenia, Denmark, Czech Republic, France, United Kingdom |
| 499 | Czech Republic | Austria, Australia, Ireland, Slovenia, Denmark, New Zealand, France, United Kingdom, Iceland |
| 495 | France | Ireland, Denmark, New Zealand, Czech Republic, United Kingdom, Iceland, Latvia, Luxembourg, Norway, Portugal |
| 494 | United Kingdom | Ireland, Denmark, New Zealand, Czech Republic, France, Iceland, Latvia, Luxembourg, Norway, Portugal |
| 493 | Iceland | Czech Republic, France, United Kingdom, Latvia, Luxembourg, Norway, Portugal |
| 491 | Latvia | France, United Kingdom, Iceland, Luxembourg, Norway, Portugal, Italy, Spain |
| 490 | Luxembourg | France, United Kingdom, Iceland, Latvia, Norway, Portugal |
| 489 | Norway | France, United Kingdom, Iceland, Latvia, Luxembourg, Portugal, Italy, Spain, Russian Federation, Slovak Republic, United States |
| 487 | Portugal | France, United Kingdom, Iceland, Latvia, Luxembourg, Norway, Italy, Spain, Russian Federation, Slovak Republic, United States, Lithuania |
| 485 | Italy | Latvia, Norway, Portugal, Spain, Russian Federation, Slovak Republic, United States, Lithuania |
| 484 | Spain | Latvia, Norway, Portugal, Italy, Russian Federation, Slovak Republic, United States, Lithuania, Hungary |
| 482 | Russian Federation | Norway, Portugal, Italy, Spain, Slovak Republic, United States, Lithuania, Sweden, Hungary |

# THREAD 2 - HOW DOES MOBILE TECHNOLOGY ENHANCE ACHIEVEMENT AND ENGAGEMENT, PARTICULARLY FOR CHILDREN WHO HAVE HISTORICALLY HAD DIFFICULTY ASSESSING THE CURRICULUM?

**Bringing Context to the Crisis!**

- The countries that perform above NZ have education systems that are designed fundamentally differently to NZ.
- They are designed in a way that complements closed question, test type situations.
- NZ has an education system that develops far more creativity, innovation, independence and collaboration - skills that are highly valued and sought after around the world.(Interestingly, NZ students are among the most motivated students in the world, but this is not reported.)
- Designing tests that can comparably measure these qualities and competencies is not politically popular or easy.

# THREAD 2 - HOW DOES MOBILE TECHNOLOGY ENHANCE ACHIEVEMENT AND ENGAGEMENT, PARTICULARLY FOR CHILDREN WHO HAVE HISTORICALLY HAD DIFFICULTY ASSESSING THE CURRICULUM?



# THREAD 2 - HOW DOES MOBILE TECHNOLOGY ENHANCE ACHIEVEMENT AND ENGAGEMENT, PARTICULARLY FOR CHILDREN WHO HAVE HISTORICALLY HAD DIFFICULTY ASSESSING THE CURRICULUM?

- Early research indicates that mobile digital technology may marginally lift academic achievement through carefully designed learning experiences, but it is definitely not harmful. However, there is no statistically significant difference.
- Question - Does that mean that using digital technology has little or no impact on Achievement?
- Answer - It all depends on whether the definition of achievement is limited to measures which are inconsistent with the nature of the NZ Curriculum!
- The NZ Curriculum has "a vision of young people developing the competencies they need for study, work, and lifelong learning, so they may go on to realise their potential."

# THREAD 2 - HOW DOES MOBILE TECHNOLOGY ENHANCE ACHIEVEMENT AND ENGAGEMENT, PARTICULARLY FOR CHILDREN WHO HAVE HISTORICALLY HAD DIFFICULTY ASSESSING THE CURRICULUM?

“Outcomes from education need to be viewed in three ways.

1. Academic
2. Social
3. Dispositional/affective (attitudes, values , etc.)

The first is relatively easy to measure and record (tests, assessments etc) but the others are harder. They concern the person as a whole and really underpin how they can contribute to society more broadly. Academic measures are useful and easier to see visible evidence of as they can be readily applied and linked to the world of work, higher education (university etc). The other two are broader and more difficult to quantify, as they are more concerned with the type of person one becomes. Education should be about creating balanced individuals across all 3 domains. It is unfortunate that so often the value of an education is measured only against academic criterion.” Professor Garry Falloon 2014.

# THREAD 2 – HOW DOES MOBILE TECHNOLOGY ENHANCE ACHIEVEMENT AND ENGAGEMENT, PARTICULARLY FOR CHILDREN WHO HAVE HISTORICALLY HAD DIFFICULTY ASSESSING THE CURRICULUM?

- My Sabbatical findings (readings, conversations, visiting schools in NZ, Australia and California) does tend to consistently indicate that for those schools that have a deliberate focus on putting students at the centre of the learning (instead of the teacher teaching) and then explore ways to use digital technology to enhance the learning experiences available to children, there are clear links to increased motivation, attendance, refinement of work, collaboration, problem solving and higher order thinking skills.

- Schools referred to the quantity of work that children (particularly reluctant writers) produce in their writing being increased which has linked to a gradual increase in academic achievement,  as well as overall increases in motivation to write, willingness to take risks and perception of self as a writer.

- The levels of thinking that children engage in transition to the higher levels much easier and faster as the knowledge and understanding barriers / levels can be moved through much faster.

- "You can lead a horse to water, but you can't make it drink.  However,  the horse has more chance of having a drink if you are camping by the river!"

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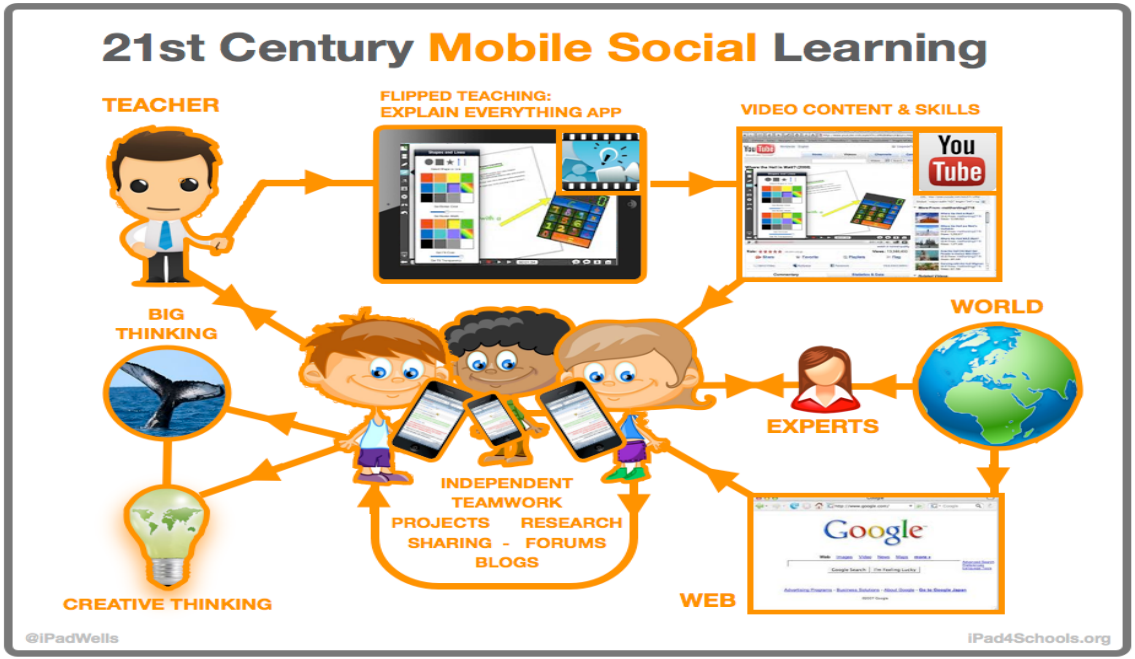

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**When these 4 factors come together, achievement is enhanced. This diagram shows the interconnected / dependent nature of all 4 elements,**

**Learning task design –** criteria, thinking 'pitch' (higher order?), scenarios, problem posing, debate/negotiation, promotes discussion of various perspectives, encourages collaboration

**Children's learning resources –** facts, concept knowledge, technical knowledge, task & criteria knowledge, word/text decoding analysis skills & strategies, dispositions (motivation to 'find out', collaboration) app cognitive tools, teachers & peers

**Technology –** supports collaboration and interaction (f2f & networked); information access, process, present/share knowledge; can support HoT; careful & strategic app selection 'fit for purpose'; motivating & engaging

**Teacher -** knowledgeable *teacher* of learning resources, learning task designer; skilful & challenging questioner; reflection/evaluation/analysis encourager (criteria); diligent & (pro)active observer, 'interactor' & assessor; critical and strategic app selector

Professor Garry Falloon Research finding 2014

# THREAD 2 - HOW DOES MOBILE TECHNOLOGY ENHANCE ACHIEVEMENT AND ENGAGEMENT, PARTICULARLY FOR CHILDREN WHO HAVE HISTORICALLY HAD DIFFICULTY ASSESSING THE CURRICULUM?

## Key Findings

- While still important, we need to see achievement as more than just academic results through test scores as the NZ curriculum is around future focused learning.

# THREAD 2 - HOW DOES MOBILE TECHNOLOGY ENHANCE ACHIEVEMENT AND ENGAGEMENT, PARTICULARLY FOR CHILDREN WHO HAVE HISTORICALLY HAD DIFFICULTY ASSESSING THE CURRICULUM?

**Key Findings**

- When task design is focused on developing higher order thinking skills, and key competencies required for life -long learning, e-learning acts as a powerful enabler to increase:
    - Motivation, collaboration, self belief, output, refinement of work, levels of thinking, on task behaviour, student ownership of learning.

- The types of experiences (task design) teachers can plan for can be greatly enhanced which improves the conditions necessary for accelerated learning to take place.

# THREAD 2 - HOW DOES MOBILE TECHNOLOGY ENHANCE ACHIEVEMENT AND ENGAGEMENT, PARTICULARLY FOR CHILDREN WHO HAVE HISTORICALLY HAD DIFFICULTY ASSESSING THE CURRICULUM?

**Key Findings**

- ICT / E-learning will not by itself increase student achievement.

- It is almost impossible to attribute any academic gains to ICT. However through the use of ICT, task design can be greatly enhanced. It is the improvement in task design that has the potential to improve the conditions necessary for accelerated learning to take place.

# THREAD QUESTION 3 - EXPLORE THE DOMINANT TYPES OF TECHNOLOGY SCHOOLS ARE USING / PURCHASING AND THE OPPORTUNITY COSTS ASSOCIATED WITH EACH OPTION

- The third thread is to explore the opportunity costs associated with the popular types of mobile technology schools are currently purchasing.

- The goal was to provide some assistance to school leaders (particularly Principals) to assist in the decisions made about technology purchases once they had established a school vision.

# THREAD QUESTION 3 - EXPLORE THE DOMINANT TYPES OF TECHNOLOGY SCHOOLS ARE USING / PURCHASING AND THE OPPORTUNITY COSTS ASSOCIATED WITH EACH OPTION

**BYOD vs School Purchased vs Lease to Own**

- There was a real mix in this area.
- There did not seem to be a "one size fits all" solution to this question.
- "Parents don't mind investing in a device, but they rely on schools to work out exactly how they plan to use it and then let parents know which device is needed. Where parents get annoyed is when a school specifies a device that is not used, is not fit for purpose or cannot meet the needs of the learner as they become more competent."
- "Move to where the puck will be, not where it is" - Wayne Gretzky

# THREAD QUESTION 3 - EXPLORE THE DOMINANT TYPES OF TECHNOLOGY SCHOOLS ARE USING / PURCHASING AND THE OPPORTUNITY COSTS ASSOCIATED WITH EACH OPTION

## BYOD vs School Purchased vs Lease to Own

The observations I made while exploring this area had several trends

| Schools who had a clear learner centred vision enabled through ICT. | Schools who did not have clear a learner centred vision with ICT |
|---|---|
| More open to BYOD and Lease to Own options, or a mixture of all three. | Were more prone to school purchased options |
| More prone to allow the learner to take responsibility for controlling the location, storage and safety of their created work. | More prone to opt into a School Purchased approach where the technician (or technical person) made decisions about where work should be stored. |
| Were concerned about equity and actively sought solutions for all. | Said were concerned about equity, but often had not consulted the community to find out their preferences, the focus seemed more on school control . |
| Spent a lot of time looking at what others had done / learnt before making a decision. | Were worried about making a wrong decision. |
| Were concerned with teaching children how to be Cyber Safe. | Were concerned with controlling what the children could access on the internet. |
| Were concerned with teaching children how to use their device as a learning tool. | Were concerned with children being off task and playing games. |

# THREAD QUESTION 3 - EXPLORE THE DOMINANT TYPES OF TECHNOLOGY SCHOOLS ARE USING / PURCHASING AND THE OPPORTUNITY COSTS ASSOCIATED WITH EACH OPTION

- There is no "one device does everything perfectly" - yet!
- Every device has opportunity cost associated with it i.e. It does some things really well, it does some things better than everything else, and it does some things less well than others.
- The next table summarises what schools are currently thinking about in terms of technology purchases and the relative performance of each device.
- The purpose of such a table is to try and put in one place a concise summary of the key considerations most school leaders consider when making technology purchases.
- Most assessments are subjective in that what one school sees as a strength, others may see as a weakness. i.e. Not many fonts to choose from can be seen either way.

# THREAD QUESTION 3 - EXPLORE THE DOMINANT TYPES OF TECHNOLOGY SCHOOLS ARE USING / PURCHASING AND THE OPPORTUNITY COSTS ASSOCIATED WITH EACH OPTION (click table to download)

**Opportunity Cost of Different Technology Types**

| Key<br>Stand out Strength<br>Strength<br>Weakness | Physical Size | Screen size# | Battery life | Keyboard | Processing Word | Spreadsheets | PowerPoint's | Flash player | Cloud storage ease of use | Device storage | Save to a local server ability | Internal Memory size | Life Expectancy (yrs) | Price (ex GST) | Camera Quality | Video Camera quality | Video editing | Able to work with photos | After Sales support | Tech expertise required to setup | BYOD options | Ability to print | Use as a tool when shared among multiple people | Computer Programming options | Google Drive capability | Office 365 Ability | Durability | Software that can be added | Cost of new Software | Create Music | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Chromebook | S* | SO* | SO* | SO | S | S | S | S | SO* | W | W | W | 3-5 | $400 - $500 | W | W | W | S | S | SO | S | W* | SO* | S | SO | S | S | W* | S | S | |
| Netbook | S | S | SO | SO | SO | SO | SO | S | S | S | SO | SO | 2-4 | $600 | W | W | S | S | SO | W | S | SO | S | SO | S | SO | W | SO | S | W* | |
| Surface | S | S | SO | S | S | S | S | S | S | S | SO | S | 3-4 | $600 | W | S | W | S | S | S | S | SO | S | S | SO | S | SO | W | S | W* | |
| Android | S | S | SO* | S | S | W | S | S | S | S | W | S | 3-5 | $600 | W | S | W | S | S | S | S | W* | S | W | S | S | SO | S | S | W* | |
| iPad | S | S | SO | S | S | S | S | W* | S | S | W | S | 3-5 | $600 | W | S | S | S | S | S | S | W* | S | W | SO | S | SO | SO | S | S | |
| Comment | * depends on the model you get and what willing to pay | * Depends on the model you get & same saw the screen size of ipads as a strength, others a weakness | * Depends on the model you get and what willing to pay | Same saw a physical keyboard as a strength, others did not | | Those that wanted to remain in the traditional 'Microsoft Family' saw the Net Book as the best solution. Other devices had similar programs that offered much the same capability, albeit a stripped down version of the full Microsoft experience. | | *The iPad is unable to run 'flash player' type programs easily, but as HTML5 takes over, this is less of an issue. | *The Chromebooks stands out in its ability to store files naturally in the cloud and switch easily between users. | | | This largely depends on how much is spent on 'up front' storage capacity. | | Depends on internal specs, especially memory size and battery life. | All devices have cameras, but none are of the quality many now expect. The mobile devices are easier to take photos due to the external camera included. | | The netbook is rated lower here due to being unsuitable the technical knowledge of must to run a server, establish profiles etc. | | | *Web rewards are available, but the native Windows environment a more suited to gaming. | *The Chromebook 'Instant on' ability to log into a Google drive account makes it easy for multiple users to use the device. | | | | Same thought the Android devices were more robust than iPads. | *The Chromebook cannot have programs loaded to it expect via the Chrome Store browser add ons. This is both a SO and W. | | | |

| Key<br>Stand out<br>Strength<br>Strength<br>Weakness<br>NA | Projector a screen via cables | Projector a screen wirelessly | Speakers for sound | Upgradable after purchase | Ability to easily mass control fleet | Teacher ease of use | Student ease of use | Parent ease of use | Most natural place to store files | Virus Protection needed | Reliant on Wifi |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Chromebook | S | S | S | W | SO | SO | SO | W* | Google drive | No | Yes |
| Netbook | S | W | S | So | SO | SO | SO | S | Hard drive | Yes | No |
| Surface | S | W | S | W | W | SO | SO | S | Device | No | No |
| Android | S | W | S | W | W | S | SO | S | Device | No | No |
| iPad | S | SO | S | W | W | SO | SO | S | Device / Icloud | No | No |
| Comment | | | | | | | | *Ubly a weakness as parents may not readily understand the idea of cloud computing. | | | |

# KEY FINDINGS FROM SABBATICAL

- Q. - Thread Question 1 - How does teacher pedagogy and implementation of the curriculum evolve as a result of using mobile devices.

- A. - When School leaders had worked collaboratively with their staff and community in genuinely meaningful ways to develop a shared learner centred, Future focused vision and worked with them to develop this in a range of areas over time (including ICT) significant and purposeful changes in teacher pedagogy were emerging. This was seen particularly in the areas of collaboration, authenticity, creativity, developing skills over content, global connections, critical thinking, timely feedback and feed-forward , parent inclusiveness with learning, learner independence and teacher reflection about their practise.

# KEY FINDINGS FROM SABBATICAL

- Q. - Thread Question 2 - How does mobile technology enhance achievement and engagement, particularly for children who have historically had difficulty assessing the curriculum?

- A. - It is almost impossible to attribute any academic gains to ICT. However through the use of ICT, task design can be greatly enhanced. It is the improvement in task design that has the potential to improve the conditions necessary for accelerated learning to take place.

# KEY FINDINGS FROM SABBATICAL

- Q. - Thread Question 3 - Explore the dominant types of technology schools are using / purchasing and the opportunity costs associated with each option.

- A. - There is no "one device does everything perfectly." Every device has opportunity cost associated with it. When a school carefully chooses a device; critiquing it against their school vision for learning, the device can become an enabler to facilitate improved task design.

# LINKS TO MORE INFORMATION

- Readings on the academic benefits of mobile devices
- Future Focused Learning Report - (the Appendix of this is especially worth reading)
- Modern Learning Environments sabbatical report by Ross Hastings
- NMC Horizon Report (examines what the emerging trends in ICT will be within 5 years)
- Open Learning Spaces Blog
- Team Teaching Blog
- Evidence-Based Strategies for Leading 21st Century Schools
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# LINKS TO MORE INFORMATION

- SAMR
- E-learning Framework
- Claire Amos Blog
- ipad myths in education
- Habits of an effective iPad teacher
- VLN - e-learning
- VLN - MLE

# BOOKS THAT HELPED SHAPE MY THINKING

- Great By Choice - Jim Collins
- 5 Levels of Leadership - John C Maxwell
- Good to Great - Jim Collins
- Principal Centred Leadership - S. R. Covey
- It's Your Ship - Dr M Abrashoff