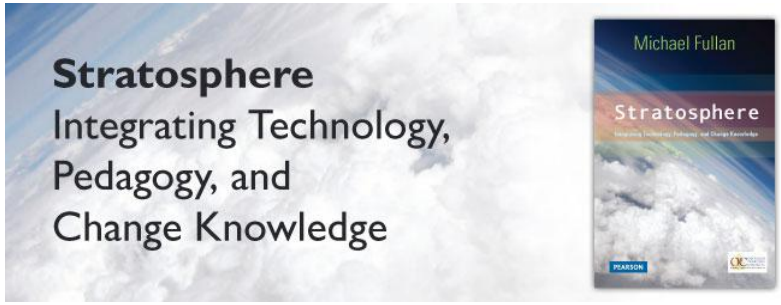
Stratosphere (Sean's Notes)



Fullan M (2012). Stratosphere: Integrating Technology, Pedagogy and Change Knowledge

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The Journey

p 2

... the current education system is so very inappropriately content bound and [this is] why the new pedagogy–learning how to learn–is so essential. Learn how to learn because the evolving world is ever changing and elusive. We need the capacity to keep up–to periodically grasp the ungraspable. Only those who know how to learn, who can relate to others AND the environment (including "things"), and who make the world part of their own evolving being will thrive in this world.

p 3

Research on pedagogy is now demonstrating that even for higher-order skills, small investments in targeted relationships with students pay off with high-yield motivational and achievement results. Technology can accelerate these learning experiences on a large scale with minimal costs after initial investments.

p 4

... focusing on a small number of ambitious goals with a coherent strategy that attends in concert to half a dozen or so key factors: intrinsic motivation, capacity building, transparency of results and practice, leadership at all levels, and a positive but assertive stance on progress. Borrowing from Jeff Kluger, I call this change knowledge "simplexity" – a small number of key factors (the simple part) that must be made to gel with large groups of people (the complex aspect).

... four criteria for integrating technology and pedagogy to produce exciting, innovative learning experiences for all students – something desperately needed to bring education into the 21st century. These new developments must be (i) irresistibly engaging (for students and teachers); ii) Elegantly efficient and easy to use; iii) technologically ubiquitous 24/7; and (iv) steeped in real-life problem-solving.

...

Integrating technology, pedagogy, and change knowledge is fundamentally liberating. It democratises learning so that every student learns how to learn for a lifetime of pursuing personal passion, purpose, and fulfilment. Best of all, students learn collaboratively, consolidating connections with others locally and from afar. Citizenship, human solidarity, collective problem-solving, and sustainability are thereby served.

p 5

In education we have just about reached the end of squeezing good out of an outdated school system. The current system is too costly, too ineffective, and as any kid will tell you, deadly boring.

Technology and Humans Shape Each Other

pp 12-13:

Kelly [Kevin Kelly (2010). What Technology Wants. New York: Viking] observes, "Yes, technology is acquiring its own autonomy and will increasingly maximise its own agenda, but this agenda includes – as it's foremost consequence – maximising possibilities for us." This is why Kelly eventually answers his question by concluding that "technology wants what life wants":

- Increasing efficiency
- Increasing opportunity

- Increasing emergence
- Increasing complexity
- Increasing diversity
- Increasing specialisation
- Increasing ubiquity
- Increasing freedom
- Increasing mutualism
- Increasing beauty
- Increasing sentience
- Increasing structure
- Increasing evolvability

(ibid, p 274)

When we turn these thoughts to technology and education, we have a long way to go. Technology in schooling has its dark side, including cyberbullying and inappropriate sexting, but its biggest problem is that it isn't present much. The digital life of students is largely outside schools, and it is a fairly undisciplined world, recalling worries of our distractor critics who see superficiality and long-term diminution of the brain as problems.

p 13
Goldin and Katz [Claudia Golding and Lawrence Katz (2008). The Race Between Education and Technology] conclude that "technology has been racing ahead of education in recent decades because educational growth has been sluggish, not because skill-biased technical change has accelerated." Try this for a crossover observation: technology has not raced ahead **inside schools**. Our answer in this book will not be let's load up technology in schools – I call this a "wrong driver" – but rather, let's rethink how technology can be used at our service as well as push us to do even more.

Rosen [Larry Rosen (2010). Rewired: Understanding The iGeneration and the Way They Learn] is perhaps too generous in his admiration of the iGeneration who, according to him, are introduced to technology at birth, are adept at multitasking, love virtual social worlds, and are confident and open to change. [...] "Smart educational models must consider social networks as a valuable source for enhancing student interest and participation in the classroom [...] The trick is to leverage their love of social networks to create educational tools built around them.

It is revealing that Rosen takes a dramatically more sober position in his newest book (presumably because the evidence is mounting about the dark side of technology). He calls the constellation of dangers "iDisorder." [Larry Rosen (2012). iDisorder: Understanding Our Obsession with Technology and Overcoming its Hold On Us. New York: Palgrave Macmillan]

p 14

Rosen amasses page after page of evidence that technology increasingly controls our lives in dysfunctional and pervasive ways, from the mildly rude checking-out of text messages every few minutes regardless of who we are with, to the more psychotic descent into schizoid behaviours of delusions, hallucinations, and social avoidance.

Rosen takes the reader through a range of debilitating problems that technology does not cause but that it naturally enables. He outlines the evidence on the following domains of distortion associated with the increased presence of digital technology in our lives: narcissism (it all about me, me, me), obsession (checking in with our technology 24/7), addiction (wallowing in impulsivity, sensation seeking, and social deviance), bipolarity (feeling high or low depending on one's social–networking digital day), ADHD (being jerked around by the instant gratification of hyperlinks with accompanying information overload, poor sleep, and an inability to stay with and complete tasks), decrease in quality relationships (including low empathy), hypochondria (a little medical knowledge is a dangerous thing), fixation on appearance (associated with eating disorders), schizoid behaviour (becoming more solitary, emotionally cold, and attached), and voyeurism (watching rather than engaging in). Whew! That can fill your day!

Rosen has been at this for a while, beginning his scientific studies in the 1980s and continuing to the present. He concludes that we have an increasing dependency on technology, but the worst part is that we are "happily traipsing down our road to an iDisorder," unaware of what is happening to us.

Rosen's main argument, as is the meaning of this chapter, is not that we should discount technology; rather, it is that we need to be aware of its dangerous downside in order to reduce its addictive power and maximise its prodigious upside. The basic question is, who is in charge here – human or machine?

When it comes to education and schooling, a whole new set of issues become evident. School boredom has no chance against the addictive digital draw of the outside world. Within schools, technology is conspicuous by its absence or by superficial, ad hoc use. [...] How can technology help us by opening up the world to deeply engaged learning and worldwide, collaborative problem-solving? In a word, technology, well used, can help us race rapidly to the future that humankind wants and will find fulfilling.

p 15

... The solution consists of the integration of advances in pedagogy (especially built on how we learn), and technology (especially around engagement), and in change knowledge (especially around making change easier). If we get the combination right, the floodgates of learning will open and there will be an unstoppable explosion of energy and participation by all that will benefit individuals and the world alike.

p 16

As sinister as technology can become, it has far more upside than downside potential. It is time to define the learning game as racing with technology.

Pedagogy and Change: Essence as Easy

p 17

Learning is all about purposeful engagement. The engaged student is attentive, committed, persistent, and finds meaning and value in the tasks, says Schlechty [Phillip Schlechty (2011). Engaging Students: The Next Level of Working on the Work. San Francisco: Jossey–Bass]. The engaged student finds that learning is worth the effort (high yield).

Change and the Student

pp 18-19 [interventions]
What looks like a small intervention can appear quite large to a student. Interventions do not have to remain in the conscious mind for them to have an impact. If a message affects how a student [or teacher] thinks and feels about school or about self, it can work away in the subconscious mind. Yeager and Walton [David S Yeager & Gregory M Walton (2011). Social–Psychological Interventions in Education: They're Not Magic. Review of Educational Research 81, no 2: 267 – 301] call these "stealthy" interventions – a quality that increases their effectiveness.

p 19
None of the interventions tried to directly persuade students to think differently, "rather than simply delivering an appeal to a student who passively receives it, each intervention enlisted students as actively [and knowingly] participating in or generating the intervention itself." (ibid, p 284)
These "stealthy" interventions have the added benefit that they do not stigmatise students. They do not single them out for needing help. Stealthy interventions are brief and thus much less expensive. They can be long lasting, say Yeager and Walton, because they set in motion social, psychological, and intellectual processes that result in initial success, greater sense of belongingness, and a belief that students can learn more than they thought possible. Interventions like these, with corresponding supports, can alter students' academic trajectories.
Yeager and Walton do not assume that it is simply a matter of going to scale with these types of interventions. The interventions require on the part of the educators **theoretical expertise** (understanding the psychological experiences at play) and **contextual expertise** (understanding the background and experiences of students in the local context). The skinny, in other words, demands sophistication of design and good teachers in order to get ease of use.

... essentially it involves knowing where every student stands, intervening in a nonjudgemental manner, providing a good program mix, improving teaching and learning, and connecting school deeply to their communities [Ben Levin, 2012. More High School Graduates. Thousand Oaks, CA: Corwin Press].
...
But little things made a big difference. [...] These teachers work with school leaders and teachers and students to personalise the connection to students.

20 minutes to change a life.

Change and the Adult

pp 21-22
If we get the pedagogy right and incorporate technology accordingly, learning will become easier, deeper, and more engaging. Students and teachers will be putting in long hours, but what they do won't feel like work.

In the progress principle, Teresa Amabile and Stephen Kramer, write about "using small wins to ignite joy, engagement and creativity at work." [Teresa Amabile and Stephen Kramer (2011). The Making Of Young People Who Will Change The World. New York: Simon and Schuster] The progress principle: using small wins to ignite joy, engagement and creativity at work [...] Making even small progress in meaningful work is the most powerful stimulant to wanting to do more.
...
What matters most is progress in the work itself and paying attention to small wins and setbacks on a daily basis – this is the essence of change management. If people are involved in meaningful work, and if they feel capable, and if they are helped to make even small progress, they become more motivated and ready for the next challenges. Effective organisations foster conditions of these **positive progress loops** to prevail.

p 22
Of course, there is more to organisational effectiveness than small wins. Amabile and Kramer identify several catalytic factors (such as time, resources, autonomy, and help), And nourishment factors (respect, affiliation, and emotional support)... The main point is that people – students and teachers alike, for example – need to feel and experience some regular progress. As the authors note, any video game designer knows that small steps of progress are essential for drawing players in. [Daily progress in work]
...
...the new pedagogy – technology combinations tap into, stimulate, and even create purpose and passion in what students want to learn. Amabile and Kramer essentially say that adults – teachers, in this case – must have the same motivational experiences. <What is good for the goose is good for the gander - smc> The magic of stratosphere is that students and teachers are conjointly stimulated to engage in the pursuit of deeper learning: it is fuelled by their passions and purposes. Both students and teachers are turned on.

The New Pedagogy

p 23
The new examples [constructivism through technology integration] meet our criteria: being engaging and offering ease of use. By ease of use, I do

not mean simple, but rather use as relatively easy because of the draw of engagement and the work with others (much how you find work when you're doing what you like).

[Creativity]
...
Tony Wagner's Creating Innovators [Tony Wagner (2012). Creating Innovators: The Making of Young People Who Will Change The World. New York: Simon and Schuster, 32] is the perfect example of the new pedagogy. ... He draws on the work of Teresa Amabile ... He adapts her creativity model which is based on three components: expertise (knowledge), creative thinking (problem-solving), and motivation (intrinsic drive). Wagner considers motivation as the source of all good learning and unpacks it by concluding that intrinsic motivation is fuelled by playing (experimenting), purpose (wanting to make a difference), and passion (devoting yourself to something you find deeply meaningful).

p 24
All of these experiences contrast with the fundamental basis of schools as they are today. As Wagner says, schools currently reward individual competition, are subject based (versus problem based), and rely on extrinsic motivation (such as grades). By contrast in all of the successful examples, the students in question talk of doing things that are meaningful in the world, projects that focus on solving a problem, engaging in teamwork, and operating under conditions that encourage risk-taking. The new pedagogy involves helping students find purpose, passion, and experimental doing in a domain that stokes their desire to learn and keep on learning.

"Increasingly in the 21st-century," argues Wagner, "what you know is far less important than what you can do with what you know. This interest in and ability to create new knowledge to solve new problems is the single most important skill that all students must master today. All successful innovators have mastered the ability to learn on their own 'in the moment' and then apply that knowledge in new ways (ibid, p 142)."

The new pedagogy that Wagner documents does not involve a long list: its emphasis is on addressing real problems, intellectual risk-taking and trial-and-error problem-solving, collaboration in learning, and intrinsic motivation.
...
Although he doesn't delve far into it, Robinson makes the point that "digital technologies are now putting in the hands of millions of people everywhere, unprecedented tools for creativity and sound, in design, in sciences and in the arts." [Ken Robinson (2009). Out of Our Minds: Learning to be Creative. Westford, MA: Courier Westford, p 205]

p 25
Teachers are needed, but it is a new role that is required – the teacher as change agent. Robinson calls them mentors who play four roles: recognising, encouraging, facilitating, and stretching.

p 27

... Feedback to students during learning is probably the most powerful teaching strategies we can use. Learning from mistakes is the key. [Wiliam - AfL]

p 28
... Lehrer [Jonah Lehrer (2012). Imagine: How Creativity Works. New York: Houghton Mifflin Harcourt.] has reinforced the point that creativity can be designed for and fostered in every student – not just so they can be more fulfilled individuals, but also because the mobilisation of individual and collective talent is essential for global survival. This different approach to learning could bring a marked increase in the level of innovation, entrepreneurship, problem solving, empathy, teamwork, and sustainability. It is the future.
...
...the entire curriculum needs to be redefined: the whole raison d'être of schooling becomes a single expanded entity called "learning about and for life" and doing it in a passionate and purposeful manner. We are talking about a total makeover – made practical by the integrated forces of technology, pedagogy, and change knowledge.

[Four reasons for technology integration]

Conclusion

p 31
1. The old technology of tell and test or experience and evoke does not work, and it is becoming clearer to more people that it can never work.
2. Examples of the new pedagogy of partnering with students are rapidly under development. These examples will only advance in quality and availability all the more so because technology can be the great accelerator. Indeed this what the stratosphere phenomenon predicts.
3. There will be a great appetite for the new way. Passion, purpose, and the new pedagogy are natural winners because they tap into and activate what is human – doing something intrinsically meaningful and of value to oneself, one's peers, and the world at large. You don't get any closer to secular spiritualism than this.
4. It really is easier than you might think for the simple reason that people will be doing what they like, and many people will be helping. Many hands and minds do make light work.
5. ...

Prensky has 10 other measures that take minimal effort on the part of teachers, but have great potential positive impact on children's education:

1. Doing less "telling" while allowing students to research the answers to guiding questions on their own [Dan Meyer - 'help less']
2. Always connecting what is taught with real-world outcomes
3. Helping students distinguish the unchanging "verbs" (skills) of education from the rapidly changing "nouns" (tools)
4. Treating students as learning partners

5. Employing students' own tools (particularly video and cellphones) for learning
6. Using more peer-to-peer teaching
7. Offering students far more choices, rather than mandating what all must read or do
8. Allowing students to be the primary users (and maintainers) of classroom technology
9. Sharing success via short video posted on sites such as YouTube or TeacherTube
10. Regularly connecting students with the world via free, secure tools such as Skype and ePals

p 32
In summary, we are at the beginning of a powerful disruptive innovation that will grow in leaps and bounds. We must have our wits about us to take advantage of this once-in-a-century opportunity. We must take a trial-experiment-learn-refine approach to this next phase. We must, in other words, take a learning approach. The new journey will be bumpy, but less bumpy than what we are going through now. And it will be relatively easy with bursts of progress.
...
We need learners proactively in charge of their own learning–how-to–learn. And for the latter we need teachers and other mentors who can design and oversee the learning process.

Digital Disappointments and Dreams

p 33
The integration of technology and pedagogy to maximise learning must meet four criteria. It must be irresistibly engaging; elegantly efficient (challenging but easy to use); technologically ubiquitous; and steeped in real life problem-solving.
...
Irresistibly engaging is what it means to be rapt, or in a state of "flow" where time has no meaning.
...
...these new products must be elegantly easy to use – simple to get hooked on and natural to use – challenging yes, but because we are drawn in not so daunting. A crucial point in these developments is that as innovations they do not further complicate the lives of students and teachers, but, on the contrary, they make their learning easier and more interesting. Rarely do we experience changes that give us a net advantage from the beginning.

p 34
... Three pillars of the educated student: standards, assessment, and instruction or pedagogy. Currently priorities are being placed on standards and assessment while the solution in stratosphere must be driven by pedagogy. ... Fortunately, they can be incredibly accelerated by innovations in technology – as long as we get the causal sequence right: pedagogy to technology and then back and forth, back and forth. If there is any racing to the top it is humankind with machines. Yes, when you are in a fast machine it sometimes controls you, but ultimately the machine is there to serve you

– to do things that you could never do without it.

Digital Disappointments

p 35
There is no way to accomplish the ideas without the power of machines. The biggest culprit is 21st-century skills that seem to have been around since at least 1990. To state the conclusion upfront: the skills as treated are too vague to be of any use, and they almost always leave out pedagogy (learning experiences for getting there).

p 36
No matter how you cut it, we are not making progress on this agenda. By and large the goals are too vague, having a glitzy attraction. When we start down the pathway of specificity, the focus is on standards and assessment (which does help with clarity), but the crucial third pillar – pedagogy, or fostering actual learning – is neglected. And aside from its use in assessment schemes, which is a contribution, technology plays little role in learning, surely the main point of all this highfalutin fanfare.

p 38
When the Media awareness network did find effective use of integrating technology, it was "precisely because they [teachers] focused on pedagogy, were comfortable with not being the tech expert in the room, had strong classroom management skills, and saw online pitfalls as teachable moments." [Valerie Steve (2011). Young Canadians in a Wired world – phase III: Teachers Perspectives. Ottawa: Media Awareness Network, p 16]
...
Even high performance in PISA (Program for International Student Assessment), such as Finland, do not fare well when it comes to pedagogical use of technology. ... While 21st century skills are contained in the core National Curriculum, "they do not usually show up in the classroom," and "technology is well available, but the pedagogically innovative or effective use of ICT is still very rare." [Juho Matti Norrena, Marja Kankaanranta, and Arto Kalevi Ahonen (2012). Innovative teaching in Finland (Paper presented at the annual meeting of the American Educational Research Association, Vancouver, BC, April 2012), 11]. In other words, even in countries touted for their leadership in education, use of the new scenarios as discussed in this book is only sporadic.
...
Test results can increase relative to the old system, but applying knowledge is not advanced.

p 39
[Serious gaming for education]
[Michael F Young et al, (2012). Our Princess is in Another Castle: A Review of Trends in Serious Games for Education," Review Of Educational Research 82, no 1: 62-89]
The biggest problem, according to Young and his colleagues, is that "educational video games are most frequently researched as the primary means

by which the player learns, removing the instructor and allowing the student to complete his or her learning in isolation (p 61)." In other words, these innovations (or at least the research on them) omit the teacher. It is as if pedagogy is irrelevant. The authors obvious conclusion is that video games should be implemented "in concert with good teaching." Sound instructional design, skilled teaching, and quality implementation will be required. Most of all, partnership between teachers and students (and among teachers and students) will be essential.
...
p 40
The point of course is not that [gaming] technology is less effective, but that it is being grossly under utilised pedagogically.

Digital Dreaming

p 41
Resistance is futile. The December 10, 2011, issue of the Economist contains a 10 page special report on video games. ["All the world's a game," Special Report: Video Games. The Economist. December 10, 2011: 3–12]
...
The best games have huge potential for education because they incorporate the very design elements that new pedagogical practices emulate. By turning learning into a game, we create the intuitive interface with mobile devices (sophisticated design, elegant ease of use); we can create something that game designers call "juiciness" (lots of feedback).

p 42
"Gamifiers," or people who revel in developing games, says the Economist, make players want to perform difficult tasks and pay for the privilege. They "capture that sense of engagement by providing rapid, continuous feedback, a clear sense of progression and goals that are challenging enough to maintain interest but not so hard to put players off." [p 12] With improved everything, digital innovations are "marrying the power of modern technology to the insatiable human desire for play. "As every good kindergarten teacher knows, learning cannot be far behind.
...
In 2011, Nancy Watson and I completed a review for the Hewlett Foundation of their "deep learning" goals. [Michael Fullan and Nancy Watson (2011). Deeper Learning: Right/Wrong Drivers Perspective. San Francisco: Report to the Hewlett Foundation] Their version of higher order skills contains competencies organised into three categories: content knowledge (master core academic content, and acquire, apply, and expand knowledge); cognitive strategies (think critically, solve problems, and communicate effectively); and learning behaviours (work collaboratively, and learn how to learn).

p 43
The Bill and Melinda Gates foundation aspires to use technology and innovative instructional practices where "students learn beyond the bounds of traditional classrooms," ... "How can we capitalise on their digital prowess to inspire confidence, curiosity, persistence, and desire for knowledge?" [Bill and Melinda Gates foundation (2011). Supporting students: investing in innovation and quality. Redmond, WA: Bill & Melinda Gates foundation]

p 44
We see in the ITL [Innovative Teaching & Learning - sponsored by MicroSoft's Partner's in Learning Initiative (PIL)] research that individual and small groups of teachers can improve instructional practices that, in turn, affect higher order learning outcomes, and that this process is strongly helped by the explicit use of digital technology for that purpose.

p 46
In terms of this book, SWST [The Student Work Study Teachers initiative is a literacy and numeracy secretariat program structured around a collaborative study between an experienced practitioner working in a temporary research role, an SWS teacher, and a hosting classroom teacher.] is doing all this with one hand tied behind its back in the sense that technology plays no particular role. The integration of technology will make this work easier, less expensive, and way more effective in its impact on higher-order skills learning.

The Flipping of Teacher and Student Roles

p 47
John Hattie [John Hattie (2011). Visible learning for teachers: maximising impact on learning. London: Rutledge] also comes to our rescue with his army of meta-studies. He too sees the effective teacher as active change agent. When he compares the effect sizes of instructional practices of "teacher as activator" (feedback to students, helping students access there own thinking, furnishing challenging goals and the like) with those of "teacher as facilitator" (problem based learning, simulation and gaming, individualised instruction), The average perfect sizes greatly favourite teacher activator (0.60 to 0.17). Teacher as mere facilitator even with digital resources is not good enough.

p 48
Hattie strongly argues that the most important aspect that a teacher must get good at is to know what impact he or she has on every student. All of the high-yield practices he found in his empirical analysis rely on the influence of student peers, feedback, transparent learning intentions, success criteria, and adjustment of instruction to attend to both surface and deep knowing. So the undisciplined possibilities of the web, no matter how wonderful, will not be sufficient. Unassisted discovery will be less likely to have benefits compared with the teacher as change agent to help students learn how to learn and how to monitor their own learning.

p 49
The new pedagogy already is based on students working with one another and taking greater charge of their own learning, guided by the teacher as coach. Instead of thinking about how to differentiate instruction for each student, in the new essence-as-easy mode, the teacher needs to think of the class as a team and determine how to use the team to develop the team.

p 51
[Park Manor is a senior public elementary school in Ontario, with 300 students in Grades 6 to 8] ...their core goal is to develop "global critical thinkers collaborating to change the world." ... surrounded by "digitally rich learning tasks without limits." It integrates technological tools, exemplary pedagogy, rich learning tasks, and 21st-century learning skills.
At Park Manor it is clear that pedagogy is the driver with student learning at the centre and technology as the Formula 1 Grand Prix machine that gets the student there faster and better.

p 52
The school uses success criteria and evidence to determine the effectiveness of the framework as it relates to student learning. The success criteria explain in detail how students and teachers can determine that the technology tool, program, application, or website adds value to student learning. They pertain to student engagement, active learning, easier learning, assessment **for** learning (student feedback), assessment **as** learning (student monitoring their own learning), assessment **of** learning (concrete evidence), 21st century learning skills (creating, collaborating, communicating, critical thinking, and citizenship), support for higher-yield instructional strategies (differentiated learning and gradual acceptance of responsibility), and finally, easier instruction (for the teacher).

p 53
Technology serves to accelerate and deepen learning.
...
I chose Park Manor to feature because it is a normal school with standard resources – just like any of the 120 schools in the Waterloo School district. It has no special status or privileges. It has gone from a situation of using no technology to the vibrant integration of technology and pedagogy in just two and half years. Its success shows that stratospheric scenarios are practical and compelling.

Design Principles and Change Knowledge

p 58
...this tablet [iPad] marks the beginning of ubiquitous technology, bringing us closer and closer to persons as easy – for all.
...
...the education revolution is not a given. The first is that even the most sophisticated technology still needs to be guided by strong pedagogy. In this respect even the vaunted iPad doesn't measure up.
...
p 59
...kids these days are technological whizzes when it comes to the tool, but pedagogically clueless with respect to getting the best out of it. Murray and Olcese [Orrin T Murray & Nicole R Olcese (2011). Teaching and Learning with iPad, Ready or Not. TechTrends 55, no 6, 42 – 48] eventually draw the

following conclusion:

We cannot point to a single application that steps up to modern understanding of how people learn. Our study suggests that there is a paucity of applications that truly extend capability... The lack of collaboration capabilities underlie this point, as do the overwhelming number of applications that are simply drill and practice or focused on delivering content for consumption, not creation or reuse.

Still, there is no denying that good technology under the direction of a great pedagogue can do wonders.

iPad Literacy

The next time you marvel at your 18-month-old granddaughter working away through some iPad apps and routines, remind yourself that it may be no more impressive than what an ape can do. More seriously, there is no question that this toddler will grow up to be a whizz at using technology. But how well she learns to work her way through the 21st century will depend on whether she encounters great pedagogy and mentors along the way. Technological prowess by itself doesn't make you much smarter (although it may appear to).
...
Pedagogy, powering 21st-century skills, is what will make the difference.

Change knowledge

p 66
Progress for us is simplexity. We call it "motion leadership" or the skinny on becoming change savvy. Motion leadership is about leadership that causes positive movement forward for individuals, organisations, and entire systems. The change knowledge you need to do this must meet four criteria: (1) Motivate people to engage in deep and meaningful change, even when they might not want to do it at the outset; (2) help them learn from wrong paths and blind alleys; (3) use the group; and (4) do all of this on a very large scale (whole system reform).

Change knowledge:

1. Focus
2. Innovation
3. Empathy
4. Capacity Building
5. Contagion

6. Transparency
7. Elimination Of Non-Essentials
8. Leadership

May 2011, Jobs asked Gates to outline his vision for education. Gates responded with the image of students independently watching lectures and lessons and then meeting in class to discuss them and solve problems. Jobs and Gates agreed that computers have had remarkably little impact on schools. But that would change, said Gates, if computers and mobile devices were to deliver more personalised lessons and to provide encouraging feedback (Isaacson, Steve Jobs p 554).

This vision is incomplete for our stratosphere agenda because it omits pedagogy – **it omits the teacher!** The teacher as change agent is crucial, or we will get aimless multitasking.

p 69
Let's redefine the role of teachers and equipment to be the orchestrators of learning and change agents required for learning to flourish. Use the world as the classroom. Embrace ubiquitous technology. For reasons stated throughout this book – essence as easy, the new pedagogy, mind-boggling technology – the time has never been more propitious. Bold moves have a real chance of connecting with what makes humans tick: the appetite for learning and doing something meaningful by collaborating with others. Failure to act is to leave dispirited teachers and students at the mercy of dominant technologies. Without the capacity building of professional capital, it will be no contest.
...
Our change knowledge sees and uses social contagion as a prime strategy. Remember the ITL findings. Innovative teaching and learning was found sprinkled across schools but was not embedded within many schools or systems. If you want an accelerated strategy to change this situation, **use the group**. Thus figure out how these innovative teachers who are further down the line than their colleagues can be deployed systematically as change agents for other teachers.
...
...as the capacity of the teachers increased in systems, **peers became the greatest source of innovation** [Mona Mourshed, Chenezi, & Michael Barber (2010). How the world's most improved school systems keep getting better. London: McKinsey and company]. Leadership is still critical, but it operates in the service of social contagion. Social capital is the new resource.

p 70
Technology has just as much evil or good as we want to put into it. That is why we need pedagogy and the moral imperative to be the key drivers. Then you can't avoid wanting to embrace technology as one of the best means around.
...
Our challenge is to combine the best of change knowledge with the best of technology and pedagogy. If we can do so, progress in educational transformation will accelerate dramatically because of the synergising influence between these three forces. Pedagogy, technology, and change knowledge operating in concert will become a powerhouse of learning. Once this happens, technology, we can be sure, will pay more than its share.

It will become a dynamic player shaping the future.

p 72

Making technology pay

Technology has dramatically affected virtually every sector in society that you can think of **except** education. It is shocking to have to say that. Learning, surely the most important human resource in the world, is not benefiting from the greatest technical resource on the planet. It is time that gadgets go to school and schools go to gadget 24/7.

Technology is way too powerful for us not to have a plan.

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The solution lies in the concentration of the three forces pedagogy, technology, and change knowledge. If you want to head off destruction, we need to make it all about the learning (the pedagogy part), let technology permeate (the technology part), and engage the whole system (the change part).

1. Make it all about the learning.
2. Let technology permeate.
3. Engage the whole system.

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We should do less of spending money on assessment detached from designing learning and more of creating learning experiences that are irresistibly engaging. This is why I have made the primary driver pedagogy, or learning. The first thing to ask is this, "How do we make everything we do about learning?" Literacy and deep learning goals – higher-order skills (and proper literacy is higher order) need to dominate. Creativity, passion, and purpose must also flourish. We can do all this by gradually building a pedagogy where as they get older, students are more and more steeped in real-life problem solving, guided by teachers as change agents or mentors.

Second, we can't make everything we do all about learning if we don't let–indeed, make–technology permeate. We already know that digital power is almost limitless. Technology wants what we want if we work with it. Man against nature never worked, nor will man versus machine.

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Technology becomes more powerful as it becomes less expensive. Many of the pedagogical innovations free up inexpensive labour, so to speak – students do more of the work (but find it engaging), adults are involved in more efficient exchanges, crowdsourcing (in which users, the crowd, sort out quality through feedback and circulation of information) becomes widespread, quality teachers can reach more students, the myriad of free digital resources available on the internet constantly increases, and so on.

p 77
Change really isn't as hard as we thought if we capture people's interest and give them enjoyable, worthwhile experiences. It can thrive if we unleash the power of peers (students and teachers alike) to help one another learn and be even greater if we access intergenerational learning. The source of innovation is peers who are further down the line and people of all ages as they learn from one another.

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With the help of technology we can go viral on the substance of innovation.
...
Technology is not a panacea. Not all technology is good pedagogy. And great pedagogy can and will exist without technology. We have, however, greatly miscast and underutilised technologies power. When we enlist technology in the service of exploratory learning for all, watch out! On the other hand, if we plod along with standards and assessment using technology only as a prop, we will get what we deserve: a higher level of tedium.
...
It is time to take the lid off learning. It is all there to be assembled. We know that the right combination of our triad already resonates with frustrated learners and frustrated teachers. It is time, to put it in a dramatically exciting way, to meet each other in the stratosphere where we get twice the learning for half the price. Instead of paying for technology that sits on the shelf, let's change the game. Let's race with the machines. Let's make technology pay! If we figure it out, we will find that technology wants what we want.