Reference List
Introduction

(p. 11) …more kids have access to education...


(p. 11) …more students are graduating...


(p. 11) …gender and racial performance gaps are shrinking...


(p. 11) …bullying is on the decline...


(p. 11) …standardized test scores...


(p. 12) Advances are made...

Chapter 1

Expertise

(p. 13) In theory there is no...


(p. 13) ...Australian Institute of Public Accountants Tax Conference...


(p. 13) ...ASCD Conference on Teaching Excellence...

Conference program available at: http://www.10thingsbook.com/ascd-conference-schedule

(p. 13) ...Australian Medical Law Conference...


(p. 13) ...Australian Association for the Teaching of English...


(p. 13) ...Australian Women in Law Enforcement...


(p. 13) ...Beginning Teacher’s Conference ...

Conference program available at: https://semannslattery.com/courses/1327-talking-teaching-beginning-teacher-conference/
(p. 14) …nearly 70% of teachers…


(p. 14) …nearly 90% of teachers…


(p. 14) …Expert Blindness…


(p. 14) …"As you [improve a skill]…


(p. 14) …"We delight in the beauty of the butterfly…


(p. 16) …most widely accepted characterizations…


**Abstracted**


**Idealized**


**…”No theory changes what it is a theory about.”**


**…”reading begins as the visual recognition of letters…”**


**…”After 40-years of work, Ericsson has concluded…”**


(p. 22) …three-quarters of early-career researchers…


(p. 22) …teacher training programs have limited impact…


(p. 22) …school supervisors view recent graduates…


(p. 23) …experienced teachers routinely outperform…


(p. 23) …new teachers generally require 5-years of practice…


Chapter 2
Evidence

(p. 26) …an estimated 90%...


(p. 26) …this drug proved to be highly toxic to the developing foetus...


(p. 26) …Thalidomide molecule comes in two unique configurations...


(p. 26) …only the right-hand form causes birth defects...


(p. 26) …it has a 50/50 chance of spontaneously flipping...


(p. 26) …Prontosil has no effects in vitro…


(p. 26/27) …his own six-year-old daughter…


(p. 27) …prescriptive translation…


(p. 27) …levels-of-organization…


(p. 28) …emergence…


(p. 29) …movement, behaviour, emotions, consciousness, cognition.


(p. 30) …communication, relationships, social obs, behavioural mimicry, culture.


(p. 30) …the brain’s primary energy source is glucose...


(p. 30) …spent thousands of dollars...

(p. 31) …once a child consumes sugar...


(p. 31) …once a dozen kids consume sugar...


(p. 31) …mnemonics are rarely used in the classroom...


(p. 31) …only be effective with simple facts...


(p. 31) …appears to fade with time.


(p. 33) …silent reading voice...


(p. 33) …comprehension decreases significantly.


(p. 34) …enhance both student learning and participation.


(p. 34) …decrease short-term learning confidence.


(p. 35) …10 million practicing scientists...


(p. 35) …2 million research articles per year...

Chapter 3

Grades

(p. 37) When Galileo said that the language of nature is written in mathematics...


(p. 37) In Phaedrus, Plato tells the story of Thamus...


(p. 38) …neuroscientists conceived of the brain as a passive processor.


(p. 38) …the brain actively predicts...


(p. 38) …top-down processing...


(p. 39) …the very first cells in your brain to process vision shift their function...


(p. 39) …a person’s worldview drives his/her top-down expectations.


(p. 39) …"To a man with a hammer..."


(p. 39) …"The medium is the message."


(p. 39/40) …"Tools alter the structure of our interests...

In 1792, Cambridge University professor William Farish...


Reification is the process of...


…Brad Pitt’s face is highly symmetrical...


…sat the world’s first standardized test of Creativity...


…schools can purchase CLARA...


(p. 43) …a paid program can teach them how to boost their score…

Available at: http://learningemergence.net/about/learning-futures-design-principles/

(p. 43) …schools can access Assessment and Teaching of 21st Century Skills…


(p. 44) …Washington Post published an article…


(p. 45) …[Narcissism] means they are farming-out their identity…

Chapter 4

Homework

(p. 51) You can do anything…


(p. 51) …install drain pipes with a gradient of at least 1.65%…

Commonwealth of Australia (2009). Grade and Fall. Available at: https://emedia.rmit.edu.au/dlsweb/Toolbox/plumbing/toolbox12_01/units/cpcpdr4001a_sanitary/03_size/page_001.htm

(p. 51) …a country with around 10,000 schools…


(p. 51) …over 350 million hours of homework.

Calculation based on the following.
- 3,948,811 million students (Australian Bureau of Statistics)
- 30min of homework per student per evening
- 180-days in the school year.

(3,948,811 x 30 x 180) / 60 = 355,392,990 hours

(p. 51) …over 90% of teenagers fail to meet basic daily physical recommendations…


(p. 53) Even a cursory glance at the last century of literature…

California passed a law in 1901…


…a strong Cold War-influenced pro-homework movement…


"Homework is a long-standing education tradition…


…due to its historical association with the concept of ‘rigour’.

Davidson, C.N. (2020). Quantity is not Rigour. Inside Higher Ed. Available at: https://www.insidehighered.com/advice/2020/05/13/academics-should-rethink-way-they-assign-homework-opinion


…a recent review only returned five published articles…


Regarding the one paper that conducted an experimental intervention…


The remaining four correlational papers…


(p. X) ..."There’s been no research done on whether homework teaches…


(p. 56) ..."is rationalized by invoking a notion called BGUTI…


(p. 58) In general, this work demonstrates that homework does have a positive effect…


(p. 58) …little-to-no learning benefit among Primary Years students.


(p. 58) …few young students have developed strong inhibitory mechanisms.


(p. 58) …older students typically devote study time...


(p. 58) …these two issues can be mitigated through adult intervention.


When we shift our focus to older students, the news becomes slightly better.


…correlation between duration and outcome is not linear.


…Primary Year students are assigned an average of 35 minutes...


Middle-and-Upper Year students are assigned an average of 90 minutes...


approximately 60% of students cite homework as a primary source of stress...


30% of students in some countries are categorized as clinically depressed...


pursuing personal passions with like-minded peers...


homework largely boosts learning when it is task-based...


(p. 60) …reading with parents is a great way...


(p. 61) …"The ache for home lives in all of us...

If we have the truth, it cannot be harmed by investigation…


…the story of Roger Bannister…


nearly 1,500 runners would break the 4-minute mile…

Brannen, N. (2018). Only 1,497 humans have ever broken the 4-minute mile – and I’m one of them. *CBC Sports.* Available at: [https://www.cbc.ca/playersvoice/entry/only-1497-humans-have-ever-broken-the-4-minute-mile-and-im-one-of-them](https://www.cbc.ca/playersvoice/entry/only-1497-humans-have-ever-broken-the-4-minute-mile-and-im-one-of-them)

"What changed was the mental model…


Carol Dweck published one of the most popular and impactful books…


consider the Google Books description of Dweck’s book…


you may want to watch her 2014 Tedx Talk…

Available at: [https://www.ted.com/talks/carol_dweck_the_power_of_believing_that_you_can_improve?language=en](https://www.ted.com/talks/carol_dweck_the_power_of_believing_that_you_can_improve?language=en)
(p. 65) …what researchers call face validity.


(p. 65) Dweck’s early research has demonstrated...


(p. 66) …published the most comprehensive meta-analyses of mindset ever compiled.


(p. 66) …conducted a replication of her work.

Li, Y., & Bates, T. C. (2019). You can’t change your basic ability, but you work at things, and that’s how we get hard things done: Testing the role of growth mindset on response to setbacks, educational attainment, and cognitive ability. *Journal of Experimental Psychology: General, 148*(9), 1640.

(p. X) …2 million peer-reviewed articles are published annually.


(p. 67) …up to 40% of articles within the social sciences...

(p. 67) …up to 80% of papers within the humanities...


(p. 67) …research articles are read in their entirety by only 10 people.

Biswas, A.K., & Kirchherr, J. (2015). Prof, no one is reading you. The Straits Times. Available at: https://www.straitstimes.com/opinion/prof-no-one-is-reading-you

(p. 67) …ask how many peer-reviewed journal articles s/he has read...


(p. 68) [mindset] has profound effects…on students learning and school achievement...


(p. 68) …[mindset] can matter even more than cognitive factors...


(p. 68) …mindsets play a key role in math and science achievement.

(p. 68) …if we changed student mindsets we could boost their achievement.


(p. 68) …emphasis on growth can not only increase intellectual achievement...


(p. 69) …expectancy priming...


(p. 69) …"no support for the idea that fixed [mindsets] are harmful...

Li, Y., & Bates, T. C. (2019). You can’t change your basic ability, but you work at things, and that’s how we get hard things done: Testing the role of growth mindset on response to setbacks, educational attainment, and cognitive ability. *Journal of Experimental Psychology: General, 148*(9), 1640.

(p. 69) Priming is a notoriously fickle cognitive occurrence...


(p. X) In response, dweck has argued that the contradictory findings...

Dweck, C. S., & Yeager, D. S. A Simple Re-Analysis Overturns a “Failure to Replicate” and Highlights an Opportunity to Improve Scientific Practice: Commentary on Li and Bates (in press).

(p. 69) …in her famous 2007 research...


(p. 69) …shown to have no significant impact on later maths exam performance...


(p. 69/70) …in 2019, Dweck and colleagues published another study...


(p. 70) …distinguish between statistical significance and clinical significance.


(p. 70) …economically disadvantaged students at risk of dropping out of school...


(p. 71) One recent analysis from Brown University...

(p. 72) …"In the beginning…we did not recognize the complexity…


(p. 73) …"The most competitive individual I’d ever met”.

Chapter 6
21st Century Skills

(p. 77) The illiterate of the 21st century...


(p. 77) Standardized curricula were first proposed in 1576...


Petrus Ramus (accessed 2020). The New World Encyclopedia. Available at: https://www.newworldencyclopedia.org/entry/Petrus_Ramus

(p. 77) By the mid-17th century, curricula were widely used throughout Europe...


(p. 78) …the C21 skills were established at a breakfast meeting...

Available at: https://web.archive.org/web/20021210162514/http://21stcenturyskills.org/events.html

(p. 78) …these companies released a document...


(p. 79) An estimated fifty percent of entry-level hires don’t reach the 18-month mark...


Akhtar, A. (2019). Apple, Google, and Netflix don’t require employees to have 4-year degrees, and this could soon become an industry norm. *Business Insider Australia*. Available at: https://www.businessinsider.com/top-companies-are-hiring-more-candidates-without-a-4-year-degree-2019-4?r=US&IR=T


... magnetoencephalography data was published...

Under this scenario, the issue was most likely one of shielding. Due to the sensitivity of SQUIDs, without effective shielding it will pick up signals from any strong electromagnetic signal. In this instance, the 6 cycles per hour almost certainly aligned with the local subway schedule and the MEG was picking up the signal from passing public transportation.

If, however, this data was accurate, it would suggest that ephaptic coupling works via quantum entanglement.

... knowledge precedes skills.


(p. 82) BAR GRAPH

*Adapted using data from:*


(p. 82) ... domain knowledge has been internally embedded within long-term memory...


(p. 83) ... they commit fewer facts to memory.


(p. 83) ... "The processes we most hope to engender in our students..."

(p. 83) …the same skill can differ significantly when applied to different contexts.


(p. 84) …the human brain possesses a unique dual-system learning apparatus...


(p. 84) …frontal regions...coupled with rhythmic activity across deeper memory...


(p. 84) …enhanced activity within the basal ganglia...


(p. 85) …automaticity hinders adaptation.


(p. 85) A set of seminal psychological experiments from the 1980’s...


(p. 85/86) LINE GRAPHS

Adapted using data from:


(p. 87) …prior automated patterns have an annoying tendency to re-constitute...


(p. 87) …taking in, organizing, and acting upon knowledge…is the process of learning.


(p. 88) …an estimated 50% of high-performing high school students fail...


(p. 89) …over 90%...can differentiate study techniques, less than 35% actually adhere…

“Humanity is acquiring all the right technology for all the wrong reasons.”

Buckminster Fuller, R. (1966). Available at: https://www.goodreads.com/quotes/93734-humankind-is-acquiring-all-the-right-technology-for-all-the

92% of students reported having access to a computer at school.


99.7% of schools are equipped with high-speed internet...


NZ’s internet is faster than ever, but a digital nation? Nope.


the computer-to-student ratio has dipped below 1:1...


Yearly expenditure of K-12 learning software exceeds $8 billion annually...


Schools spend an average of $400,000 pounds on computers every year.

Bundell, R. (2018). How Schools Spend Their Money on IT. Available at: https://commercial.co.uk/schoolspendingedtech/
(p. 92) A 2015 OECD international review of the impact of computers…reports:


(p. 92) …the global research centre J-PAL concluded:


(p. 92) …Larry Cuban…summed up the state-of-affairs:


(p. 92) …I have listed 50 ‘negative’ research studies…

<table>
<thead>
<tr>
<th>Reference</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Angrist, J., &amp; Lavy, V. (2002). New evidence on classroom computers and pupil learning. The Economic Journal, 112(482), 735-765.</td>
<td>After 8-years of using computer-aided instruction within Israeli schools, there was no discernible educational benefit.</td>
</tr>
<tr>
<td>Campuzano, L., Dynarski, M., Agodini, R., &amp; Rall, K. (2009). Effectiveness of Reading and Mathematics Software Products: Findings From Two Student Cohorts. NCEE 2009-4041. National Center for Education Evaluation and Regional Assistance.</td>
<td>After a year of using computer learning software, there was no discernible benefit on student learning and, in some cases, impaired learning compared to traditional methods.</td>
</tr>
<tr>
<td>Source</td>
<td>Summary</td>
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<tr>
<td>Carter, S. P., Greenberg, K., &amp; Walker, M. S. (2017).</td>
<td>Students who use a laptop during class time (for notes and/or research) perform significantly worse than students who do not use computers.</td>
</tr>
<tr>
<td>Chingos, M. M., Griffiths, R. J., &amp; Mulhern, C. (2017).</td>
<td>Students who used a computerized program for math tutoring during summer hours did not demonstrate improved math scores the following year – regardless of number of hours used.</td>
</tr>
<tr>
<td>Cristia, J., Ibarrarán, P., Cueto, S., Santiago, A., &amp; Severín, E.</td>
<td>15 months of a ‘one-laptop-per-child’ intervention across 319 Peruvian schools demonstrated no discernible impact on learning or academic achievement.</td>
</tr>
<tr>
<td>Daraban, B. (2015).</td>
<td>Students who use a laptop during class time (for notes and/or research) demonstrate significantly lower participation and learning than students who do not.</td>
</tr>
<tr>
<td>Ellis, Y., Daniels, B., &amp; Jauregui, A. (2010).</td>
<td>Students who use a cell phone during class time demonstrate significantly worse performance on the final exam and significantly worse final grades.</td>
</tr>
<tr>
<td>Falck, O., Mang, C., &amp; Woessmann, L. (2018).</td>
<td>Quantitative review finds computers lead to worse ‘skills practice’ (and, consequently, learning) than traditional practice methods.</td>
</tr>
<tr>
<td>Figlio, D., Rush, M., &amp; Yin, L. (2013).</td>
<td>Students in an online course show significantly worse learning than students in an identical face-to-face course.</td>
</tr>
<tr>
<td>Fox, A. B., Rosen, J., &amp; Crawford, M. (2009).</td>
<td>Instant Messaging time is negatively correlated with time-on-task and overall GPA.</td>
</tr>
<tr>
<td>Glass, A. L., &amp; Kang, M. (2019).</td>
<td>Students who use a laptop during class time (for notes and/or research) demonstrate significantly worse long-term retention and exam performance than students who do not.</td>
</tr>
<tr>
<td>Goolsbee, A., &amp; Guryan, J. (2006).</td>
<td>Over a 4-year period, there was a 68% increase in classrooms with internet connection across the US, but zero discernible impact on learning and academic achievement</td>
</tr>
<tr>
<td>Goolsbee, A., &amp; Guryan, J. (2006).</td>
<td>Over an 8 year period, over 12 billion dollars were spent on CPU and internet subsidies across US schools, but there has been zero discernible impact on learning and academic achievement</td>
</tr>
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<td>Author(s)</td>
<td>Title</td>
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<tr>
<td>Jacobsen, W. C., &amp; Forste, R. (2011).</td>
<td>The wired generation: Academic and social outcomes of electronic media use among university students.</td>
</tr>
<tr>
<td>Kraushaar, J. M., &amp; Novak, D. C. (2010).</td>
<td>Examining the effects of student multitasking with laptops during the lecture.</td>
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<td>Author(s)</td>
<td>Title</td>
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<tr>
<td>Patterson, R. W., &amp; Patterson, R. M. (2016). The Impact of Laptop Use in the College Classroom.</td>
<td>Laptop use during class time decreases scores by 0.14-0.37 grade points.</td>
</tr>
<tr>
<td>Woessmann, L., &amp; Fuchs, T. (2004). Computers and student learning: Bivariate and multivariate evidence on the availability and use of computers at home and at school.</td>
<td>Increased access to computers at home is negatively correlated with academic achievement. Increased access to computers in school has no impact on academic achievement.</td>
</tr>
</tbody>
</table>
Honours students forced to use computers during class show no GPA improvement and less satisfaction than honours students who do not use computers during class.

Banning laptops during class led to significantly improved student performance.

(p. 92) …I have also listed 50 highly-cited ‘positive’ research studies.

(Blue = Studies that show computers are merely equivalent to traditional methods
Green = Studies that do not compare computers to other methods)

<table>
<thead>
<tr>
<th>Reference</th>
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<tbody>
<tr>
<td>Bebell, D., &amp; Kay, R. (2010). One to one computing: A summary of the quantitative results from the Berkshire wireless learning initiative. Journal of Technology, Learning, and Assessment, 9(2), n2.</td>
<td>Over 3-years on one-to-one computer use in schools led to significant student learning (no comparison to other teaching/learning methodologies).</td>
</tr>
<tr>
<td>Cheung, A. C., &amp; Slavin, R. E. (2013). The effectiveness of educational technology applications for enhancing mathematics achievement in K-12 classrooms: A meta-analysis. <em>Educational research review</em>, 9, 88-113.</td>
<td>Use of computer assisted learning in K-12 significantly improves scores compared to traditional methods (effects are largest when used in addition to traditional learning).</td>
</tr>
<tr>
<td>Dunleavy, M., &amp; Heincke, W. F. (2007). The impact of 1:1 laptop use on middle school math and science standardized test scores. <em>Computers in the Schools</em>, 24(3-4), 7-22.</td>
<td>Students in a one-to-one laptop program for 2-years performed significantly better in science than students in a traditional class (but not math).</td>
</tr>
<tr>
<td>Elliott-Dorans, L. R. (2018). To ban or not to ban? The effect of permissive versus restrictive laptop policies on student outcomes and teacher evaluations. <em>Computers &amp; Education</em>, 126, 183-200.</td>
<td>Banning laptops in class had no discernible impact on learning or academic achievement compared to no-ban.</td>
</tr>
<tr>
<td>Foldnes, N. (2016). The flipped classroom and cooperative learning: Evidence from a randomised experiment. <em>Active Learning in Higher Education</em>, 17(1), 39-49.</td>
<td>Students in cooperative-based blended learning (part computer / part face-to-face) had significantly higher final exam scores than students in face-to-face.</td>
</tr>
<tr>
<td>Hu, P. J. H., &amp; Hui, W. (2012). Examining the role of learning engagement in technology-mediated learning and its effects on learning effectiveness and</td>
<td>Students who participated in an online learning program performed similarly to students in a the same face-to-face course.</td>
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<tr>
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<tr>
<td>Kay, R. H., &amp; Lauricella, S. (2011). Unstructured vs. structured use of laptops in higher education. Journal of Information Technology Education, 10(1), 33-42.</td>
<td>Students with structured laptop use during class spent significantly more time-on-task than students with unstructured laptop use (no comparison to traditional methods).</td>
</tr>
<tr>
<td>Koedinger, K. R., Kim, J., Jia, J. Z., McLaughlin, E. A., &amp; Bier, N. L. (2015, March). Learning is not a spectator sport: Doing is better than watching for learning from a MOOC. In Proceedings of the second (2015) ACM conference on learning@ scale (pp. 111-120). ACM.</td>
<td>Students who perform activities during online learning perform significantly better than students who only watch videos during online learning (no comparison to traditional methods).</td>
</tr>
<tr>
<td>Lowther, D. L., Ross, S. M., &amp; Morrison, G. M. (2003). When each one has one: The influences on teaching strategies and student achievement of using laptops in the classroom. Educational Technology Research and Development, 51(3), 23-44.</td>
<td>Students who had one-to-one laptops performed significantly better on writing assessments than students who shared laptops during class (no comparison to traditional teaching methods).</td>
</tr>
<tr>
<td>Ma, W., Adesope, O. O., Nesbit, J. C., &amp; Liu, Q. (2014). Intelligent tutoring systems and learning outcomes: A meta-analysis. Journal of educational psychology, 106(4), 901.</td>
<td>Students who received personalized computerized tutoring performed similarly to students who received personalized face-to-face tutoring.</td>
</tr>
<tr>
<td>Mitchell, M. J., &amp; Fox, B. J. (2001). The effects of computer software for developing phonological awareness in low-progress readers. Literacy Research and Instruction, 40(4), 315-332.</td>
<td>Students who received 5-hours of computer-based phonological training performed similarly to students who received the same training face-to-face.</td>
</tr>
<tr>
<td>O'Dwyer, L., Russell, M., Bebell, D., &amp; Tucker-Seeley, K. R. (2005). Examining the relationship between home and school computer use and students’ English/language arts test scores. The Journal of Technology, Learning and Assessment, 3(3).</td>
<td>Review shows students who use computers to edit papers at school demonstrate higher scores than those who use computers to prepare presentations (no comparison to traditional teaching methods).</td>
</tr>
<tr>
<td>Author(s)</td>
<td>Title and Details</td>
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<tr>
<td>Sivathaasan, N., &amp; Velnampy, T. (2013).</td>
<td>Use of electronic information resources and academic performance of university teachers: a case study. <em>European Journal of Business and Management, 5</em>(14), 46-52. Students who have access to e-resources (reading, notes, etc.) score significantly higher on exams than students who do not.</td>
</tr>
</tbody>
</table>

Students in an online course performed similarly to students in the same traditional face-to-face class.


A meta-analysis shows students who employ intelligent tutoring systems performed similarly to students who employed face-to-face tutoring.


Students who undertook one-to-one laptop language arts training for two years performed significantly better than students in a traditional class.


Students who received extra support via digital tutoring demonstrated significantly higher test scores (no comparison to traditional methods).


Students who used a computer-based language arts tutoring system score significantly higher on language scales than students in a traditional class.

(p. 93) …recent survey exploring how over 1,500 students…most often utilize this tool…


(p. 94) …less than 6 minutes before accessing social media…


(p. 94) …students typically spend 38 minutes of every hour off-task.


(p. 94) …nearly 40% of students were unable to stop themselves from multitasking.

(p. 95) …[J-PAL] goes on to state:


(p. 97) …excerpt from a 2010 paper exploring the impact of 1-t-1 computer programs…


(p. 97) …teaching computer skills is a worthwhile goal…


(p. 97/98) …the OECD goes on to state:


(p. 98) …where Thamus (Socrates) warned…


(p. 98) Philo T. Farnsworth…intended his tool to disseminate knowledge…


(p. 98) Robert Propst…intended his easily reconfigurable office dividers…


(p. 98) Alfred Nobel…intended his invention to be used only for industrial purposes…


(p. 99) As the OECD states:


(p. 100) …pleasure has been linked to motivation…


(p. 100) …correlation between enjoyment and learning is surprisingly weak.


(p. 101) Approximately 90% of schools can boast possession of a library...

(p. 102) …the OECD statement quoted earlier...


(p. 103) …fewer than 5% of enrolled students have ever completed...


(p. 103) …completion rates are below 50%.


(p. 103) …individuals have a legitimate reason for being unable to attend live classes.


(p. 103) …individuals with specific learning disabilities.


(p. 103) …can use computers to transcribe speech...


(p. 103) …can use computers to type...

Airline pilots practicing mid-air emergency manoeuvres...


Surgeons practicing invasive procedures...


Formula One drivers practicing city-street courses...


The same cannot be said for knowledge of facts, dates, events, etc.


The same cannot be said for knowledge of facts, dates, events, etc.

Chapter 8

Rewards

(p. 105) “No one asks how to motivate a baby...”


(p. 105) In his book *Predictably Irrational...*


(p. 105) ...reflects on the surprising findings from one of his experiments...


(p. 106) ...it's actually the infamous Harvard professor B.F. Skinner.


(p. 106) A staunch adherent to the tenets of behaviourism...


(p. 106) Skinner’s most notable set of experiments involved a conditioning chamber...


(p. 106) ...Azrin published research in 1968...


(p. 106) In all 6 of Azrin’s experiments...

This extinction effect has since been replicated in dozens of studies...


The psychological concept of generalisation...

Encyclopedia Britannica (retrieved 2020). *Generalization*. Available at: https://www.britannica.com/topic/generalization

…in Pavlov’s famous study...whenever they heard a sound resembling a bell.


…a number of educational studies dating back to the 1970s...


In one such study, researchers lamented that...


…and in 1942 researcher Leo Crespi found...

(p. 107) …"manifestation of some degree of frustration...


(p. 107) …called behavioural contrast...


(p. 108) …hundreds of schools in America where financial incentives are being used...


(p. 108) …the impact of paying 27,000 students to read and study...


(p. 108) …ranging from weight loss...


(p. 108) …to anti-smoking...


(p. 108) …coined the undermining effect.


(p. 110) …a related framework called organismic integration theory...


(p. 112) …the brain circuitry associated with reward-driven behaviour.


(p. 112) …processed within a student’s ventromedial prefrontal cortex.


(p. 114) …a scarcity mindset must underpin the competitive...


(p. 114) …John Hagel refers to as the Masculine/Feminine archetype...


(p. 115) …Intrinsic motivation emerges only when an activity or behaviour...


(p. 115) …intrinsic motivation can emerge with clear evidence of impact.


(p. 115) When rewards are left ‘dangling’…reduce effectiveness...


(p. 116) Intermittent rewards…increase efficacy...

(p. 117) “Time is what we want most, but what we use worst”.


(p. 117) In a 1784 letter to the Journal of Paris…


(p. 117) Starting April 30, 1916…


(p. 117) …only to be reintroduced during the global energy crisis of the 1970s.


(p. 117) …daylight saving time actually increases energy consumption...


(p. 118) …the 8-hour work day was instituted to protect exploited workers...


(p. 118) …nearly 60% of modern work being knowledge-based...

(p. 118) …increased productivity, efficiency, and wellbeing with 6-hour work days.


(p. 118) …the 3.5 minute pop song...


(p. 118) …US public schooling was a year-round endeavour.


(p. 119) …the 9-month school year was an urban invention.


(p. 119) ...25 to 35% of students wouldn’t show up for school...


(p. 119) ...mandatory school attendance laws...extant in nearly all world countries...

For a list of all countries with compulsory school laws and the year each was ratified - https://en.wikipedia.org/wiki/Compulsory_education

(p. 119) ...reduced the average family vacation to only two-weeks...


(p. 119) ...a phenomenon called the forgetting curve...

Ebbinghaus H (1880) Urmanuskript "Ueber das Gedächtniß". Passau: Passavia Universitätsverlag


(p. 119) ...spaced repetition.


(p. 121) …to apply for Iowa State...


(p. 121) …Carnegie established a $10 million pension fund...


(p. 121) …only students who successfully completed 24 Carnegie Units...


(p. 121) …"improve the administration efficiency of schools and colleges...


(p. 122) …the brain possesses a unique dual-system apparatus...


(p. 123) Flow state...


(p. 123) …individuals become deeply absorbed in a particular task...


(p. 123) …engagement increases, confidence grows, and productivity soars.


(p. 123) …performing a task that is deeply familiar but challenging...


(p. 123) …undertaking a task that is intrinsically motivating...


(p. 123) …undertaking a task that is intrinsically motivating...


(p. 124) …research suggests this can improve student/teacher relationships...

Mizhquiri, L. (2019). *White Paper: The Effects of Block Scheduling and Traditional Scheduling on High School Student Achievement*. Available at: https://digitalcommons.dartmouth.edu/educ17whitepapers/1/
(p. 124) …the impact of block scheduling on general learning is varied...


Mizhquiri, L. (2019). *White Paper: The Effects of Block Scheduling and Traditional Scheduling on High School Student Achievement*. Available at: https://digitalcommons.dartmouth.edu/educ17whitepapers/1/

(p. 124) …some schools have embraced shorter class periods.

For example: https://tenneyschool.com/what-is-the-real-ideal-class-length/

(p. 125) …sleep-based memory consolidation.


(p. 125) Human beings have a near 24-hour circadian rhythm…


(p. 125) …each night is typically divided into five 90-minute sleep cycles.


(p. 126) During stage II, the brain largely consolidates memories…


(p. 126) It's not until the fourth and fifth sleep cycles of the night…

Available at: https://thebrain.mcgill.ca/flash/d/d_11/d_11_p/d_11_p_cyc/d_11_p_cyc.html

(p. 126) …the circadian rhythm shifts about 2 to 3 hours later…


UCLA Health (retrieved 2020). Sleep and Teens. Available at: https://www.uclahealth.org/sleepcenter/sleep-and-teens

(p. 126) …research largely supports this notion.


Chapter 10

Purpose

(p. 129) “Form [ever] follows function”.


(p. 129) “From within, outward”.


(p. 131) …public schools do not exist to serve a public...


(p. 131) [A Narrative] must meet three key criteria...


(p. 132) Spearheaded largely by Thomas Jefferson...


(p. 132) …”Public schooling is the keystone in the arch of our government”.


(p. 132) …nearly 50% of eligible voters did not cast a ballot…


(p. 132) …nearly 70% of Americans cannot name any current state representative.

Haven Insights (2017). *Just 37% of Americans can Name Their Representative*. Available at: https://www.haveninsights.com/just-37-percent-name-representative/


(p. 135) …fewer than 50% of students report feeling engaged...


(p. 135) …alternative schooling increases by about 5% every year.


(p. 135) …music, exercise, and dramatic arts programs do little...

Sala, G., & Gobet, F. (2020). Cognitive and academic benefits of music training with children: A multilevel meta-analysis. Available at: https://psyarxiv.com/7s8wr/


(p. 135) …this relationship appears extant amongst low-income countries...


(p. 135) …according to the most recent international PISA results.

Available at: https://www.oecd.org/pisa/publications/pisa-2018-results.htm

(p. 136) “Let us be good stewards of the earth we inherited...


(p. 136) …over 18-million hectares of land…9 thousand homes…1 billion local animals...


(p. 137) “If I have seen further...


(p. 138) “Without tools [man] is nothing...

Carlyle, T. (retrieved 2020). Available at: https://www.goodreads.com/quotes/129420-man-is-a-tool-using-animal-without-tools-he-is
(p. 141) “The task is not so much to see what no one has yet seen..."


(p. 142) This tent...was dubbed Skunk Works.


(p. 142/143) …only 143-days into the project...


(p. 143) …capable of flying nearly 200 kilometres per hour faster...

Mustang Top-Speed: 703 km/h. Available at: https://en.wikipedia.org/wiki/North_American_P-51_Mustang

Spitfire Top-Speed: 594 km/h. Available at: https://en.wikipedia.org/wiki/Supermarine_Spitfire

XP-80 Top-Speed: 965 km/h. Available at: https://www.lockheedmartin.com/en-us/news/features/history/p80.html