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Leornian Principles HANDBOOK

Reforming Literacy Education for the 22nd Century: Applied neuropsychological theories and innovative solutions for the mass education market including a new model for how education systems can employ innovation and modern technologies into the future

Author:

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Old English - Verb: leornian: t*o learn, to teach*

INTRODUCTION

Welcome to this ‘work in progress’ as it can never be truly completed.

Literacy education and the creation of the intelligent student is the general topic here, but in order to allow for a broad scope it is going to be multiple things, a handbook of techniques, provide philosophical arguments for the widespread underperformance of our schools and the rearwards looking of our researchers rather than optimistically looking towards the future with the attitude of a visionary.

Importantly, this book isn’t about me and my work to date, but an invitation to everybody to take up ownership of the world’s literacy crisis in our English speaking schools. To that end, think of what you read here as YOUR BOOK and all errors, typos and inconsistencies are your problem that need your effort to repair and then your effort to collaborate in its proof of authenticity. This very early effort has literally been ‘thrown’ together to get it out to you warts and all, because I am critically underfunded, have limited time, a very short attention span, about two quality work hours per day and no idea how to write a book properly. I have some strengths but writing books isn’t one of them.

To give some validity to this work, it will incorporate our findings and sometimes discuss in minute detail clinical observations that are thought to be significant in the development of the modern learning mind. These often disparate contributions are really an invitation for future researchers to replicate my findings and then attempt to formally install them into their rightful place within the formal literature.

As a note of caution: unlike usual research protocol whereby everything is highly referenced, this work is a fresh view. Early on a conscious decision was made to avoid any established schools of thought or doctrines meaning it hasn’t been constrained in any formal way, but from intuition, instinct and a keen eye for positive clues. This is an original work. It was very early on in our clinic when forced to take a few sessions in reading that it became apparent that I had a very different intuitive way of approaching the reading dilemma. In its purest essence, I just saw it as a skill to teach and be learned akin to my major teaching areas of wood, metal and the manufacturing crafts in the workshop. Never having actually formally been instructed in reading instruction techniques, I was unaware of what all the problems were and really for me there were hardly any problems because the way I worked with them, it worked.

Recent decades has seen an exponential growth in research right across the spectrum of academia. As with all research, the primary academic faculty whom hosts the research is often not the ultimate end user of the insights revealed. This underlying fact is a hallmark of this work. Regardless of when, where or

which academic faculty the knowledge originates it will have been incorporated should it benefit the end result.

A guiding principle of this work emerged early on that it must be built to be included within the fabric of a ‘machine’. The concept of a machine in education was virtually unknown before the advent of some computer software in the recent decade as teaching is largely seen as an art, but Leornian Principles believe that it is only possible to tangibly increase global performance outcomes through the creation of machines that are operated within strict guidelines. The machines can then be designed, built, tested, refined and finally described with a specification document that will accurately define realistic expectations as to performance outcomes in much the same way as we see as common practice in the medical industries, engineering, motor vehicles to name but a few.

Recently, the worlds Covid-19 pandemic should have taught even the most ardent believers of ‘evidence based and evidence informed’ as to the nonsense of these for building a viable education system over the long term. The simple truth of hand washing clearly demonstrates that an evidence based approach would have killed many more hundreds of thousands of innocent people this past year if not millions. Why, because an evidence based approach says- ‘washing hands is shown to be effective in controlling the spread of germs’, so we now add the professional opinion of the teacher who should use their considered opinion as to if you actually use this knowledge, and if so how you actually implement it. Do you wash briefly, a quick flick here and there, wipe your hands on the grubby tea towel after. If you asked 100 million people how to wash their hands, every single one of them will have knowledge of and an opinion on how it should be done. But.

Covid-19 has shown us that the simple process of hand washing hygiene requires a definite protocol. It is not difficult in any way, but doing it in a particular sequence and duration alters the effectiveness comprehensively. This has meant that governments around the world have spent millions of dollars educating the masses on this incredibly simple yet basic skill. It is screaming at everyone ‘we don’t want your opinion, do it this way and only this way because it works, it has been tested and verified as effective’.

Unfortunately for our education systems around the world, there are no definitive machines, programs or processes that are able to be efficiently researched and refined to the point that a specification document could be viably created but I believe this could be changed quite simply. Imagine our motor cars without the rigorous testing that occurs in labs, on race tracks, in desert rally’s and on the congested peak hour roads. It is this ongoing refinement that sees our world with safe and reliable cars that are an accumulation of knowledge, then expressed within a physical machine that is built to perform a function at the highest standard, economically, reliably, in any weather around the world regardless of driver experience or competence. It is the machine that spans the gap in knowledge and the frailty of the human condition but which still allows for excellence of performance by the human operating the machine in the quest to achieve a desired outcome be that getting from A to B using a car or creating an intelligent capable human individual whom is able to learn efficiently within any school system the world over regardless of the imperfections of the personal circumstances they find themselves..

To do this it is not difficult, but does require a mind shift:

Step one: Use a high technology tool to create the modern learning brain. This won't be the substance of the 3 R's but the capacity to do the 3 R's. In other words, not the curriculum of them but the 'ability' to learn them. This step needs to be rapid, efficient, effective, and the 'magic bullet'. **This is currently the missing ingredient in our education's collective academic wisdom the world over.**

Step Two: Teach whatever you want, curriculum, flavour of the month, government agendas. Who cares, because the student has a brain developed to be able to process, comprehend, infer, attend, grow with the future demands.

Philip Gruhl

5th October 2020

Chapter 1

A RECENT HISTORY THAT SETS THE SCENE FOR FAILURE

Let us begin our history lesson as it being relevant to creating our issues with reading and learning. 1960 was when many of the current older people of our community were learning to read at school. I am also one of those people and following my initial education and University I began teaching. Something that was very apparent at that time was that there was a shift from a narrow curriculum within a school to a very broad-based curriculum. It was in my first couple of years of teaching where there were extremely heated discussions at staff meetings where faculties of Maths English and Science where arguing their case for requiring their full allocation of time against other new subjects that were beginning to impose time demands on the curriculum.

These new demands on the school day continued through the 20 years of my in-class experience and over time the curriculum base steadily broadened at the expense of deep learning as it is described today in modern research.

In these first 10 years of my classroom teaching career I was also being exposed to a parallel universe of speech pathology as my wife being a speech pathologist, was transitioning into a fledgling speech pathology private practice. The typical private practice client was of our younger people and in the early 1990s newly employed graduates in the practice promoted the strong movement in literacy acquisition towards phonological awareness, as cutting edge research emerged about the important place that this technology and method had for emerging readers.

Within a few years the creation of early commercial expressions of this new technology began to emerge. University of QLD were at the cutting edge of this new work and as that is our local university it was logical that we embraced it. We went on to create our own phonological awareness early literacy package that for us, we called STARS: Sound Training Activities for Reading and Spelling. This package was never commercially released for the general public other than in-clinic however over about seven years the package which ranged from pre-literacy through to late Primary school 12 year old's and became

comprehensive and a well-developed package that was clinically robust and created consistently good outcomes – usually. Almost always with kids 5 to 8 years old, but at much lower rates in 10 to 14 year old aged students.

Many countries around the year 2000 commissioned major studies as to the underperformance of literacy acquisition and the university faculty 'School of Education' became significantly aware of this new shift at this time and significant research from an educational perspective began accordingly.

It became very apparent in a parallel universe of speech pathology running alongside of education that there was a rift between the two faculties with very limited exchange of ideas as initially the Speech Pathology faculty was invited to provide lectures on Phonological Awareness PA theory and practise but over coming years the amount of cooperation dwindled with speech pathology faculty no longer receiving invitations.

Working within these two worlds was quite strange at first because I was unaware that there would be this stress between these two organisations. As time has passed the situation has not improved but to the contrary has degraded further.

Around about the year 2000 when education began researching the phonics approach to teaching of reading it began publishing and in a small way beginning a dialogue about the place that phonics has in early reading.

At this stage over 10 years have passed since we were using phonological awareness in our clinic and the take up in the classroom was nearly zero as evidenced by the clients whom we worked with. It is now the year 2010 nearly 20 years from the early evidence of phonological awareness and phonics and its place in early reading. It is being more heatedly discussed amongst teachers and universities and what is the classroom impact.

The take up of phonics and phonological awareness technology really struggled within the classroom as there had been a movement away from the rigorous and rigidly taught curriculum in the early 1980s and this was the time that our older teachers were at University training and this has carried right through to the teacher training as it exists to date. We are now in the situation that our current teachers were at school and in their tertiary education completely embedded within a whole word approach to literacy and this has provided the core philosophical framework for their thinking.

The university academics who promoted the whole word approach of the 1980s 90s justifiably had earned their academic positions through their own research and the collective wisdom of the day. The very nature of our universities and the research that they do is that only after exhaustive work can an idea grow to a theory and become an accepted practise. Owing to this, it was unreasonable to expect that the Whole Word faction of their education faculty should willingly give up their position. However, the emergence of the phonics, phonological awareness theory and practise conflicted with this Whole Word work, but as evidence became more abundant, it was clear that outcomes were more predictable and better.

These days, there is a disconnect between cutting edge technology and its application within the classroom. In no way condemning the professionalism of teachers but the nature of the profession sees it more as an art rather than a technique and systems following industry.

Our academics who worked on early phonological awareness and phonics theory for most of their entire careers have had their work rigorously validated by myriad studies. It is reasonable to understand their frustration that this work which was affectively validated in 1990 some 20 years later is being largely ignored or at least struggling to find its rightful place within the classroom setting.

The emergence of many other so-called Literacy solution technologies is frustrating these phonological awareness academics. They are emerging in response to the growing body of research that often comes from faculties completely unrelated to education or speech pathology. Reading is a common activity that every academic has mastered and as such everyone believes that they can offer something. There has been a rapid emergence of all sorts of different programmes things like Dore, Irlen, Cogmed, FastForward neurofeedback therapy to name a few, but are just the tip of an iceberg of alternative programmes which number well over 100.

It's these new kids on the block that don't have rigorous testing so far, that has infuriated many senior academics that have worked tirelessly under the umbrella of phonological awareness and now here emerges the next era of academic expression and publications towards the reading puzzle.

Less formal ways are now being used by academics to make their point such as writing and publishing books. There is now a loud voice coming from older academics discouraging the use of newer therapies and practises on the basis that they lack the evidence base. Older academics rightfully argue that phonological awareness has a greater body of support than any other method, though this is largely because they have been at the forefront of literacy education and research now for about 30 years. Using this logic, no innovation can be used as by definition an innovation is something that comes without any formal evidence at its point of creation.

The dilemma for our recent history now is that we have emerged from a period of this new PA technology, that has been professionally researched, but then been poorly taken up within its intended marketplace. Now it is becoming threatened through competition of other technologies for which there is not robust evidence. This has seemingly frustrated our academics to the point that they are actively discouraging the use of any innovation technologies which have scant research and may only have a small body of compromised evidence compared to the thousands of papers written on Phonological awareness.

I heartily sympathise with these academics because they have created a product which is extremely effective as we found within our own private practise. My estimation is that when the PA method is well taught to children of 5 to 8 years old, successful outcomes are about 90% successful. These academics understand this completely, and it must be incredibly frustrating that it is not being well used to achieve these outcomes.

You might then ask where does BRPOD Leornian principles fit within this whole process, because with what has just been described it too is a new technology and therefore likely to be received poorly by academics.

Very briefly because this is not the place for describing the BR POD, but in our clinic we found that after a student was beyond the 8 year old age bracket, the students who are ten 12, 14 years old responded very poorly to a Phonological Awareness approach. In our private practise, we had other specialties including occupational therapy optometry and psychology professionals working towards the successful educational

outcomes for our students. It was working with these other faculties and distilling the very essence of essential components from each faculty that was the difference. It allowed for the creation of a package that would encompass the very best across multiple faculties which revealed the mixture required enabling a short term intensive solution that would kick start an older student on their path to reading. In its simplest essence, it created a new beginning and was not reliant on anything previously learned, in fact it worked better the less previously learned!

History has now brought us to this point and we either continue as we have done for the last three decades or as every other industry has around the world we embrace new technologies with enthusiasm and try to distil their very essence in order to make profound gains moving towards the 22nd century.

Chapter 2

DESIGN: WHY EDUCATION ACADEMICS HAVE FAILED US

See homo deus pp 14 15

The past three decades have been extremely formative in our current dilemma as over this time which parallels with my own life as a student, then teacher, then private practitioner and inventor, we as a society have journeyed from the awakenings following WW2, the Vietnam War followed by the transition to a more liberal humanist philosophy where the individual person is the prioritized unit with systematic downgrading of our classical institutions such as churches.

Our schools of psychology took inspiration from this epic shift in society and whether by design or chance, the landscape of the classroom morphed from an ideology of 'the teacher knows best' to a 'student centered teaching' approach where the teacher is a guide to a student rather than an instructor.

The real life difference of the 'instructor' centered approach compared to a student centered, sometimes called an experiential approach can be splendidly displayed with the process of learning to drive a car and pass the licence test where the teacher will cover all aspects of the driving process, technical, legal, method and attitude. By comparison, a student experiential approach would be that a student driver would be put amongst cars, see them, perhaps touch them, perhaps get in and try to make them move, all with the teacher looking on prepared to give feedback from time to time. Skill development would be through the expectation that the student hops in the car and drives for 20 minutes each day.

We all know that this is not how we teach a student to drive. It is done in a highly restrictive manner, reducing the number of skills to just one or two until these are familiar, then another few can be added until the composite skill grows into what we know as 'driving a car'. Driving instruction success rates approach nearly 100%. There are just a very few people whom have special issues that prevent them from competency but even these people with special intervention from often unrelated fields can help resolve a problem leading to ultimate success.

So we can instruct nearly 100% of school aged students to drive but globally we fail to have over 50% of our students effectively literate to the minimum PISA standard. So what do driving instructors know that school teachers and our academics are failing to understand?

Chapter 3

THE NEW WORLD OF LITERACY EDUCATION NEEDS TO LEARN A FEW LESSONS ITSELF…

From Concept to Commercial Practice, a glimpse at another industry:

Hydrometallurgy:-

ELSEVIER

Hydrometallurgy

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Present and future commercial applications of biohydrometallurgy

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Abstract

Modern commercial application of biohydrometallurgy for processing ores became reality in the 1950s with the advent of copper bioleaching at the Kennecott Copper

Excerpt:

"Even with the current success of biohydrometallurgical applications in the mining industry, the real potential of biotechnology in mining remains to be realized. ***As confidence in commercial bioprocessing grows and experience extends the application's knowledge base, innovations and new commercial practices will emerge."***

Literacy has no machines.

And this is the major reason for why the 'Literacy Education System' has bogged down:- it doesn't have any machines.

Definition of ***machine****: "General: Semi or fully automated device that magnifies human physical and/or mental capabilities in performing one or more operations"*

That of course would seem to be the most idiotic thing anyone could propose as to the problem with the Literacy Industry, but *well-built* machines are what has allowed societal progress as we recognize it today.

It is very apparent is that there are extremely few actual 'machines' developed that are capable of enhancing the 'teaching of literacy' process. The beauty of a machine is that it can be created with a definable function that has a measurable effectiveness. It is capable of being consistent, able to incorporate many and varied technologies concurrently and ultimately it either works or it doesn't.

Everyday we use machines, be them scissors that cut or not, a pen that lets us make lines or a syringe that enables the safe and efficient transfer of liquids for a doctor. Our machines either work or they don't. It is a very simple measure of effectiveness.

And in the spirit of being proactive, effective and visionary, this project is about Leornian Principles bringing a real hands on machine that is a Literacy Teaching Apparatus. It either works or it doesn't - simple.

You have used a Design Brief:

Anyone who has wanted to build a house or used the services of a designer will know that when building or making anything, there is always a design brief. An architect may ask for your budget, preferred style, number of bedrooms and bathrooms and an engineer may want to know how many people a staircase may need to carry. The list is pretty huge and it shapes the thinking process for both you and the designer so that when the project is completed, it reflects the desires of the 'customer' and will conform to legal and safety requirements.

Of course it makes sense that there is a design brief associated with this project. It will either meet the specifications of the design brief or it won't. Either way, it will give an opportunity to create some lofty goals and shape the thinking process so that ultimately as the project evolves, each stakeholder may have a common idea of where things began and where it is heading.

This Design: Is it Rhetoric or a New Reality – Truth or Fraud.

I believe that unless this document goes on to offer a genuine difference then it is also a fraud and only supports the notion that Literacy is in fact apparently impossible to repatriate or teach efficiently!

This may take a lot to believe, but the rest of the book is going to outline aspects of the Literacy Learning Process that is **results centred rather than research based.**

If I make a bold claim that we can demonstrate consistent improvements in Reading Comprehension of three years following a single two week period of instruction, then this bold claim is either fact or fiction.

Another pivotal point is that if this has never been achieved before and is in fact a revolutionary change in methodologies, then it is also logical that it cannot be steeped in the formal research based process where development is achieved incrementally.

This then also leads to the seemingly indefensible position for this new methodology that there will be little research available to substantiate the claims being made short of taking the new 'End Position' and working backwards to explain the phenomenon occurring.

And this new thing will then be exposed to vitriolic attack by the 'establishment' as is the established norm that has occurred with any new reformist idea over the centuries.

So I shall go on to share what is the beginning of a new reality for Literacy education into the remainder of the 21st Century so we can get off to a flying start for the next one!

Overview of Leornian Principles

Formerly known as 'Behavioural Reading' TM (Leornian Principles™) created by Philip Gruhl (2013) it includes a number of innovative techniques and resources developed over eight years teaching in a private practice clinic. These have been designed, practised and refined to specifically support students with learning difficulties but as it has seen an every greater cross section of clients its true versatility is looking really exciting and is proving to effect remarkable outcomes with many and varied client profiles.

At its core, Leornian Principles stems from a non-discriminatory view of any and all sources that may have something to directly or indirectly contribute to eliciting favourable outcomes. This new philosophy, method, system and technology has then been built into some sort of physical machine, IT technologies, or physical apparatus that can be handled and used to create consistent and predictable outcomes.

At the heart of Leornian Principles, an elite sports philosophy where applying correct technique to essential learning processes combined with efficient daily practice will can create successful reading and learning minds in almost all students in a rapid manner.

A key feature of Leornian Principles is the short feedback loop for verification of correct practice. Unlike traditional education where 'teaching' may occur for a year before evaluation of the 'technique' can be measured, Leornian Principles allows for capturing qualitative or quantitative data within a single fortnight. This advantage enables the growth of knowledge and practice from hypothesis to evidence to clinical practice in an incredibly short time.

From concept to reality, there has been the need for some guiding principles which I wrote as a Design Brief. This made the creative process and then the evaluation of anything that was produced easy to keep or discard.

Parents of children would ask if it was the right thing and would it work in their particular circumstance, the same way as you might go to the swimming pool shop and ask if the filter and pump unit is appropriate for your pool and spa combination. To me this was an easy answer because when I built it and would come upon an obstacle, it would be redesigned and rebuilt to circumvent the problem.

Design statement

LP has been built so that it works irregardless of a students ability or condition, the support or lack of it from their home, the competence or not of their teachers, the varied support from their school, the current fashion of the educational curriculum or any political bias of the day or even the accessibility to quality computer hardwares and bandwidth.

In other words, it works in spite of everything, at least that unashamedly is the goal!

Design Brief

1 Create a method that enables Literacy Learning for all

2 The method shall succeed regardless of political climate, educational resources or personnel skills

3 The method will be rapid and easy

4 The method shall always be safe and effect measurable change within two weeks.

5 The method shall be robust, complement emerging technologies and forward looking

6 The method will empower people all over the world to assist, instruct and learn effectively

7 The method can morph into other target disciplines

8 The method and apparatus will foster creativity, research and innovation globally.

9 The method will be a collaboration of all relevant sciences and schools of study

10 The method will be recognised as the New Peak Body

Evolution of Leornian Principles

Leornian Principles began with a strong foundation in Phonological Awareness interventions that has been researched extensively and the use of computer based software has some evidence base to support its use in the treatment of literacy difficulties. Working memory and sequencing difficulties and its association with reading difficulties were also well reported in the literature. Strategies such as 'chunking', reducing reading rate and the use of mnemonic strategies are often recommended to assist students with working memory and subsequent literacy difficulties.

Leornian Principles began as a research based intervention approach, integrating such recommendations cited in the literature, however as success became evident the willingness to explore and incorporate many and varied ideas occurred.

Leornian Principles offered a unique opportunity because of the very short feedback loop for success.

Prior to this a variety of theoretical explanations as to the causation of literacy difficulties have been hypothesised. In summary, these include the phonological theory, the cerebellar theory and the magnocellular theory (Ramus, Rosen, Dakin, Day, Castellote, White and Frith, 2003). According to Prideaux, Marsh and Caplygin (2005) cerebellar theorists' postulate that the range of deficits associated with dyslexia can be attributed to a mild dysfunctional cerebellum evidenced by difficulties with skills such as balance, postural stability, motor coordination and automatisation. The phonological theory has at its core of dyslexia, a cognitive deficit in phonological awareness; whereas magnocellular theorists propose both auditory and visual temporal processing deficits resulting from impairment of neural pathways involving large magno cells (Prideaux et al., 2005).

The creation of an internet Leornian Principles browser served medium allowed for the creation of our main actual physical tool which we affectionately call POD. I was of the opinion that ultimately, research and understanding can only be of use if somehow the knowledge can be integrated into some actual hands-on item that will efficiently and effectively be integrated into the daily practise of clinical professionals. It is then possible for the 'tool' to be refined, made better, more efficient, faster and all the good things we see in product evolution in our modern world.

Ultimately we see a process which reliably results in the designed learning or repatriation of a given student to a place of comfortable competency within their school community.

Overview of POD

POD was built to provide a machine style of device that gave a consistent output. It had a few features that were thought to reflect current modern ideas of the reading and learning brain from inside the fields of Education, Speech Pathology, Occupational Therapy and Optometry.

The prescribed use of POD intervention software of 10 daily sessions of one hour each was hypothesised to open new neural pathways and ‘create the learning mind’.

POD intervention is based upon the multi-deficit hypotheses (phonological, cerebellar and magnocellular) of dyslexia using computer-based tasks requiring central executive processing, sequencing, visual and auditory processing as well as phonological awareness skills (segmenting and blending letter sounds).

POD is web based and available via online subscription. The design of POD in its delivery and content has evolved following global improvements in computer technologies and web speeds.

Measurement and observation of student responses using standardised testing and anecdotal data has provided direction for POD software design to improve foundation skills necessary for reading including:

: • Visual perceptual skills (visual tracking, visual memory, visual discrimination, visual form constancy and visual closure);

• Auditory perceptual skills particularly auditory discrimination; • Phonological awareness skills;

• Central executive sequencing.

Use of POD is prescribed and recommended for students eight years and over (although can be suitably adapted for younger students where appropriate) who have not been diagnosed with epilepsy or other neurological disorder.

In addition to task requirements, students are expected to verbalise what they are doing, alternate coloured and clear glass lenses between the right and left eye are used to increase the visual load and central executive loading to alternate hemispheres and also for syntonic effects. In addition students ‘tap out’ phonemes and read letter combinations phonetically (nonsense words) and spell in name form.

Concurrent to this students are instructed to read using the unique Behavioural ReadingTM techniques. By combining this aggregation of activities it is evident that improvements in processing and phonological awareness skills combined with explicit reading instruction are transitioned into effective and efficient reading behaviours..

Unique features of POD

Lorem

Clinical experience of POD

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Research:- The Clinically Short Feedback Loop with Leornian Principles

An idiosyncrasy of the Leornian Principles/POD environment is the very rapid way that change can occur and be seen. This is something very unusual in the field of literacy and reading but it does occur. The research and development opportunity that comes from this, is massively profound and was a very significant reason that the method was able to be produced ostensibly by a single person and where a lot the developing occurred in a two year period.

When this was being developed I had a saying,,,, “when you get it right, you can see the improvement in only a few minutes or virtually immediately.” - That was the environment that I enjoyed, one with an incredibly short period between idea, hypothesis, design and manufacture of a technique, trial, indicative results revealed, decision to keep or discard and move on. This whole process would often happen within a single clinical session with a client.

The importance of this style of research is that the subtle observations that I was able to make were in fact significant, yet if I attempted to record the observation and write it up later, the nuanced nature of the phenomenon was so ethereal that it would escape me. It was literally the ‘aha’ moment of clarity for just a moment in time which I was able to capture.

The capturing and manufacturing of a Leornian Technique was facilitated by the genius of our Leornian Software Team whose vision was to empower inventors to pursue their own talents. In

expressing their idea, they provided a software ‘shell’ that I could program the actual content that I needed in real time and deliver it via an internet served browser. This meant that in the single session with my client when I noticed the ‘problem’, had an idea, wrote a new page or sequence of pages, allowed the client to use the new pages immediately and then observe the outcomes as either successful or not it meant that the feedback loop from problem, to idea, to solution could literally take 15 minutes.

Leornian Principles now want to take this much further into the realms of education and our understanding of treatments for acquired brain injuries because of the Leornian Principled Short Feedback Loop.

Picture this scenario as to the power of such a concept. We have 200 schools using the software streamed via the internet in real time. Lets assume we have five students doing POD in the current fortnight in each school. Five students times 200 schools gives a sample size of n=1000.

Students have undergone an appropriate clinical test to quantify pre values for the desired feature that is being investigated. The software is then altered to allow 100 schools receive variable ‘A’ and the 2nd 100 schools receive variable ’B’. The variable could be things as simple as the background colour, the timing of words being flashed on screens, wearing colour filter glasses.

The point being, is that on retesting a fortnight later, there will be quantified values as to the outcome of the experiment and whether at a glance the concept is worth pursuing or not. Now multiply the amount of questions that can be asked and answered for researchers if there is data from across the world with sample sizes of literally millions facilitating the asking of literally thousands of questions per week.

Chapter 5

INSIGHTS: THE LEARNING BRAIN

The Biology: Synapses, Dendrites and Learning

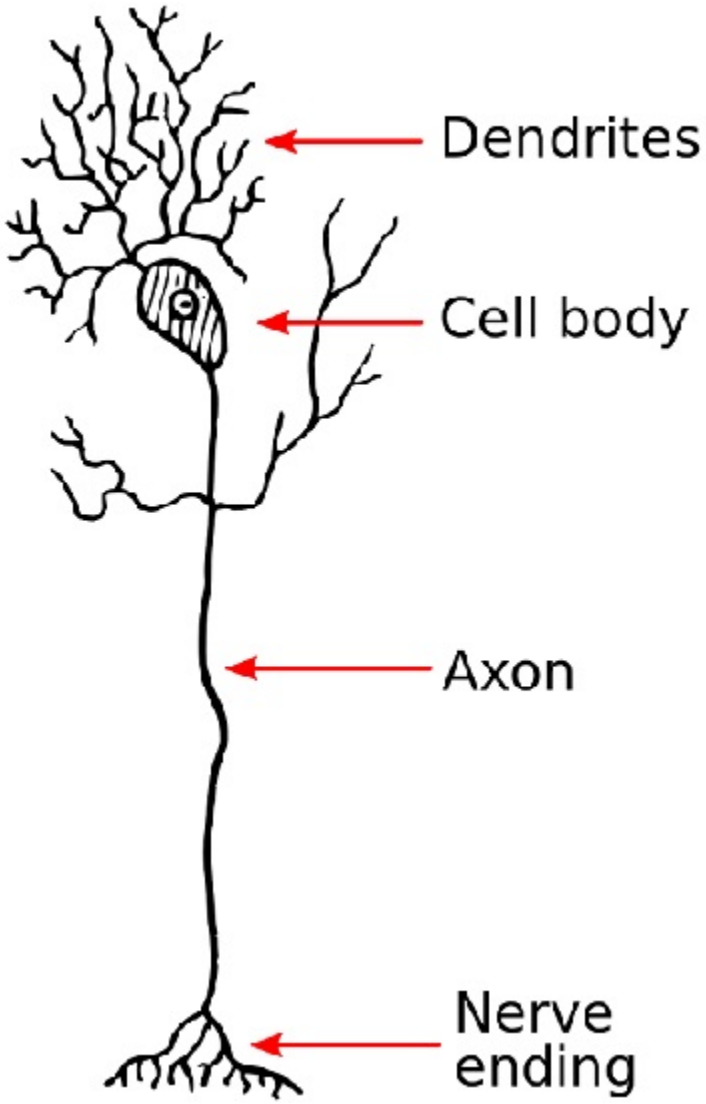
The neural anatomy of our learning brain is a given. Despite any rhetoric, ideas, theories or so called evidence based best practice, ultimately what is occurring is a physiological process within the brain whereby the end of the learning process sees an actual thing grow. This thing is called a dendrite.

Dendrites are things that grow in the brain as a result of learning and though our understanding is quite limited a simple analogy would be to describe them as the new growth like twigs on the

end of a tree branch. Dendrites are an actual thing, the same way as a twig is an actual thing. Just like twigs that grow in response to their DNA genetic coding plus their environmental pressures, so to do dendrites.

The reason the brain likes to grow dendrites is that the most prevalent other way that there is a transfer of message in the brain involves a small gap between two different dendrites called a synapse.

The synapse is simply a chemical switch. It switches on and off. You can see this in action very simply by looking at a bright light for a moment then closing your eyes and holding the visual imprint. Most people find that the residual imprint lasts for ten to twenty seconds then fades away to nothing. You can make this a bit of fun by using the flashlight on our phone and waving it around in front of your eyes then closing them. Kids love it when you make fun shapes. Circles, trees, triangles, squiggles. All fun shapes that don't cost anything to make, just a light and their eyes!



biologydictionary.net/dendrite/

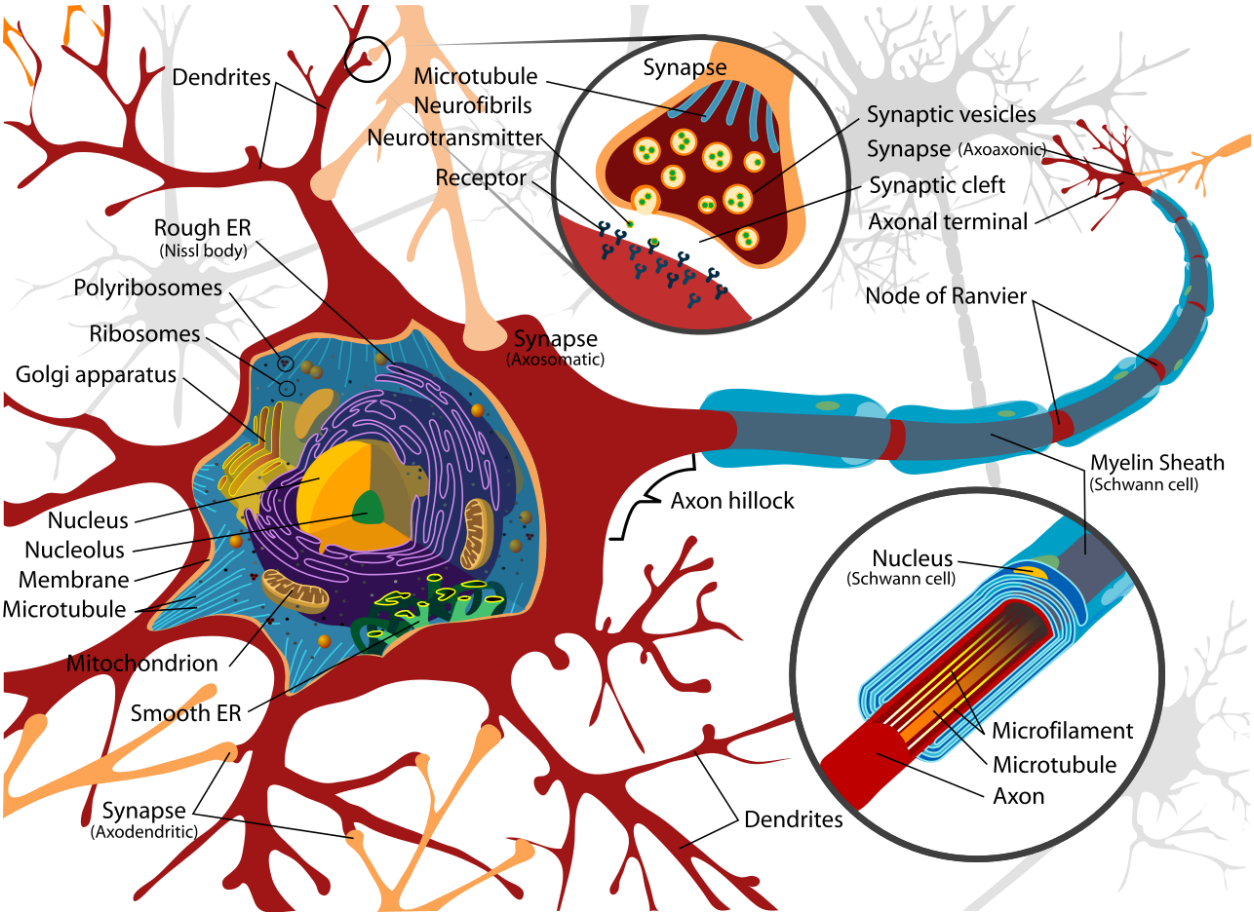
Understanding Dendrites and Synapses is best described in laymans terms if an understanding of why our classrooms might not be achieving what we expect.

The brain processes something. Let's choose something pretty silly like, what make was the third last car you drove behind yesterday? Hopefully you will have absolutely no idea, because that would be the healthy response. There is no reason to remember that car unless something really unique was a feature of it but that is not the point. The point is, that everyday we see thousands of things, signs, people, cars, objects, trees, waves, clouds. All the things in our busy world. That is no different to our caveman ancestors whom also saw trees, leaves moving, clouds, waves, animals moving or still, shadows, raindrops, fire flickering and shooting stars.

Our brains have a couple of important jobs to do in humans. Firstly it needs to actively observe the environment in the present for safety, the opportunity to collect food and the need to do life sustaining activities. Secondly, unlike all the other animals, we have a massive ability to learn and retain memories which we can then analyse and do 'intelligent' activities like think, reason, calculate, design and problem solve. Along with being a social creature that makes good use of the collective social group, by communication and distribution of labour skills, the group had an advantage when collecting food compared to our animal competitors.

Food and the brain is a hugely important factor, because survival of any species is conditional upon finding enough nourishment and each animal species has unique adaptations to give them a competitive advantage allowing them to get enough calories or kilojoules for life.

The human brain is known to be large relative to our size and weight. This is very significant because if we use a very simple formula of ⅓ of our food energy keeps us alive, ⅓ of our food makes us move and the final ⅓ runs our brain, then relatively speaking the brain is a very heavy user of food energy and it must help with the food collection process if we are to get enough to survive.



Wikipedia

Back to synapses and dendrites. These things use different amounts of energy. Synapses more, dendrites less. The brain in its quest to save energy likes to grow dendrites for tasks that it uses over and over. Riding a bike and driving a car are good examples of physical activities. Remembering a song like Happy Birthday a good example of spoken and hearing language along with a tune - sometimes :) The travelling directions from home to school are also worth remembering. All these things are recorded on little bits of brain that grow especially for that special item of information and as long as you keep using it even occasionally, the brain will be very happy to hold onto it for a very long time. These things are the dendrites.

The synapses on the other hand are happening as well. The synapse switch system will be registering the crack in the pavement that the cyclist should avoid, the car approaching from the left and the red traffic light. The Happy Birthday song recorded on the dendrite will have synapse activity dealing with the dreadful singer on your left, the flickering candles that threaten to blow out with the breeze and the perfume of Mrs Flynne, whoever she is. Travelling to and from school memories keep you on the right track so you don't miss turning left at the next corner, but remembering that the shop on the corner had out three tables yesterday but only two today is of little survival value, so why remember it?

So as cavemen, when our brains were evolving to the current form, the things that might have been grown onto dendrites could have been where the deep pool in the river is for fishing, where Old Smoky the crocodile likes to sleep and what food attracts the fowl so that can be lured into a snare trap, All good things to remember. Things not even worth remembering for five minutes could be the twig floating across the pool with the gentle breeze, Old Smoky has his tail curved to the right today, but it was straight yesterday, the fowl with the curly tail feather arrived today, yesterday it had a straight tail and the day before no tail. They all tasted good in the pot regardless.

So we know that if the brain gets to observe the same repetitive activity in order to save energy, it grows a dendrite. In the classroom this can be seen as repeating the writing out of a math problem many times, learning the times tables or reciting the alphabet. As the brain uses the same sequence over and over, it will recognize it as the same and want to retain it accordingly.

As an unintended consequence however, the brain can also build useless memories for things that are wrong. Incorrect spelling, incorrect number facts and incorrect grammar. Our brains

though pretty smart have no more ability to learn good from bad, or right from wrong than a dish cloth can choose what it must wipe up off the counter. Whatever it is repetitively exposed to it will retain. Like it or not.

A beaut little experiment to see the difference between dendrites and synapses in action is to use your alphabet, something we all know and have imprinted onto a dendrite.

Step 1 Dendrites: Say your alphabet out loud really fast. Just observe what it sounded like, how easy it was, how much effort and perhaps if you had a sensation within your brain as you did it.

Step 2 Synapses: This time say your alphabet quite slowly, two letters at a time with a one second break between each pair of letters. Like this ab……..cd……...ef……. And so on.

Most people experience a very different set of outcomes from forgetting the next letters, jumbling them up, giggling because they find it funny that they struggled. Perhaps you felt your brain working in a different manner than the first time when on 'autopilot'.

Hopefully you might now have an appreciation for the results of any activity within a classroom or a period of study and the impact at a biological level. Repeat something enough times and the brain will grow a dendrite to retain it or alternatively only experience it a few times and the brain will discard it with all the myriad unimportant things it must process on a daily basis.

It is very simple.

Chapter 5.1

Neccessary and Sufficiency: the neurological logic of learning

The use of the terms necessary and sufficient cross many disciplines but it is a very useful concept when attempting to explain the learning processes related to reading and other intellectual endeavours which of course reading is only one..

Reading an end result of many and varied processes that must all come together in concert to achieve the complex activity we call reading. This however doesn't make it special from any other complex activity that humans are able to learn and it is for this reason that the academics have probably failed to understand why their methods of instruction have proved deficient.

It's interesting when I have a parent attending the clinic in support of their child and the profession of that parent is something trade based such as a concretor or carpenter because when I am explaining what the problem is and how we shall go about fixing it, they completely understand. There is also a complete puzzlement on their face as to why the schools don't know this, as it is so straightforward and easy.

The Tradie as we call them here in Oz, are masters of understanding the Necessary. They have learnt through years on the job that if you require a task to be completed successfully, then all the little factors need to come together and if any are missed then the outcome will be unsatisfactory. This is quite unsatisfactory for the as that means redoing the job at their personal expense. The problem is magnified when they are responsible for a team that multiplies any errors. In this situation, by necessity Tradie becomes the perfect teacher. As they must see the deficiency in technique, analyse the problem, observe the processes, breakdown each process to its constituent part, isolate the particular behaviour that isn't being done appropriately, correct that behaviour then integrate the newly adopted behaviour into the long and complex string of behaviours so that the end result is that the tradie apprentice now has a new way of doing a particular task that results in the desired outcome rather than the undesired.

Now that all seems pretty straightforward to Tradie, but even if that is understood by a teacher it certainly isn't applied in actual teaching practice. In order to push this point I am going to use the humble 'pencil grip' as an example.

The pencil grip, or the lack of it, is a great demonstrator of the inability to effect change by most teachers. Change is what it is all about. If steps are taken and ultimately the outcomes don't change, then the wrong steps have been taken.

There are industries which our very survival rely on the correct learning of techniques and behaviours. Industries such as being a pilot of an aircraft require strict adherence to exacting techniques and behaviours. It is these precisely learned behaviours that make air travel so safe today. Tradie must correctly instruct his apprentice how to use the humble tape measure correctly, where to place it, where to look, how to hold it for measuring an outside length, how to hold it for an internal length, where to look to get the correct numbers, how to interpret the numbers and how to care for it.

Each of these little items are not difficult to learn, nor are they very complex, but for the successful outcome to be achieved consistently, then they must all be known and applied every single time.

That brings us to the idea of the second part of teaching something. To reiterate, the first was we instruct the particular skill e.g. where to hold the end of the tape measure on the item being measured. The second part of the skill is the TRANSITION. The transition is the part where we

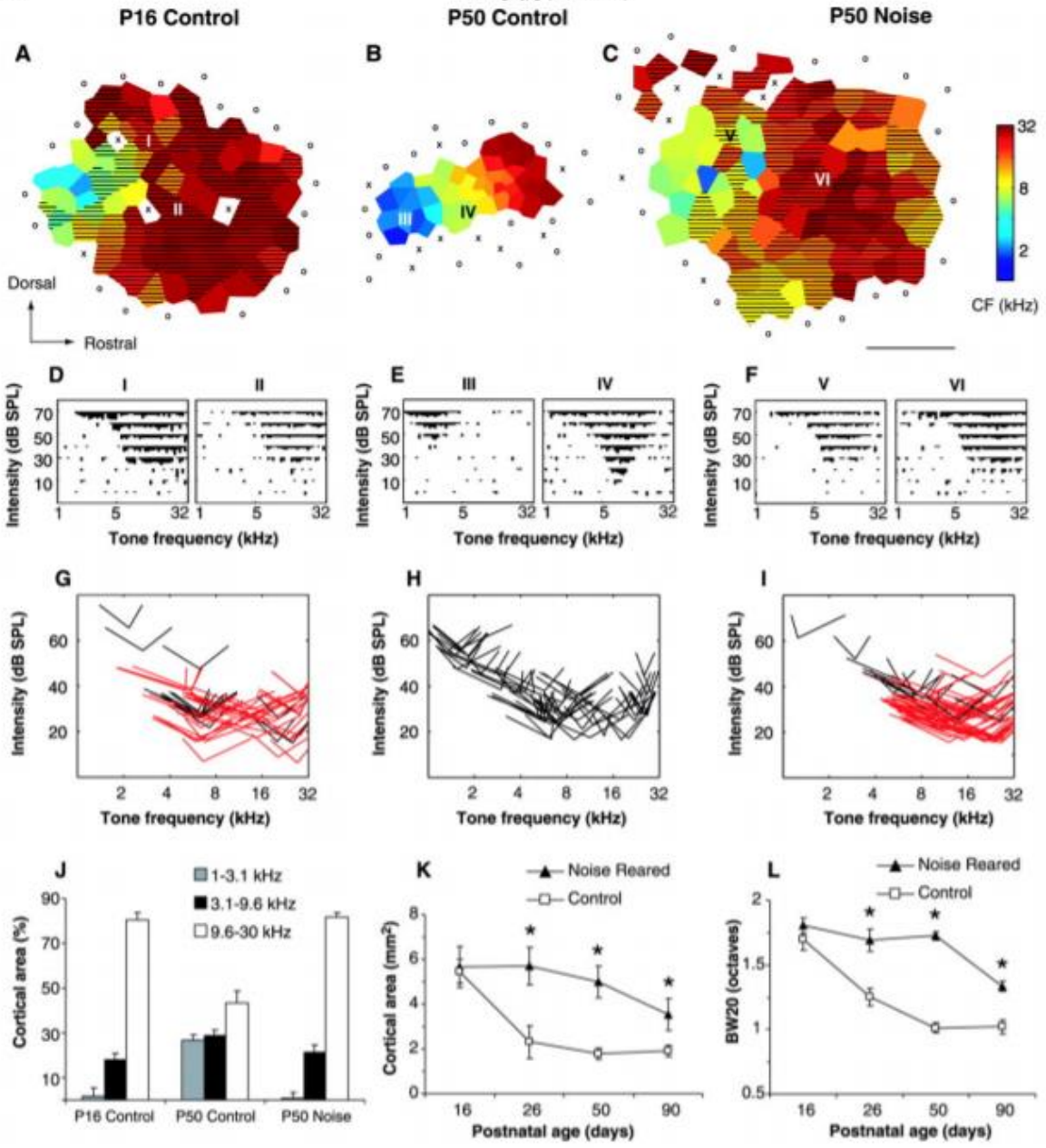
must move the person from where they have a new default position. Their old default, some would call it a habit, others would call it their applied dendrite, was wrong. The pencil grip was wrong. The combination of muscles, coordinations and positions resulting in a pencil grip was not correct for the perfect tripod pencil grip.

The student is going to have to be shown the new correct grip and then use it repetitively until the brain recognises the patterns and grows dendrites to record this new behaviour. This still will not guarantee a reliable use of the new behaviour. We must now work towards SUFFICIENCY, where the process has been repeated so many times that the new default is the correct grip. This repetition isn't simply repetition……. it is a process of growing more and more dendrites and then pruning the dendrites that are not perfect and discarding them.

This repetitious practice achieves a few things physiologically in the brain and the outcomes of this are recognised by every high achieving person in their special field. The concert violinist knows that the bow, violin and standing posture must be precise. The placement of fingers, form and function of the wrist, precise. They will also know that these postures took literally hundreds and thousands of hours to develop, to become the maestro.

At the neurological level, we can see this happen with the use of brain scans.

Shown below is the brain scan of a rat. You will notice that there are three images and they are quite different from each other. These images were recorded to illustrate the function of hearing sounds for rats of different ages and having lived in different environments.



The first image is of a young rat, only 2 days old. This image shows the normal healthy ‘mapping’ of the part of the brain called the auditory cortex which is responsible for recognising

sounds. The colour coding shows that there is a lot of area allocated to high frequency sounds and less allocated to the lower pitched sounds. I have no evidence why, but it might have something to do with parent rats squeaking/talking to their offspring in a high pitched sound, therefore it is important and a lot of brain is allocated to this function..

The next two images are the same age of 34 days old but with two different rats living in two different environments.

The thing to note here is that the middle smaller image has a lot of symmetry, it is logically organized with blue on the left shading to green, yellow orange and finally red on the right hand side just like a rainbow. This has been colour coded intentionally to logically coordinate with low pitched sounds being blue and high pitched sounds red with yellow in the middle.

The middle image is also smaller in size with many fewer segments, especially red. It also has much more blue, the low sounds. This is the mapping of Healthy Rat in a nice quiet ‘normal’ cage that allows the growth of a correct healthy brain map.

The image on the right hand side is for Noisy Rat that has had its cage in a noisy place. Noisy Rat is still the same age as Healthy Rat, but we have a huge variation in the mapping of the brain and it is very undesirable.

Noisy Rat is now trying to hear with a poorly mapped brain which if we remember that the synapses require a lot of energy to function, will be a tiring activity. We can relate this to many of our struggling students who are exhausted by morning tea time.

So to tie this all together, when we instruct a new way of doing an activity, first the brain will grow a lot of dendrites to capture the general idea and record it - NECESSARY, but then with practice and repetition, the brain will prune off the unused or less correct dendrites until the brain allocated to the task is small, logical and highly efficient. This efficient brain will now strive to do its task and want to interact with other parts of the brain also working towards fulfilling the larger task, like the ears are communicating with the posture, with the wrist, the eyes the music, the memory. This complex interplay is occurring when we have achieved SUFFICIENCY. An easy way to recognise this in readers is when the ability and interest reaches the level where chapter books become the preferred choice.

Not yet supported with research, but observable outcomes of students transitioning from Primary School to High school see two distinct groups. The students who are at a reading level of Grade 7 or equivalent 12 years old reading ability appear to have attained sufficiency that they will spontaneously keep improving to where university is a logical progression, whereas students below this standard are likely to ‘fail to progress’ spontaneously and stagnate at their current level indefinitely without a specific intervention and effort.

Chapter 6

SKILLS AND TECHNIQUES

Leornian Principles effect a rapid change owing to new brain pathways built in a timely manner

Dahini i in his discussion. See … on the well understood hierarchy of language, speech, reading and writing acquisition. He describes the logical process. It is well steeped in research that the relationship between sounds and the letters that form those sounds, the manipulation of the sounds and letters and the rules that come into play are referred to as phonological awareness. Here I wish to use this name as an umbrella term, covering the idea that this has dominated research in recent years and based on those outcomes the principles have been used to create 'evidence based' educational programmes and methodologies. But to reiterate yet again, the application of these methodologies is being done in what I consider a very ad hoc manner and far from a 'gold standard' grade therapeutic approach. As to the efficiencies and environmental standards required other industries the efficacy parameters accepted within education are laughable.

Our understanding through the research and also with the use of fmri brain scanned images, we are now confident of the respective roles that differing regions of the brain will generally perform. Notice that I said generally and not always. This distinction is made as the brain has shown to 'recruit' locations at its discretion to perform our 'intelligent' behaviours. There are generalized themes where a given specific function will occur, however LP directs it energies towards the outcomes, aggregation and efficiencies of the individual functions irrespective of its locale.

This is supported by studies and experimental evidence is able to support the idea that the visual aspect of reading is localized in the region associated with sight, the sounds aspect of reading is in the general area associated with our hearing. THE LANGUAGE aspect is in the general area where our language is sited.

Frmi brain scans are assisting understanding showing that the independent and unique segments of the brain are also interconnected. Well they should be if the images of proficient readers is anything to go by. This then raises the question of, if they are not interconnected, and we can quickly and efficiently interconnect them through a well designed and targeted series of exercises, should the operation of the brain change to function like that of our proficient reader?

My clinical experience suggests that this sometimes works. Having seen my partner apply excellent therapy of a phonological awareness bent, the outcomes have varied from spectacular to quite marginal in her clients. Using a LP based different approach proved to be superior when it was employed.

The other aspect that is known about but yet has very little spoken of written is to do with the aspect of neural learning called 'automaticity'.

In Dahinis, 120 minute discussion on literacy, its acquisition and our understanding of it gets to the final five minutes of the presentation and 2 powerpoint slides explain that "we know that the brain has independent unique regions that also interconnect, but then there is the region that is associated

with rapid automaticity based activities called brocas area. We can observe that following two to three years of slow and energy consuming reading, the brain will establish a link between the visual word recognition centre and rather than going via the circuitous rout to enable it to be read and understood, it uses this shortcut directly from visual cortex to brocas area" **THIS IS THE MAGIC BULLET.** Leornian Principles have revealed that this shortcut can be established and effectively used for reading within a single fortnight. How else can it be possible to improve reading comprehension for a student by 5 years and reading accuracy by 3 years following a fortnights intervention. Much more needs to be said on this aspect as this is the money shot! I will continue. The Leornian Principles of reading regard the creatinn of this direct link between Viaual C and Brocas as pivotal and though academic researchers are aware of it, they have not had any understanding on how to intitiate it. It has simply occurred as a natural progression without any medium to make the occurrence predictable. I have every confidence that fmri evidence to confirm this very soon.

Learning Activities:- Prioritized Compulsory and Needed Now

Lor

The psychological view of our learning world

The view, its 4 steps to human learning and the associated biology – in brief:

LP has not reinvented this well understood process but for convenience I shall describe it again here.

1) The first step to human learning is becoming aware of something, or more to the point being aware that you in fact don't know anything about something

2) The second step is simply the 'enquiring mind and body' wanting to seek out the answer. This triggers all sorts of neurological processes and neurochemicals in our brain.

3) Thirdly begins the action of learning. We are instructed, we read books, we are coached, taught, tutored, helped guided and taken on a journey towards the goal of competence. This phase our brain is actively growing dendrites recording the patterns and sequences it needs. Our muscles are growing and developing muscle memory and the myriad other processes in our bodies work towards harmoniously creating an outcome of doing a given task. The task is now at a level of competence, but still not imprinted to excellence. Physiologically the brain has grown dendrites and mapped a rough representation for the processes.

4) The ultimate phase of learning sees repetitious practising of the task until it becomes part of the very fabric of our being. Its what makes humans able to perform myriad tasks and retain them in the long term. Of course it doesn't mean we can be brilliant at everything, but we can be brilliant at something if we apply ourself and practice enough. This phase sees our biological brain pruning the dendrite clusters, mapping the brain regions towards an ever more efficient model for the desired task. The mapped regions become ever smaller, more efficient, and requiring less energy to operate. Automaticity has been achieved.

Implications of the perceived view for an individual when learning to read

Perceived views are a persons reality. This reality may or may not be helpful.

LP observe our struggling child in a reality where it is big and confusing. There is so much to see and do. So much to learn. Anyone trying to learn one simple thing can do so, but make them attempt 300 things at the same time and its an impossible task even for the gifted student or adult and this is where the problem lies.

We must realize that our young child has had a truly unique journey from conception, birth, early developmental growth, to their current world. DNA genetics, environments, illnesses, syndromes and many other impacting agents will have made this so. The reality for the child will be that at the moment of attempting to learn to read, the world may have moved beyond their personal capabilitiesbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbb more here

Learning Activities:- Prioritized Compulsory and Needed Now

A word's FIRST IMPRINT acts as a LIFELONG REFERENCE

When discussing computer data entry, it is well understood that the computer will only be as good as the quality of the data entered. This can also be said of the workings of the brain and I find that a good way to describe this is to use this example. I will use an example that seems to get the message across quite well in the clinic.

As I love going fishing in my private life, there is a fish that is caught by very few people and even those whom regularly go fishing it would be rare to find another person who has ever caught one of these. It is this rarity that makes it perfect for this illustration.

There is a fish it comes from very deep water of over 400m deep. It has a name and you are about to hear it for the very first time……..

It is called a 'POMMFFRRiTT'. That is not the correct spelling but I want you to say the word out loud to yourself a few times. What is now occurring is your brain is receiving an imprint of the sound of the word. It might be correct. It might not. This is no different from the child that has hearing deficiencies hearing the word poorly. So at this point the brain may register a good quality auditory mapping of this word or it might not. Either are possible.

What I now will ask you to do is to spell the word. What I have written is incorrect, so you should just listen to the word and try to spell it yourself. Change the spelling and give yourself about four different spelled attempts.

What I have now led you to do, is to imprint a poor quality representation of this fishes name by its sound and an even worse representation of the spelling.

If you think about it logically, you only want one version of the name as you hear it and also as you would spell it.

Now whenever you wish to speak of and write about this fish, rather than only having a single correct representation, you will now have a few but this is just an example of how I would imprint an erroneous map.

The reallife implications of this can be seen in the child for whom mixes up letters such as 'b' and 'd'. Another common error occurs with 'c' and 's'. in both of these cases I like to use a simple analogy that most people seem to relate to, can understand and see the cause and the solution.

FIELD OF GRASS ANALOGY:

This analogy is used to describe the relationship between our memory and the anatomical structures that create it. Our dendrites as we have previously discussed provide the item where the recording is held and these are able to be strengthen and weakend by using them or not.

Picture this in your mind. Yourself standing in a field of long nicely even grass. Now you are going to spell Pommmfffrrrit incorrectly, so walk a few paces through the grass and back agsin. Repet this a number of times trampling the grass. Now spell the word as POMFRIT and walk back and forth but

in a different direction again trampling the grass but making a separate track. Again spell the word but this time as POMFRET- the correct version. Again walk back and forth in a new direction. What yyou should now envisage is that you have three trampled grass tracks from yourself to each of the spellings.

Consider the effect of using the respective spellings into the future. What will happen to the grass? What happens to the dendrites? The dendrites would get stronger, the grass more and more trampled until it becomes an obvious path.

So the situation now is that on hearing Pomfret and wanting to spell it, the preference for the brain is to follow the best path the most dendrites, the strongest connection. The brain is pretty stupid at this point though. It has no ability to discern good from bad, right from wrong. Whatever the imprint is there and with the strongest connection will be the selected version.

Move your thinking to the child that has mixed up letter pairs such as b/d, c/s, c/k, p/b, g/j or word pairs such as of / off, were/where, and/the, then/them, there/their to name just a few. Picture these errors as tracks created in the field of grass. Perhaps see them as ruts or even cement paths that are firm and strong but not necessarily correct.

Correcting errors with the imprinting can also use the grass model nicely, as if you consider what would happen to the paths and tracks if they were to stop being used. Wouldn't the grass begin to grow back through disuse until there was hardly any trace of it? In the same way, wouldn't the dendrites wither and weaken through disuse. It certainly is a commonly accepted concept of 'if you don't use it you lose it' within research domains that involve brain function and its disorders such as memory loss, dementia and Alzheimers.

So this grass model gives a nice simple way to understand the implications of learning something incorrectly initially, but also how it can be discarded at a later date through disuse. It also raises a very serious question of whether a student should be encouraged to use the 'have a go even if its wrong' philosophy needing any errors to be corrected later through a well managed and targeted rectification process, compared to the 'here are the correct words' and we look to 'exploring and being creative' later on using them correctly.

APPLYING THIS MODEL TO THE RTI TIERS 2 AND 3 COHORT

RTI or the Response To Intervention (reference needed) speaks of three tiers characterized by the ability or inability to learn within a regular classroom and the amount of support required. It represents an easy to understand measure that is pretty much perfect for discussing LP against. In a nutshell, Tier one students are able to attend class and actively participate in the lessons with good understanding and learning outcomes being achieved. They pretty much appear able to learn in spite of rather than because of the process.

The Tier Two student doesn't find things quite as easy. It is likely that they will need a little extra help to follow the lesson and gain the concept being taught. This body of students respond brilliantly to LP and with just a short two week intervention, the improvements in applied cognitive function are spectacular.

Tier Three students will always exist in our schools as they are both complex cases carrying illnesses, syndromes, genetic predispositions and may have had possible injuries. The education system in its effort to have an inclusive education for everyone will always strive to make our schools accessible. This of course means that there is never such a thing as a perfect 100% possible outcome as ever lower students with ever complex needs will become clients of the school. The current Tier Three student requires support from many and varied professionals to assist, support and treat these complex needs students.

When taking any model of instruction to an entire cohort, it will have various strengths and weaknesses just as any business model does or an engineering solution. Leornian Principles see the creation of the modern learning brain as one which can be developed in a controlled and

designed way and will have predictable outcomes. This is of course quite unnecessary for the high achieving student that we see in our schools as they do ok now, but for the poor achievers it is essential.

The current model of education has many and varied methods and techniques employed at the professional discretion of the teacher and school and there are valid and justifiable reasons for doing this, however the Tier 2 and 3 students have unfortunately had a different formative outcome from the sum of their genetics, health and environmental experiences. The implication of these differences lie in possible different neural mapping for the low level cerebral processes such as auditory processing and visual processing which has implications with the higher order skills such as letter and word recognition. A current focus within our indigenous population looks at the implications of repeated ear infections in young children and the flow on to literacy difficulties later. This is a good example of how an environmental or health related issue will result in an altered brain mapping and condition.

The Leornian Principle solution to this range of scenarios now is that with the new technologies available to us with the new high quality and high speed outcomes, no longer is it appropriate that any insufficiently trained professional should be responsible for the remediation of such individuals.

LEORNINAN PRINCIPLES MAKE A NEW MODEL FOR REMEDIATION:

In days gone by the Tier 2 and 3 students came under the umbrella of support teachers and their aides. This program saw varied levels of training and when compared with the progress made from the medical industry the training of the teacher aide is laughable. Who in their right mind would go to a hospital for help with a severe form of an illness and accept therapy and support from the person who is the janitor by night and the teacher aide by day, but this preposterous situation is the norm here in Australia.

If the only requirement for the effective remediation of poor literacy was for some caring and patient adult to sit and help with difficult words and to model good reading then the teacher aide model would suffice, but evidence shows that this isn't the case. Even more so now with the Leornian Principles of Literacy education where a thorough understanding of the LP learning process, it's neurology, methods, tehniques and technologies need to be understood, applied and the hardware used in clinically appropriate ways to reflect the individual needs for any given client, oops, student.

These students under a Leornian Principled model would be seen as clients or patients and rightfully so. They do require the specialized services of appropriate professionals, but in the past providing such support proved excessively time consuming and costly. Today using an LP approach, most of the students either seen as not severe enough, could be inexpensively assisted to much higher standards, or else the more demanding tier 3 student could receive the spending allocation currently directed towards the 'LP fixable' students who presently receive assistance year in year out for many years through their schooling. All of this money and effort could be either not spent and saved from the public purse or reallocated away from remediation to excellence instead.

It must be reiterated at this point that LP is able to provide a one off solution for virtually all of the Tier 2 students rendering them into what is regarded as a Tier 1 student in only a few weeks of support applied once in their schooling somewhere between 10 years and 15 years old.

The less severe Tier 3 student will likely see the same high level of success, though rather than taking about a month of support, it would realistically take two to three terms of school time, but once again, when this is completed, the educational opportunities for these students moving forward should comfortably include further education at the Tertiary level thereby empowering the individual to effect self determination.

So the essence of LP provides a rapid process, highly effective and takes the current underachiever, to being an achiever that no longer provides a financial burden on the education system moving forwards.

LEORNIAN PRINCIPLES REQUIRE A NEW BREED OF PROFESSIONAL

Traditionl education training for teachers is no longer applicable if LP is to be utilized. The high range knowledge that has content requirements to the biological sciences, neurology and LP coaching techniques see a very specific and trained individual needed.

Another differing aspect of the LP professional has to do with their role in the teaching and learning process. Currently our teachers spend a disproportitinate amount of time in imparting curriculum within a single day. This is of course fine if students are high achier=vers and can follow the lesson, but for the student requiring a differently presented lesson, time is scarce. Ultimately the shortage of time must dictate that the teacher must choose between the child and the curriculum. Currently the curriculum seems to receive the priority.

LP gives an opportunity though to make a massive change by rapidly changing the learning profile of a student thereby making them a fast learer rather than a slow learner. This has many positive effects for the student, the teacher and classroom in general.

So there is a motivation and logic for implementing LP but it must be seen that a weekend workshop and a few short courses are quite inadequate for upskilling a current teacher.

The LP professional has a completely different way of viewing the student and the learning process. They see that the curriculum learned is just one of the many outcomes, as is the ability to read and do maths. In fact all of the complex reasoning and abstract conceptual thinking that an engaged modern human can do is the product of a well buikt and functioning ‘learning brain’. We have always had them. They were the kids at the top of the class for whom wchool and straight ‘A’s was easy. LP just brings a structured way of building the brains for those students that weren’t as lucky to have it develop spontaneously and within the current process of instruction.

Close your eyes, listen and spell both words before selecting the correct word

Becau

Take extra care because it integrates the SEMANTIC LANGUAGE and VISUAL-LEXICAL form

Becau

Repeat the phrase Spell the word Place the word

a word's FIRST IMPRINT acts as a LIFELONG REFERENCE

Try closing your eyes, listen and spell the word before seeing it

Form Constancy a visual therapy that builds FONT ability

Can you visualize inside your head

Look up and downs

Read FAST

The Leornian Principles Spelling method

Adding new words and building your Memory brain

Daily practise only takes a few minutes doing a few exercises

show how some words cannot be sounded out. We must use other tactics to remember.

Listen ONLY.. hide the words so only Auditory system is activated BEFORE looking

READ and SAY and SPELL the word WHILE SEARCHING

READ and SAY the word then FIND the word in the jumble

Keep saying the words out loud while you search

SCRAMBLE THE WORDS

UNSCRAMBLE THE WORDS

UNSCRAMBLE THE FUNNY WORD put the 'a' in the bin Put the 'd' at the front D O spells do NOW search for the answer

Simply WALKING is brain food. It stimulates growth and activity in the NEURONES

Learning happens when activities are EASY AND FUN

activities and emotions affect BRAIN NEUROCHEMISTRY -always simple and easy

If it is difficult: Make it One Step Easier and easier and easier until it IS EASY

TEXT CROWDING: Look very hard for the jumbled word

Strobing words 1000wpm

strive for SEQUENCING, TIMING and PATTERNS, as it is the key to all intelligent learning

Read these funny words out loud. Be sure to use their sounds not their names and put the x in the circle when you are finished

Id,ka,yu,ve,fo,un,aj,ez,ga,op,ub,x

yaf,bon,dem,gat,jeg,fup,cav,pid,kib,waj,mot,x

Slib,brap,fosp,leks,grof,smit,resk,fant,scuj,pliv,wust,x

Crand,flosp,stens,blugs,presk,snuds,klisp,x

Dramp,glist,trant,grops,spets,x

crand,flosp,stens,blugs,presk,snuds,klisp,dramp,glist,trant,grops,spets,x

Copy the Peas to the Pods

Pea Pod Puzzle

Left to right right to left

Spell these forwards and in reverse. Take care! Also TAP and SOUND

Try and use a coloured lens each day

Tap in time

Speak slow and clear

1Tap sounds 2Say sounds 3Spell letters

Stare at the target circle

SPELLING / SOUND CHECK Spell and sound out the answer. Care with C / S

EXTRA JOB DO CIRCULAR SPELLING forwards and in reverse. Take care! Also TAP and SOUND

Leornian Principles First build the brains foundation A few Done many times Perfectly

Technique is really important: be careful and try your best

Sound Snips MUTED MUTED MUTED grasping grasping grasping

Neat writing gives neat brain imprinting

REMEMBER: iMPRINTINg eRRORs aRe sERIOUs

Our central executive makes us intelligent by managing sequencing timing and patterns

Leornian Principles Tidy organised work creates fast efficient brains

Leornian Principles Perfect Technique Perfect brain poor technique poor brain

Leornian Principles Memory Repeat Now Minutes Hours Days forever

Leornian Principles Trick Phrase2 2 2 then read the sentence

Techniques Leornian Principles 4Spelling Hear Say Pause Spell2 Pause Spell2

Close your eyes when listening then repeat the sounds

Pencil grip for handwriting

Learning Activities:- Prioritized but not urgent

Lorem ipsum dolor sit amet, consectetuer adipiscing elit, sed diam nonummy nibh euismod tincidunt ut laoreet dolore magna aliquam erat volutpat.

Learning Activities:- Not Prioritized and …...

Lorem ipsum dolor sit amet, consectetuer adipiscing elit, sed diam nonummy nibh euismod

Learning Activities:- Prioritized prerequisite items

There is a definite hierarchy within LP for the successful and rapid acquisition of our efficient brain. These items need to be strongly considered for when they are instructed and implemented.

Conversely it is a normal expectation to follow habits and generalized patterns of instruction, but this does not make it correct. Focussing on two major items within current reading instruction practise, the teaching of the alphabet and the relationship between sounds and letters is an obvious priority, but the timing of doing this work will vary quite significssntly and this will be discussed in more detail shortly.

The second item that receives a large amount of time and effort allocation are the sight word lists. This activity also has its place, but usually not when it is done for many individual students, but more on this later as well.

Let me use the lower plastics drawer in your kitchen. You know the one. It is full of those square and round, but likely to be a bit rectangle but somehow the lids breed and there are about double the number of lids per bottoms. I think that once we conquer the literacy dilemma, we all should work on solving the plastics drawer debacle. It really is a failure of our 21st century, but I digress! Actually my lateral thinking is part of why LP works and your role in contributing to the solution as we all move forward.

The plastics drawer requires a strategy and not a procedure. The strategy will remain a constant, but the procedure will need to vary. Logical trial and error will show that bigger boxes should be on the bottom, with ever smasller oxes fitting inside their larger friends. But of course that only works up to a point. Invariably that strategy will fail because there are too many large boxes with a strange combination of shapes that mean it may be necessary to in fact place a layer of smaller boxes in first in one region thereby making a floor to get above the other large boxes to enable a

particularly odd shaped but large and low container place, wwhen if it had been placed in the lowest layer, other problems were created.

This baffling scenario is common to every kitchen and almost everyone has had to go through the effort of finding a solution. Notice I said ‘a’ solution and not’the’ solution because there is likely more than one viable solution.

And so it is with reading.

It is logical to teach our young child the alphabet and the sounds at 4 or 5 years of age and this progresses to simple words by six years old, but what about the child that was seriously ill, was away with family travelling, was developmentally behind their peers, or had some other of hndreds of genuine reasons for not being able to effectively learn the alphabet and those first simple words as a four or five year old.

Of course as a six and seven year old the expectations of being able to raead simple books is ensconsed into daily classroom life and the homework divide begins. Some can. Some can’t.

LP brings the logical and perfect solution. At some point, when the likelihood of mass success is greatest, all students for whom the early phase of learning have failed, get an opportunity for a burst of LP remediation that is likely to take only a fortnight for most of these children.

Learning Activities:- Prioritized but not urgent

Phonological awareness,the relationship between sounds and their written and visual forms are able to be learned at a reasonably young age with some children developing these skills as young as three or four years old, though there are only very few children able to do this. Trying to bring it even earlier is as nonsensical as it would be to make the legal driving age five years old. The children in almost all cases are not cognitatively ready. As such if we pose the question, can a child learn to read without a good basis in phonological awareness? The answer is a definite yes. But a different question must be asked. Is reading conditional upon phonological awareness or does it simply enhance the process especially with higher levels of understanding as reading develops? Again the answer will be yes but to a very different question.

The topic and implementation of phonological awareness within our clinic has had a long history and quite a few heated discussions over the years. Yes our little clinic has also had its own Turf War where Louise saw the need to teach the phonological awareness content and I saw its value, but along with many misunderstood activities how it can be soul destroying if used at the incorrect time-- for a given child.

LP guidelines for successful use of phonological awareness.

1 At a young age for the child the pedagogy (way we teach) in the classroom and at home should have at its hub, the continuous discussion on the use of sounds and their associated relationships

with letters words and the order they are used and the manipulation of the order with little games like switching the first sound to make it last and re-say the word.

2 By the time a child has reached about 8 years old, these activities will have either worked or they won't.

3 If by 8 years old and they haven't worked very well, then the phonological awareness therapists will promote the need for intensive therapy using one of the myriad programs in the marketplace. LP has a different opinion.

4 A child now at 8 years old in entering the window of opportunity the LP begin to take effect.

5 the better strategy is to now use LP POD and build the reading brain with an intensive two week on the POD program as this invariably works with a single burst and with stubborn learners a second burst a year later. (if it doesn't please confer with the LP problem solving discussions elsewhere).

6 Be aware that unrelenting intensive phonological awareness can be counterproductive for attitudinal and psychological reasons.

Learning Activities:- Not Prioritized and of questionable value …...

Sight words…..

These things are the bane of every parent the world over! Unlike practising your piano scales which had numerous benefits, practising sight words seems to have very little formal evidence and even less anecdotal evidence that it helps with anything very much apart from being a great big unit that occupies a lot of a child's time. Our children have limited time at this stage because soon enough they will be grumpy adults like us! If our children are to commit time to something then it should give them a worthwhile outcome and not just force them into being compliant. LP suggest that the time learning sight words would be better applied to tree climbing techniques through trial and error 😋.

But rather than just dismissing sight words with little reason, LP wants to empower parent, teachers and the community with information and logic to stop this soul destroying practice.

The underlying logic of learning sight words is sound and fits into the idea that if we learn words that we will come across in our general reading, then if we can learn them in a consolidated and rapid manner it would make sense. And it does. But.

The problem that we have with sight words does not appear in our high performing students as for them the process actually works. It's the lower students that it causes problems for. Every parent who has experienced this will have witnessed the soul destroying effect that attempting to learn sight words has on them. As such, sight words can still be used but as an extension exercise for high achieving students and not as a teaching and learning vehicle for our lower performing students.

The reality of requiring this exercise should be means that a teacher must understand the ramifications, it is more difficult to organize their day and could be seen as streaming the class.

The simple solution to the problem aspect of sight words is to make the students immune to the problem! If the students are 'high achieving' then they will be able to cope and sight words will actually help. Your process therefore should be

1 suspend sight words

2 use LP, in particular POD and build the student

3 revisit sight words at a later date and see if they are now performing their intended function.

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Targeted skills and outcomes incorporated into Leornian Principles/pod

The items below are almost all featured in Leornian Principles/POD as specifically essential features in learning and reading acquisition:

spoken language skills
receptive language
working memory
verbal short term memory
letter sounds
letter names
articulation of sounds
word endings
rhyming
feeling sounds
long sounds
short sounds
long vowels
short vowels
sound chains
pronouncing the vowels
tongue placement awareness
sentence structure writing
grammar
prefixes
suffix
capitals
singular
plurals
consonant blends
two vowels go walking
phonemes

syllables
word attack
non word spelling
articulation
executive working memory
temporal processing - auditory
sequencing
adhd
auditory discrimination
dual visualization and secondary tasks
visualization gestalt
visual processing
visual discrimination
visual memory
form constancy
visual closure
visual-spatial short term memory
comprehension
rate
accuracy
fluency
word identification
repeated reading (rereading)   Reverse repeated reading
phrase reading
look up and down reading (innovation)
Expressive reading
Speed variation reading
spelling
fast reading
rapid naming
letters
alphabet
copying technique writing
verbalizing while writing
reverse spelling
pencil grip
counting numbers
odds
evens
number reading
times tables sequencing
reciting times tables
ritualizing learning cues - times tables
orthographic layout of maths

Loading: a technique used to enhance high end outcomes cited in some optometric journal article for increased efficacy of therapeutic outcomes in remediating eye trascking and myriad other that a behavioural optometrist targets
fine motor
gross motor
Tier 1
Tier 2
Tier3
self esteem
stress management
preconditioned response management Leornian PrinciplesOCA'S Central executive exercise: We will finish with a little exercise to improve something known as the 'Central Executive'. Say the alphabet really fast. Like this. That is using broca's area and your memory. Now say it like this ab cd ef gh ij or like this abc def ghi You can actually feel the front part of your brain working while this is happening. This is a vital skill for developing sequencing abilities and we use those in all sorts of learning

Handwriting - Automaticity

The automaticity of handwriting is a needed prerequisite for effective expressive writing if we accept the underlying assumption that that working memory is a finite resource.

Expressive Language - Automaticity

Rapid and easy speech describing an object is assumed to be an essential prerequisite to efficient actions and operations of the intelligent brain. Creating automaticity of this expressive language ability within BRPOD has not followed speech pathology guidelines and if they have it has been by chance.

I observed in many students a strong reluctance to speak about what they were doing and describe the process. To me it seemed that they were unable to find the words and put them in order. This is of course a very serious issue as amongst other things it will be reflected in the ability to write well for many reasons, but namely that if finding words is effortful, then it will consume scarce working memory resources.

Pondering the situation, I considered the components that were required without consulting references, but by looking at it from a BR point of view and made accommodations in POD by adapting the Pea Pod Puzzle (PPP)to this task.

The PPP is a collection of marks assembled on a grid that need to be drag and dropped using the computer mouse to replicate the pattern from left to right or vica versa.

The patterns begin with a very simple single string and only 2 marks increasing up to a large and complicated 8x8 grid with about 15 marks.

The student begins by simply counting the counters as they place them, then move onto describing the counters more fully such as top right corner, bottom left corner, below, middle, diagonal. This then progresses into a more mathematics or map coordinate system using descriptors such as row 1 column 1; row1 column 3; row 2 column 3; etc.

There appears to be a couple of useful skills learnt by doing this with the first being the sequential memory advantage of remembering the location of the last mark and rather that recalculating the position fully, it is an obvious advantage to the child to remember the previous location and then amend by adding or subtracting to create the correct answer. But as in all thinigs BRPOD, we are assuming that the student will see this pattern and spontaneously look to use it to their advantage and work out the simple algorithm to use.

The work of psychologist…. Found back in 1970?? That there is often inertia when it comes to discovering a pattern and applying a new shortcut and that in fact many people need to have a simple shortcut method shown to them explicitly and that most people are not able to recognize why something wont work and are not actively looking for shortcuts. This goes onto having major implications in mathematics and physics where early instruction should be heavily based upon worked examples rather than a ‘guided discovery’ model.

Another useful skill is the rapid and confident verbalizing for each mark as it is placed. I figure that this is owing to the repetition of task, thereby allowing for ease of finding the appropriate language descriptor, followed by the ease of assigning the motor and voice production for the description.

The BRPOD assumption that we are recognizing individual skills and microskills building and then integrating them to be the initiation of a skillset that can then grow and generalize supports this notion that by just doing what is really a very simple and seemingly simplistic exercise can have large ongoing effects.

Chapter 7

MINUTE DETAILS

Chapter 8

IN A FEW SCHOOLS

School Experience of POD

The journey into schools has been interesting to say the least. The overwhelming theme has been that “we know what we are doing and don’t need you.” Or, “we are so busy fulfilling the prescribed curriculum, testing and collating data, that there is simply no time to do anything differently” Another rebuff is that the entire system is directed to use ‘this or that’ programme and that there is no ability to consider anything beyond the prescribed. You will need to go to head office.’ Then Head Office says..’no we won’t look at your work, it would be endorsing it…. And we have a team of researchers here studying the best of research based…….’ (Strange, but then when they write their new programme, it still isn’t evidenced as working…. It’s just another try hard that will take a few years to validate!)

That said, there have been a few schools in the Hunter Valley; New South Wales, Australia where there was an invitation for us to be involved. The results have been somewhat varied owing to the overriding problems just mentioned, but where the teacher has seen merit and has championed the Leornian Principle, then the results have been outstanding.

The teacher as we all know is so important and never more so that in this project. The commonality between all of these special people is their drive to influence change for the child whom they see as their ‘client’ or as our medical industry would call them, their ‘patient.’

The teacher whom has this mindset will strive to find a solution where none exist. They are a special breed, usually nearing the end of their career, who know everything there is to know on the topic of reading, but also know when it doesn’t work for their pupil. The treasure that these teachers represent is that when they get to see a genuine method that works, they are humble enough to accept to worth for their pupil s the priority and not feel professionally threatened.

There is an aspect of professional threat because when the items are looked at singularly, many of the exercises are already used and feature in other programs, but as is so important in music, the individual instruments need to play together to make an orchestra, otherwise it is just noise.

The astonished words of one teacher said it beautifully:

"It can't be that simple, there must be more to it"

Read on see a few reports compiled on the schools as to an indication of the journey for them and us so far.

Chapter 9

A RESEARCH PAPER WRITTEN PROPERLY:

OBVIOUSLY NOT BY ME

Research Basis and Preliminary Efficacy 2016

Research Basis and Preliminary Efficacy

Behavioural Reading™ (BR™) created by Philip Gruhl (2013) includes a number of innovative techniques developed over seven years teaching in private practice. Techniques have been designed, practised and refined to specifically support students with learning difficulties. At its core, BR™ stems from an elite sports philosophy where in applying correct technique to essential learning processes combined with efficient daily practice, the result can create successful reading and learning minds in all students.

Phonological awareness intervention has been researched extensively and the use of computer-based software has some evidence base to support its use in the treatment of literacy difficulties. Working memory and sequencing difficulties and its association with reading difficulties is also well reported in the literature. Strategies such as 'chunking', reducing reading rate and the use of mnemonic strategies are often recommended to assist students with working memory and subsequent literacy difficulties. BR™ is a research based intervention approach, integrating such recommendations cited in the literature. The implementation of strategies to improve literacy skills, particularly reading fluency however has not been researched comprehensively.

During the 2015 calendar year, four studies, independent of each other, were carried out at state schools in the Hunter Valley NSW, two Queensland outer Brisbane schools (private and state), and at Tyquin Group Speech Pathology and Reading Clinic (Tyquin), Bulimba QLD. All studies were with-in subject designs and implemented differently. Common to all studies was whether implementation of BR™ techniques was effective in improving literacy skills for participating students.

Study One: NSW State Schools - BR™ trial to assist 18 tier 3 students experiencing difficulties with reading and spelling.

Learning support teachers (LST) from three different NSW state schools implemented BR™ techniques to 18 tier 3 students (years 1 to 4) experiencing difficulties with reading and spelling over an average period of three months. Instruction was taken predominantly from BR™ online subscription, and occasional phone contact with Philip Gruhl and Paula Shillington (BR™ Consultant) to problem solve. The Lead LST attended a one-hour workshop and observation

at Tyquin Group Speech Pathology and Reading Clinic, Bulimba. A two-day workshop with Phillip Gruhl and Paula Shillington including participating and interested teachers was also held post-trial.

Movements in NSW Curriculum Continuum Clusters (Reading, Comprehension and Writing) and PM Benchmark (reading) Running Records were measured over the trial period. Pre and Post measurements were converted to years of formal schooling and compared to length of intervention.

As noted in Appendix A, for the sample of participating students experiencing difficulties with reading and spelling (significant enough to warrant formal LST assistance), average gains of at least 1.5 months' growth in reading, comprehension and writing skills were attained compared to one month of (BR™) intervention.

Study Two: QLD State School Sample of 10, Year 4 students with mixed literacy abilities

In comparison to study One, BR™ techniques were demonstrated in the classroom setting by Phil, Paula and Karen Landry (Tyquin teacher) weekly over ten weeks. Group and individual consultations also took place with participating teachers, face to face, phone and via email. Yavanna Grogan and Louise Tyquin (Tyquin speech pathologists) were also involved in how literacy skills could be measured pre and post intervention and carried out interpretation of raw data. Students were tested by trained teachers at the school pre and post BR™ intervention using alternate forms of the Gray Oral Reading Test -5th Edition (GORT-5). Comparison of scaled Reading Rate, Accuracy, Fluency, Comprehension and Oral Reading Index (ORI) scores resulted in significant improvements in Reading Accuracy, Fluency, Comprehension and ORI (see Appendix A). The most significant difference achieved was for Reading Accuracy and equated to over 3 months' skill growth as tested on the GORT-5 per one month of BR™ intervention for the sample of students.

Study Three: QLD State School Sample of 21, high school students (Years 7-10) with mixed literacy abilities

Similar to Study Two, Philip, Paula and the team at Tyquin met with teachers and stakeholders prior to commencement of the trial of intervention. Trained teachers at the school, pre and post BR™ intervention, using alternate forms of the GORT-5, tested students. All staff involved in the trial attended at least one information session. Phil then presented BR™ techniques during whole class instruction weekly over ten weeks and met with classroom and learning support teachers individually to answer any queries. Specific suggestions and problem solving also took place via email. A sample of year 6 students was also included initially however they were withdrawn from the study due to conflicting curriculum arrangements that prevented participation.

With reference to results in Appendix A, improvements in Reading Accuracy were achieved for the sample although the mean difference in scaled scores was not significant. A significant difference between Reading Comprehension, pre and post intervention was however attained. This significant difference equated to 3 months' growth in Reading Comprehension ability as tested on the GORT-5 per one month of BR™ intervention.

Study Four: Tyquin Group Speech Pathology and Reading Clinic Sample of 18, clients (aged between 5 and 15 years) referred primarily because of literacy difficulties

Inclusion in this study was based on clients having attended a review assessment since the beginning of 2015 and had received BR™ intervention by Tyquin teachers. In addition to BR™ intervention, most of the participants also received intervention using a range of computer-based software (average of 22 hours) and worked with Tyquin speech pathologists on individual intervention goals including in-house phonological awareness based programs – Sound Training Activities for Reading and Spelling (STARS), Basic, Intermediate and Advanced (average of 12 hours).

Assessment and diagnosis for clients with reading difficulties at Tyquin is based on the Component Model of Reading (CMR) and involves identifying the weak component/s associated with reading difficulties and then directing corrective efforts at the weak component or components (e.g. language, working memory, sequencing difficulties, visual and auditory perception skills, phonological awareness skills, word attack skills, and reading fluency and comprehension abilities at the story level). Accordingly, students in this sample had been assessed on a range of assessments. For comparative reasons to the other three studies only GORT-5 scaled scores were compared pre and post stage one of intervention for improvements in Reading Rate, Accuracy, Fluency, Comprehension and ORI.

Per results in Appendix A, all pre and post-scaled scores on the GORT-5 for the sample of Tyquin clients were significantly different. Similar to Study Two, Reading Accuracy was most improved for the sample with the significant difference equating to 2 months' growth in Reading Accuracy as tested on the GORT-5 per one month of Tyquin intervention. Comparable to the students in Study One, clients at Tyquin have often had significant school based intervention/ support or other (with limited progress) prior to commencing treatment at Tyquin.

Limitations of Studies

All studies were preliminary, explorative and involved small or no research budgets. Strict research based protocols were not practical (such as random sample selection, non-intervention comparison groups, no other interventions, etc.). Sample sizes were small and teachers and clinicians participating in the study were involved in pre and post data collection.

Future Research

Despite limitations noted above, preliminary findings particularly in relation to improvements in Reading Accuracy and Comprehension following implementation of BR™ intervention is encouraging. Recommendations for future research include ongoing data gathering to measure long term effects and new studies that follow strict research protocols. At Tyquin, stage 2 of literacy intervention often includes BR™ techniques to increase reading rate. Effectiveness of stage 2 intervention is also worthy of investigation. BR™ also launched in 2016, 'Pod' computer-based software, designed to prepare the brain for learning. Collection of pre and post data for students prescribed *Pod* intervention has already commenced at Tyquin.

Appendix A – Results

Study One: NSW State Schools - trial to assist tier 3 students experiencing difficulties with reading and spelling.

Statistics n=18	Mean D	Mths of Intervention Mean D	Ratios -Mths Skill Growth: Mths Intervention
Reading Cluster (mths of school)	4.83	3.14	1.54
PM Readers (mths of school)	5.00	3.14	1.59
Comprehension Cluster (mths of school)	4.83	3.14	1.54
Writing Cluster (mths of school)	5.17	3.14	1.65

Study Two: QLD State School Sample of 10, Year 4 students with mixed literacy abilities

Statistics n-10 df=9	Mean D	Standard Deviation	Standard Error Mean	p=.05	t	Significant
Rate Scaled	0.40	0.49	0.221	1.833	1.81	No
Accuracy Scaled	0.80	0.84	0.291	1.833	2.75	Yes
Fluency Scaled	0.90	0.32	0.180	1.833	5.01	Yes
Comprehension Scaled	1.50	3.83	0.619	1.833	2.42	Yes
ORI Scaled	6.40	30.49	1.746	1.833	3.67	Yes

Statistics n=10	Mean D	Mths of Intervention Mean D	Ratios - Mths Skill Growth: Mths Intervention
Rate Age Corrected	0.50	0.28	1.78
Accuracy Age Corrected	0.95	0.28	3.39
Fluency Age Corrected	0.75	0.28	2.68
Comprehension Age Corrected	0.80	0.28	2.85

Study Three: QLD State School Sample of 21, high school students (Years 7-10) with mixed literacy abilities

Statistics n=21 df=20	Mean D	Standard Deviation	Standard Error Mean	p=.05	t	Significant
Rate Scaled	0.00	0.50	0.154	1.725	0.00	No
Accuracy Scaled	0.29	1.61	0.277	1.725	1.03	No
Fluency Scaled	0.00	0.50	0.154	1.725	0.00	no
Comprehension Scaled	0.71	1.21	0.240	1.725	2.97	Yes
ORI Scaled	1.90	24.59	1.082	1.725	1.76	Yes

Statistics n=21	Mean D	Mths of Intervention Mean D	Ratios - Mths Skill Growth: Mths Intervention
Rate Age Corrected	0.32	0.33	0.98
Accuracy Age Corrected	0.44	0.33	1.35
Fluency Age Corrected	0.33	0.33	1.02
Comprehension Age Corrected	0.98	0.33	2.98

Study Four: Tyquin Group Speech Pathology and Reading Clinic Sample of 18, clients (aged between 5 and 15 years) referred because of literacy difficulties

Statistics n=18 df=17	Mean D	Standard Deviation	Standard Error Mean	p=.05	t	Significant
Rate Scaled	0.83	1.56	0.294	1.74	2.83	Yes
Accuracy Scaled	2.50	4.50	0.500	1.74	5.00	Yes
Fluency Scaled	1.39	2.25	0.354	1.74	3.93	Yes
Comprehension Scaled	1.72	3.51	0.441	1.74	3.90	Yes
ORI Scaled	8.67	83.18	2.150	1.74	4.03	Yes

Statistics n=18	Mean D	Years of Intervention Mean D	Ratios - Years Skill Growth: Years Intervention
Rate Age Corrected	1.01	1.17	0.86

Accuracy Age Corrected	2.35	1.17	2.00
Fluency Age Corrected	1.67	1.17	1.42
Comprehension Age Corrected	2.14	1.17	1.82

POD Software Intervention – Preliminary Research Report November 2017

A variety of theoretical explanations as to the causation of literacy difficulties have been hypothesised. In summary, these include the phonological theory, the cerebellar theory and the magnocellular theory (Ramus, Rosen, Dakin, Day, Castellote, White and Frith, 2003). According to Prideaux, Marsh and Caplygin (2005) cerebellar theorists' postulate that the range of deficits associated with dyslexia can be attributed to a mild dysfunctional cerebellum evidenced by difficulties with skills such as balance, postural stability, motor coordination and automatisation. The phonological theory has at its core of dyslexia, a cognitive deficit in phonological awareness; whereas magnocellular theorists propose both auditory and visual temporal processing deficits resulting from impairment of neural pathways involving large magno cells (Prideaux et al., 2005).

POD Software Intervention (Behavioural Reading Pty Ltd)

The prescribed use of POD intervention software (POD - 10 daily sessions of one hour each) is designed to enhance Behavioural Reading™ Techniques, hypothesised to open new neural pathways and 'create the learning mind'. POD intervention is based upon the multi-deficit hypotheses (phonological, cerebellar and magnocellular) of dyslexia using computer-based tasks requiring central executive processing, sequencing, visual and auditory processing as well as phonological awareness skills (segmenting and blending letter sounds). POD is web based and available via online subscription.

The initial design stimulus of POD is based on several software programs commercially available that may or may not have been used in the Tyquin Group Speech Pathology and Reading Clinic over the last decade. The design of POD in its delivery and content has evolved following global improvements in computer technologies and web speeds.

Measurement and observation of student responses using standardised testing and anecdotal data has provided direction for POD software design to improve foundation skills necessary for reading including:

- Visual perceptual skills (visual tracking, visual memory, visual discrimination, visual form constancy and visual closure);
- Auditory perceptual skills particularly auditory discrimination;
- Phonological awareness skills; and
- Central executive sequencing.

Use of POD is prescribed and recommended for students eight years and over (although can be suitably adapted for younger students where appropriate) who have not been diagnosed with epilepsy or other neurological disorder. In addition to task requirements, students are encouraged to verbalise what they are doing, alternate coloured and clear glass lenses between the right and left eye (to increase the visual load and central executive loading to alternate hemispheres), tap out phonemes and read letter combinations phonetically (nonsense words).

Directly following the ten POD intensive sessions, students are instructed to read using the Behavioural Reading™ techniques. By combining the two therapies, it is anticipated that improvements in processing and phonological awareness skills combined with explicit reading instruction are transitioned into effective and efficient reading behaviours (Gruhl, 2013).

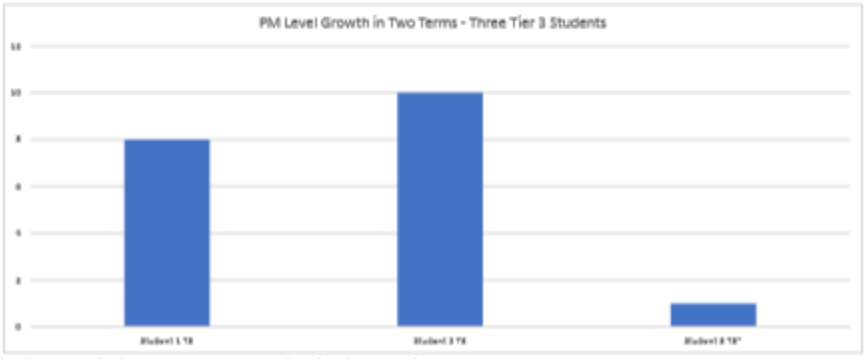
Preliminary Findings

At the time of this report, POD had been commercially available for 18 months. As with any new product entering a competitive market (particularly from a start-up position with little capital); take-up has been slow and growth has relied mostly on word of mouth. As such, only a small amount of schools have implemented it fully with their tier 2 and 3 students (students identified as tier 3 require individual learning instruction) and over a sufficient period of time to collect and measure quantitative data. Another factor is that the data belongs to participating schools and so it is a privilege and not a requirement for schools to share their data with Behavioural Reading Pty Ltd.

School 1

A public school situated in Lake Macquarie, NSW Australia (approximately 370 students K-6). Information provided by a Learning Support Intervention Teacher via email: 16 students from Years 1 & 2 targeted for POD since Term 2, 2017. 100% of students' improved in reading. Three of these students were Tier 3 students – of the three;

- Student 1 increased reading by 8 PM levels (*PM Benchmark* provides teachers with the tools and resources to assess and record students' current reading and comprehension abilities);
- Students 2 increased reading by 10 PM Levels; and
- The third Tier 3 student had not moved PM levels all year however having only completed one week of POD in Term 4, had moved 1 PM level.

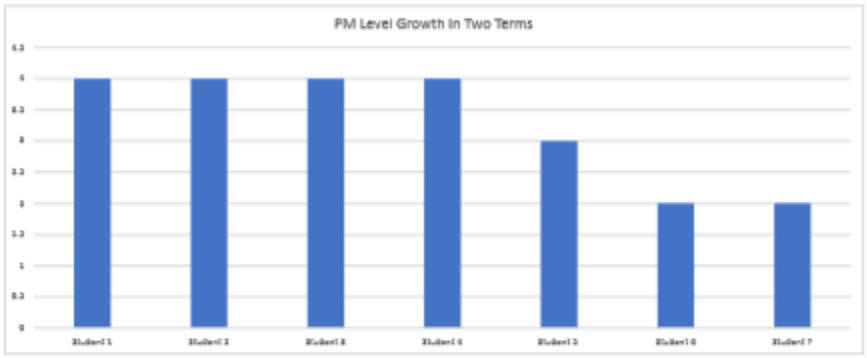


*Only one week of POD intervention completed at the time of report.

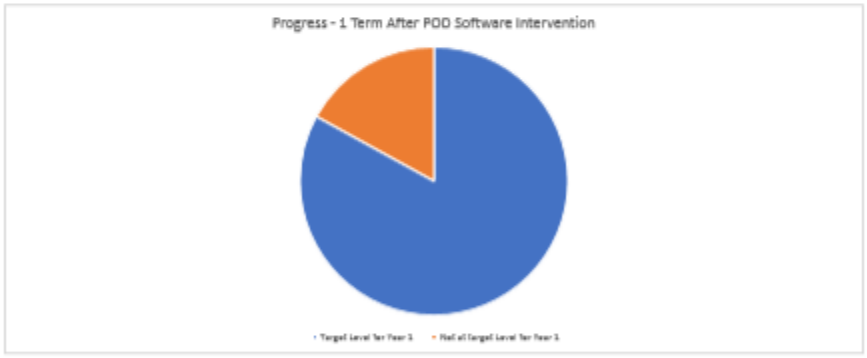
An additional seven students (all were reading at below target level) completed POD sessions in Term 2. These students were selected as they were performing at a

reading level at least 4 levels below the targeted level for their year group. Currently out of these seven students:

- Four students currently reading at the expected level (57%);
- One student reading one level below grade expectation;
- One student at 2 levels below (Previously 4 levels below target); and
- One student at 4 levels below (previously 6 levels below target).

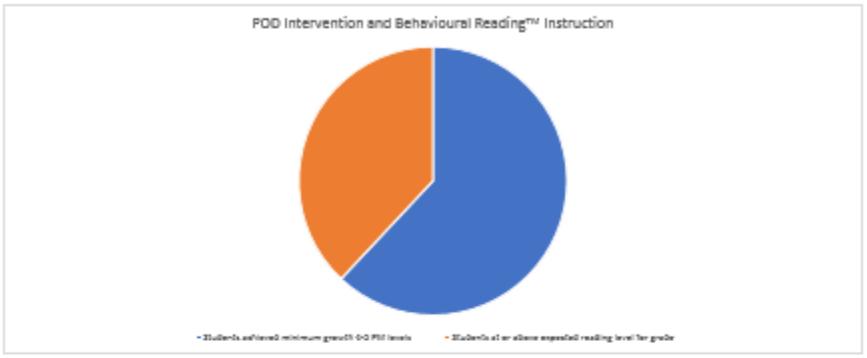


Year 1 students were introduced to POD at the beginning of term 3. Of the six students included, five were reported to be at target level after one term.



Behavioural Reading™ Techniques

It was reported that a number of other children had participated in small group and individual lessons of Behavioural Reading™ reading instruction, while some of these children had also participated in POD, of the 21 original Year 2 participants, 8 children (38%) achieved at or above expected level with regard to reading ability (expected growth for the year is 4-5 levels for Year 2). 16 of the 21 students achieved a minimum growth of this level, with students registering growth as much as 10 levels by the middle of term 4.



School 2

A public school situated in Cessnock, NSW Australia (approximately 80 students K-6). Information provided by Early Action for Success Instructional Leader via email: POD software intervention and Behavioural Reading™ statistics as at Week 5 Term 4, 2017. Six Students (years 1 & 2) were targeted for POD software intervention from Term 1, 2017. It was reported that 100% of students improved in reading.
Four of these were identified as tier 3 students:

- Student 1(year 1-tier 3) increased reading ability by 6 PM levels (received POD intervention in term 3);
- Student 2 (year 2-tier 3) increased reading ability by 6 PM levels (received POD intervention in term 2);
- Two students (year 1- tier 3) are now at stage level in reading and comprehension (POD in term 2);
- One student in year 2 at stage level for reading and comprehension, completed POD intervention at the start of term 4 to alleviate anxiety about learning and changes at school. The student is now more settled and is experiencing a marked improvement in spelling skills when writing; and
- Final student (year 1-tier 2) is now at stage level for reading and comprehension. The student completed POD intervention due to the inability to concentrate in class. There has also been a reported slight improvement in 'on task behaviour'.

Behavioural Reading™ Instruction (pre POD Software Intervention)

Four year 3 students completed POD intervention during first term, 2017. These students had all been targeted and received Behavioural Reading™ instruction during 2015 and 2016 as they were identified as Tier 3 students (year 1, PM level 6, term 3, 2015). Three out of the four students achieved stage level in reading and comprehension during 2016 (i.e. Behavioural Reading™ instruction alone). An additional student student (year 3) was tier 3 in term 3, 2015 (year 1 PM level 6). The student took part in Behavioural Reading instruction and attained stage level in

reading, comprehension and writing by the end of 2015. In NAPLAN 2017, the student received a band 6 in reading and band 5s in writing, spelling, grammar and punctuation. POD software intervention was not required for this student.

Behavioural Reading™ Instruction and POD Software Intervention

For four out of the five students noted above who also completed POD, the following NAPLAN 2017 results were reported

- Two students achieved band 3 for reading and writing with one of these students achieving band 3 for spelling and band 4 for grammar and punctuation. Both students considered 'on track' for year 3;
- One student achieved band 3 for reading, grammar and punctuation and band 4 for writing and spelling and considered 'on track' for year 3;
- One student is still tier 3 but his teacher has noted a growth in confidence and an improvement in his work habits.

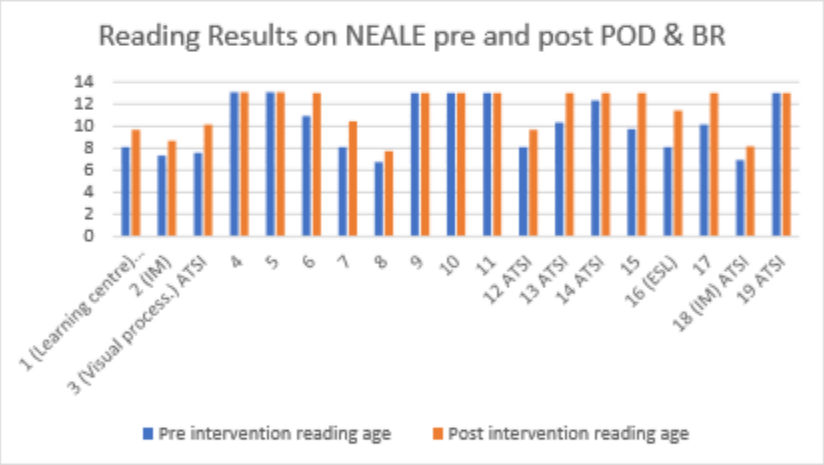
POD Software Intervention and Qualitative Information

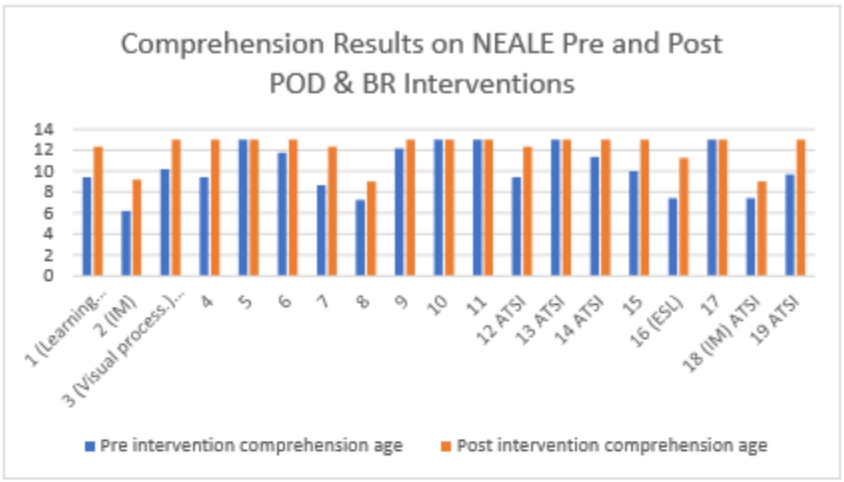
A student recently completed POD intervention software for the second time following specific advice from Philip Gruhl and also because the student reported that it has made a difference to learning. The student's teacher commented that there has been a perceived improvement in cognitive skills; appearing more confident and that the student's written expression is improved, easily read and logical.

Six students in years five and six completed POD. No quantitative information was collected however consistent reports in sustained attention, confidence and independent learning behaviours were reported by classroom teachers. An additional eight year six students are due to complete POD term 4.

School 3

A comprehensive co-educational High School situated in the Manning Valley, NSW Australia (approximately 950 students' years 7-12). Information provided by Deputy Principal Instructional Leader via email: POD software intervention and Behavioural Reading™ statistics as at Week 6 Term 4, 2017. 23 Students (year 7) were targeted for a combination of POD software intervention and Behavioural Reading instruction from Term 3, 2017. It was reported that of the 19 students re-tested post intervention (4 were not re-tested due to absenteeism) 100% of students improved in reading and comprehension; assessed using the NEALE Analysis of Reading Ability (NEALE). The NEALE is an ACER formal assessment designed to measure the accuracy, comprehension and rate of reading, monitor reading progress and obtain diagnostic observations of reading behaviour. Reading range is 6 to 13 years. Nine students (47%) were identified as Aboriginal and Torres Strait Islander (ATSI). Four students (21%) had a reported diagnosis including mild intellectual impairment (IM), visual processing, and 'learning centre student'. One student was reported as having English as a Second Language (ESL). Results in reading and comprehension age gains following interventions were reported as follows:





POD software intervention was administered as prescribed (i.e. 10 x 1 hour sessions, consecutively over two school weeks) and behavioural reading instruction during each session. On average reading age improved 1.4 years and reading comprehension age 1.9 years following 10 hours of POD Intervention software and Behavioural Reading™ instruction. These gains may have been higher given that the age range for the NEALE has a ceiling of 13 years.

At the time of report, an additional 50 students were reported to be completing POD Intervention software and Behavioural Reading™ instruction in term 4, 2017.

Conclusion

Preliminary data supporting the use of POD software intervention and Behavioural Reading™ reading instruction from three schools (two Primary schools and one High school) in NSW have demonstrated both interventions to be positive, effective and efficient in the treatment of students with literacy difficulties in the school environment for different ages, cultural backgrounds, learning abilities and potentially students from English as a Second Language background.

Further data is required to further support POD software intervention and Behavioural Reading™ reading instruction as evidence-based literacy interventions. Data from participating schools will continue to be collected. It is envisaged that once enough data is collected, Behavioural Reading Pty Ltd may be in an improved position to pursue a research grant for a comprehensive study or ideally be pursued by researchers in the higher education market or through the Department of Education.

References

Gruhl. P. (2013). *Behavioural Reading. Brisbane, Australia.* Plethus.

Prideaux, L., Marsh, K.A. and Caplygin, D. (2005). Efficacy of the Cellfield Intervention for reading difficulties: an integrated computer-based approach targeting deficits associated with dyslexia. *Australian Journal of Learning Disabilities, 10(2),* 51-62.

Ramus, F., Rosen, S., Dakin, S.C., Day, B.L., Castellote, J.M., White, S., & Frith, U. (2003). *Theories of developmental dyslexia: insights from a multiple case study of dyslexic adults. Brain, 126,* 841-865.

Further discussion:

This data was shown to a Professor of Speech Pathology in early 2018 and certain things were noted about the data.

1. For the sake of the discussion, it was accepted that the results were true and fair and that the rigor of the research process was not going to be scrutinized.
2. The test instrument used at School 3 had a ceiling of 13 years old reading age. The sample of students included five whom had pretested at 13 years prior to the intervention.
3. The implications of 2) are that it will a) reduce the gains achieved and discriminate against the outcomes and b) note if there were any adverse damaging outcomes, which the data supported that none were evident
4. The highest gain was indicated by student #16 whom pretested with a reading comprehension age of 7 years old and completed a fortnight later with a comprehension reading age of 11 years old a total of 4 years gain.
5. If recalculation of the average gains is computed excluding the 5 students with pretesting at the ceiling of 13 years, the average gain is 2 years 10 months over the fortnight.
6. By further amending the data to remove the two students that were near to the 13 year pretest value, the average gain rises up further to 3 years
7. As previously stated, this value is still conservative as the test has a maximum achievement age ceiling of 13 years old, therefore it is reasonable to suggest that if a different testing instrument was used that had a higher ceiling value, for example the Gray Oral Reading Test (GORT) with a ceiling value >18 years 11 months, then it might be reasonable to conclude that the 3 years gain in outcomes are indeed a conservative estimate.
8. I offered to the Professor that this data has no rival and went onto ask if the data was sufficiently impressive to warrant further investigation by the university at which she works. I was quite dumbstruck that with results so impressive, the Professor had no interest whatsoever in trying to understand more about it.

Chapter 10

BRICKWALLS: POLITICIANS & ASSOCIATIONS

Politicians: Minister of Education WA

Hon Peter Collier MLC

Minister for Education; Aboriginal Affairs; Electoral Affairs

Leader of the Government in the Legislative Council

Our Ref: 34-69363

Mr Philip Gruhl

Founder and Director Behavioural Reading philip.gruhl@tyquin.com.au

Dear Mr Gruhl

Thank you for your correspondence dated 23 November 2016 regarding the Behavioural Reading and POD programs.

The selection of programs and resources is made at an individual school level, where teaching staff make informed decisions based on their knowledge of the needs of students at their school. There are many different commercial programs, resources and initiatives available to schools, and teachers need to assess carefully the merits of each one to ensure that they will complement and enhance the learning program. As I am sure you will appreciate, the Department of Education is unable to recommend or endorse commercial publications.

Contact details for all public schools can be found on the Department of Education's Schools Online website at www.det.wa.edu.au/schoolsonline, should you wish to contact them directly.

Please be assured that the Department is committed to supporting all students to reach their full potential, including those with learning difficulties such as dyslexia.

The Nationally Consistent Collection of Data on School Students with Disability, provides an opportunity to support schools in the collection of data relating to students with a disability, diagnosed or imputed. Students with learning difficulties/disabilities, including dyslexia, are part of this data collection and schools in Western Australia are heavily focused on this group.

Currently, Department teachers have the opportunity to enrol in online professional learning supporting the use of research and evidence-based strategies and interventions to support students with dyslexia. Understanding Dyslexia and Significant Difficulties in Reading, designed by Online Training Australia, has been developed to support teachers and schools in delivering evidence-based practices to improve learning outcomes for students demonstrating difficulties in reading. This course is delivered by all public education sectors in Australia.

The Department also has a service agreement with the Dyslexia-SPELD Foundation of Western Australia to provide statewide advocacy, support to, consultancy, and professional learning to teachers, schools and parents. Dyslexia-SPELD is a registered charity and provides a range of services to families and individuals who are affected by learning difficulties and disabilities, including dyslexia. A number of these services are provided free of charge or at a reduced cost as a result of donations received from members of the community.

The School of Special Educational Needs: Disability, provides support schools to students with learning difficulties through consulting teachers, who can be accessed by every public school in Western Australia. The School of Special Educational Needs: Disability also has a specialist service, the Learning Disabilities Education Service, which provides intensive service to schools in relation to students with specific learning difficulties, such as dyslexia.

I acknowledge your interest in supporting students with dyslexia and related learning differences. Please be assured that the Department will continue to support these students through a system-level approach advocating research and evidence-based methods in the instruction of reading.

I note your request to meet. Unfortunately, I am unable to meet with you at this time due to my heavy diary commitments. However, I encourage you to contact Ms Angela Rees, Associate Principal, School of Special Educational Needs: Disability, for more information about the services the Department provides in relation to dyslexia. Ms Rees can be contacted on (08) 9402 6120 or via email at angela.rees@education.wa.edu.au.

Kind regards

Hon Peter Collier MLC

MINISTER FOR EDUCATION

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Leornian Principles and POD Research Basis

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The following literature review conducted late 2015 forms the research basis of Behavioural Reading™ and POD Software that is currently used by Educational Professional (EPs) and speech pathologists as part of a multi-component intervention approach to literacy difficulties in a private speech pathology clinic in Bulimba Queensland, Australia. Both Behavioural Reading™ and POD Software are also available commercially via online subscription.

LITERATURE REVIEW

According to the Australian Bureau of Statistics, 4% of Australia's population aged 15 and over have difficulty reading brief texts on familiar topics (Australian Bureau of Statistics, 2013). Although EPs utilise the K-10 English Syllabus (Board of Studies NSW, 2012) and New South Wales Literacy Continuum (State of New South Wales Department of Education and Communities, 2013) to monitor literacy development and plan lesson goals; it is up to the individual teacher and/or school policy as to what assessments, strategies or programs are utilised (Aaron, Maleta Joshi, Gooden and Bentum, 2008).

Based on Serry's (2013) qualitative research, Serry indicated confusion in the school setting including the roles EPs, speech language pathologists (SLPs) and other professionals play in remediation of literacy difficulties. This is not surprising given the vast amount of literature relating to diagnosis and treatment of reading disabilities and the lack of efficacious reading intervention approaches utilised by teachers in Australian schools (Australian Council for Education Research (ACER), 2013).

WHAT IS KNOWN ABOUT THE CAUSATION OF LITERACY DIFFICULTIES?
An Overview

Snowling & Stackhouse (2006) summarised findings from brain-imaging studies that provided evidence for the existence of a biological basis in the brainain for developmental reading difficulties also termed ‘developmental dyslexia’ in the literature. A commonality to phonological studies is that phonological processes, such as segmentation and assembly fail to activate the brain in a typical manner and with optimal efficiency. Snowling and Stackhouse also reported that studies investigating word recognition have shown that relevant information may gain access to the language areas in the left hemisphere of the brain via an inefficient route. brain imaging in children pre-and post intensive therapy has also shown a change in brain functioning towards that of typically developing readers (Snowling & Stackhouse, 2006).

Wolf, M. (2008) described the brain of the novice reader to undergo comparatively more activity in both hemispheres as learning new skills requires greater cognitive and motoric processing and underlying neuronal territory. Wolf noted that as skills become highly practised, there is less cognitive expenditure, and the neuronal pathways also become streamlined and efficient. Wolf
reported that fMRI studies have found that children use more specific regions of the brain compared to adults such as the angular gyrus and supramarginal gyrus that are both important structures for integrating phonological processes with visual, orthographic and semantic processes.

In a review of the aetiology of dyslexia, Norton and Wolf (2012) reported that in comparing people with dyslexia relative to control groups of participants, the most consistent finding is an under recruitment of left temporo-parietal and left occipito-temporal areas. In contrast, younger children without dyslexia and matched for reading ability do not show under recruitment of these areas (Hoeft et al., 2007). Hoeft et al. also commented on individual studies identifying greater activation of the right frontal and temporal lobes for people with dyslexia relative to control groups. Hoeft et al. hypothesised that additional activation of neurological processes are thought to represent compensatory mechanisms or inefficient and effortful processing.

According to Norton and Wolf (2012) diagnosis of dyslexia is not absolute due to the many processes required for reading. Norton and Wolf highlighted that inaccuracy at any level of language or processing or a lack of automaticity in connecting any of these circuits can lead to poor reading. Norton and Wolf reported the tasks used in nearly all brain imaging studies to date have focused on accuracy rather than fluency.

In a study that engaged typical adult readers to read sentences presented at rates slower than, equal to, and faster than their normal reading speed, the posterior middle temporal gyrus was engaged at all reading speeds, whereas areas of the left inferior frontal gyrus and occipito-temporal regions were more active at both slow and fast, but not normal, speeds (Benjamin & Gaab, 2011). Results were compared to a letter-reading baseline task and Benjamin & Gaab suggested that when the automaticity of normal reading is disrupted, activation in reading-related regions changes, consistent with a multicomponent view of fluency.

Theoretical Explanations

A variety of theoretical explanations as to the causation of literacy difficulties have been hypothesised. In summary, these include the phonological theory, the cerebellar theory and the magnocellular theory (Ramus, Rosen, Dakin, Day, Castellote, White and Frith, 2003). Per Prideaux, Marsh and Caplygin (2005) cerebellar theorists postulate that the range of deficits associated with dyslexia can be attributed to a mild dysfunctional cerebellum evidenced by difficulties with skills such as balance, postural stability, motor coordination and automatisation. The phonological theory has at its core of dyslexia, a cognitive deficit in phonological awareness, whereas magnocellular theorists propose both auditory and visual temporal processing deficits resulting from impairment of neural pathways involving large magno cells (Prideaux et al., 2005).

Phonological Theory

Cognitive processing difficulties as to the underlying cause of specific language impairment (SLI) as well as dyslexia have also been proposed (Claessen, Leitao, Kane & Williams, 2013). Wagner and Torgesen (1987) described the phonological processing model to be three separate but linked phonological abilities: phonological awareness, phonetic coding in working memory and phonological recoding in lexical access. Claessen et al. (2013) assessed 63 participants with a battery of tests based on the psycholinguistic framework proposed by Stackhouse and Wells (1997). Claessen et al. (2013) found that the spread of scores on all measures of phonological processing was wider than that of the age-matched and language-matched groups on most tasks demonstrating a different profile of phonological processing.

Baddeley (1992) has suggested that there is a dynamic relationship between working memory, long-term memory, information processing systems, language ability and world knowledge. Baddeley (1986) described working memory as active processing rather than passive storage of information in primary (short term) memory. Baddeley's Working Memory Model includes the Phonological Loop, Visual-Spatial Sketchpad and Central Executive Function.

The Phonological Loop has received the most empirical support having explained robust effects such as phonological similarity, irrelevant speech, word-length and articulatory suppression effects (Baddeley, 1992). In a recent study investigating comprehension difficulties in children, Pimperton and Nation (2014) analysis of group differences revealed that working-memory-related problem behaviours were noted for a small subgroup of poor comprehenders who also displayed domain-general (verbal and nonverbal) working memory difficulties. Pimperton and Nation argued there to be "genuine" underlying working memory deficits for some students with comprehension difficulties.

According to Salway and Logie (1995) the Visual-Spatial Sketchpad has been shown to play an important role in mental imagery tasks and planning of movements. The Visual-Spatial Sketchpad is thought to include a passive visual temporary store that processes visual properties of objects and scenes and an active spatially based rehearsal system (inner scribe) that is involved in the planning and cognitive control of movement. Pham and Hasson (2014) explored the relation between verbal and visuospatial working memory and reading ability in a sample of school-aged children (n=157 ages 9-12) with a wide range of reading skills. Although results indicated that verbal working memory was a stronger predictor in reading fluency and comprehension, visuospatial working memory also significantly predicted reading skills providing greater variance in reading comprehension than reading fluency.

The Central Executive Function has been proposed to coordinate the flow of information within working memory by encoding and retrieving information from the Visual-Spatial Sketchpad and the Phonological Loop (Baddeley, 1986). Gillam, Hoffman, Marter, & Wynn-Darcy (2002) suggested that adequate Central Executive Function in working memory is necessary for the development of coherent mental representations in long-term memory and these representations form the semantic network that is the basis for language development.

Working Memory and Literacy Development

Daneman and Carpenter (1980) postulated that working memory capacity plays a crucial role in reading comprehension given the reader must store pragmatic, semantic and syntactic information from the preceding text and use it in the subsequent text. Information in working memory may be lost through decay or displacement since its capacity is assumed to be limited. Daneman and Carpenter hypothesised a good reader to require fewer processes than a poor reader and be more efficient having fewer computational demands on working memory and therefore greater capacity. An efficient process would also be functionally faster, resulting in less decay of the preceding information (Daneman and Carpenter, 1980).

Berninger and Abbott (2013) suggested that superior verbal reasoning might mask dyslexia if only very low achievement is used for diagnosis. Berninger and Abbott studied 64 children in Grades one to nine who had either superior verbal reasoning or average verbal reasoning. Students with superior verbal reasoning and dyslexia significantly outperformed those with average verbal reasoning and dyslexia on reading, spelling, morphological, and syntactic skills, but not on verbal working memory tasks.

Like phonological working memory, phonological awareness, the ability to hold and manipulate the sound component of language has been linked to early reading as well as spelling achievement. Gillam and Kleeck (1996) reported that phonological awareness can occur at syllabic, sub-syllabic and phonemic levels and phoneme-level representation of speech gradually emerges during the preschool years. Gillam and Kleeck (1996) asserted that phonological working memory is necessary for performing phonological awareness tasks because the phonological coding and recoding processes that are a part of phonological working memory are also necessary for phonological awareness.

Brady (1991) described weak meta-phonological awareness skills to be implicated in dyslexia however verbal working memory problems to also be a common occurrence. In support, evidence from a small study investigating the condition hyperlexia; Healy, Aram and Horowitz (1982) found that despite the 12 participants having very low cognitive functioning, performance on working memory tasks stood out as one of the few cognitive strengths of these children.

According to Norton and Wolf (2012), Rapid Autonomic Naming (RAN), the task of naming a series of familiar items as quickly as possible appears to invoke a mini-circuit of the later-developing reading circuitry. Norton and Wolf (2012) cited an extensive body of research that supported RAN tasks as one of the best predictors of reading fluency across all known orthographies. Regarding research in this area, RAN tasks and reading have been proposed to require many of the same processes including, eye saccades, working memory, connecting of orthographic and phonological representations. As required for reading fluency, RAN tasks also depend on automaticity within and across each individual component in the naming circuit.

APPROACHES TO LITERACY INTERVENTION

Norton and Wolf (2012) reported that reading has been compared to rocket science and to conducting a symphony, yet it is expected children to have mastered the requisite and complex set of skills required for reading by the age of seven, including integration of a vast circuit of brain areas both accurately and efficiently. This "reading circuit" is composed of neural systems that support every level of language, phonology, morphology, syntax, and semantics as well as visual and orthographic processes, working memory, attention, motor movements, and higher-level comprehension and cognition (Norton & Wolf, 2012).

Wolf (2008, p.130) defined 'developmental reading fluency' as not a matter of speed but a matter of being able to utilise all the knowledge a child has about a word (e.g. letters, letter patterns, meanings, grammatical functions, roots and endings) in time to think and comprehend. Becoming fluent is therefore being able to both read and understand. Wolf however reported that fluency does not ensure better comprehension but provides additional time to the executive system (such as working memory) to direct attention where it is most needed to infer, understand, and predict. For example, Wolf reported that "sight-words" and "sight chunks" (e.g. morphemes such as prefixes 'um', 'pre' and suffixes 'er', 'ing') increase semi-fluency in the decoding reader. Wolf noted however, children rarely receive explicit instruction in morphological knowledge being one of the least exploited aids to fluent comprehension. Bell (1991) also summarised historical perspectives regarding the relationship between imagery and cognition required for reading comprehension and indicated that reading fluency is a product of efficient formation of visual imagery when decoding.

Norton and Wolf (2012) noted that improving RAN ability and reading fluency is much more difficult. Reasons stated included RAN tasks to be a surface indicator of the efficiency of the underlying processes shared by naming and reading. There have been no large-scale, well-controlled studies that have tried to explicitly train naming speed. Norton and Wolf reported that their own studies have shown that although best interventions can improve most reading and language variables, the RAN changes little from pre-to post treatment, suggesting that RAN taps a more basic index of processing.

Fluent comprehension depends on accuracy and automaticity at every level of language, although Norton and Wolf (2012) noted few intervention programs reflect this. Morris et al. (2011) examined the impact of intervention for 279 students with reading difficulties. Students

were randomly assigned to one of four different intervention programs designed to contrast different types of instruction: (a) study skills and math instruction (no reading instruction), (b) a phonological program plus study skills instruction, (c) a multi-component word-identification strategy and phonological program, or (d) a multi-component program designed to address each level of reading (Wolf et al. 2009) and a phonology program. Students were matched for IQ, race, and socioeconomic status among groups, and each group received 70 hours of small-group instruction.

Results showed that children who received multi-component interventions (options (c) and (d)) had significantly greater growth than did other intervention groups on timed and untimed word and non-word reading and passage comprehension tasks. In terms of fluency, children in the multi-component (d) group also outperformed the other interventions, gaining more than six standard score points on the Gray Oral Reading Quotient (Morris et al. 2011). Per Morris et al. results highlighted the importance of explicitly addressing the multiple levels of language and multiple cognitive processes involved in reading, especially for students with RAN or double deficits whose weaknesses are not adequately addressed by a phonological decoding program alone.

Aaron et al. (2008) described three approaches to literacy intervention: Discrepancy Model of Learning Disabilities (LD), Response to Intervention (RTI) and the Component Model of Reading (CMR). LD is defined in terms of average or above-average intelligence but below average reading performance.

The discrepancy model has been scrutinised for failing to deliver expected academic benefits. The primary reasons for poor outcomes of LD instruction being the unsystematic way children with LD are taught and lack of uniformity in instructional methods (Vaughn, Levy, Coleman and Bos, 2002). Aaron et al. (2008) reported the quality of reading instruction provided within the LD model is driven by the whole-language philosophy and relies heavily on group work, disregarding individual needs.

As an alternative to the discrepancy model, Response to Intervention (RTI) is embedded in a multi-tiered model of assessment, intervention and progress monitoring (Kovaleski, 2004). Phases are hierarchical being initial classroom instruction followed by intense instruction for at risk students and effect measured. Individualised instruction is provided to those students below average and referred to special education services. Like the LD model there are several variants or approaches to RTI and the focus of RTI being ‘identification of literacy difficulties’ and not on the ‘specific method of instruction’ has been criticised (Aaron et al., 2008).

Implementing the Component Model of Reading (CMR) involves identifying the weak component that underlies reading difficulties and focusing remedial efforts at the weak component or components (Aaron, et al., 2008). To be considered a component, the process must be independent of other cognitive processes (Sternberg, 1985). The three domains of the CMR are the cognitive domain, the psychological domain and the ecological domain. The cognitive domain has two components: word recognition and comprehension. Per Aaron et al. (2008), when the CMR model is applied to literacy acquisition, a student can fail to acquire satisfactory levels of literacy skills because of deficits in any component in any one of the domains. As well as comprehension, the second component of the Cognitive Domain includes two processes – the ability to decode written words and the ability to decode words instantly and

automatically.

Aaron et al. (2008) conducted two studies, the first to validate the CMR method and second to compare CMR-based instruction versus Discrepancy based instruction. In the first study Aaron et al. used a battery of reading assessments on children in grades 2 through 5 at different schools in the United States. Aaron et al. reported that the two components of the CMR cognitive domain, listening comprehension and decoding could predict from 38% to 41 % of the variability seen in reading comprehension. They found however that fluency makes inconsistent contribution to reading comprehension, accounting for a negligible 2.5% of the variance at the fifth-grade level.

In the second study, the reading achievement scores of a total of 330 children from Grades 2 through 5 were used for comparing the effectiveness of instruction based on the cognitive component of the CMR model (171 students) (utilising the READ program for sound and word recognition and a seven step comprehension strategy) with that of instruction based on the traditional LD model (159 students). Results indicated generally that instruction provided under the framework of the CMR was more effective than undifferentiated resource room instruction (Aaron et al., 2008).

Aaron et al. summarised outcomes stating that word recognition provided to children with a deficit in that component is more effective than undifferentiated instruction provided to children with LD. In addition, children who received training in word recognition skills showed significant gains in comprehension however children who received comprehension training but who had word recognition difficulties did not improve in word recognition skills. In contrast, children who had sufficient word recognition skills but weak comprehension skills improved reading comprehension with comprehension training.

Numminen (2002) reported many researchers in the field to have expressed doubts regarding rehabilitation of working memory. Numminen proposed however the use of plain language as a tool to improve working memory capacity. Numminen stated that reduced working memory capacity could be improved by selecting material that places less of a burden on linguistic working memory. Clear, well-paused and structurally short sentences and familiar vocabulary facilitates the functioning of working memory and makes it easier for a person to link new information to old information. This activation of deep processing during reading then assists in reading comprehension.

Prideaux, Marsh and Caplygin (2005) investigated the efficacy of Cellfield™ computer based Intervention for 262 Australian school children tested pre-and post treatment. The Cellfield™ Intervention is based upon the multi-deficit hypotheses (phonological, cerebellar and magnocellular) of dyslexia using computer-based tasks requiring visual, auditory and phonological processing. Intervention comprised of ten one-hour sessions, each consisting of ten exercises. The study provided preliminary support for the efficacy of the Cellfield Intervention with results demonstrating improvements in reading related skills, oral reading proficiency and ocular measures in the clinical sample assessed.

Prideaux et al. (2005) reported dyslexia intervention studies that achieve reading age gains of two months per one month of intervention as effective. Word attack skills were reported to be the most improved following Cellfield™ Intervention (23 times per one month of intervention).

Improvements in ‘reading words without context’ and passage comprehension demonstrated meaningful gains of 12 times per one month. Spelling skills were reported to have improved but not significantly (Prideaux et al., 2005). Prideaux et al. reported limitations of the study to include potential sampling bias as participants paid for intervention. Further research was also recommended to establish the long-term benefits of the Cellfield™ Intervention and whether ongoing learning support such as phonological awareness therapy would augment gains.

Wong, He and Chan (2014) also investigated the effectiveness of computerised working memory intervention among Chinese students. General linear model analysis (repeated measures) was applied to neurological and behavioural measures obtained for working memory, response inhibition, and inattention and hyperactive symptoms for two groups of students, experimental and control. For the experimental group that received high-intensity training in the school setting, there was a significant improvement in working memory reflected in neuropsychological measures as well as parent-rated behavioural measures compared with the control group. Wong, He and Chan concluded that results supported the effectiveness of group-based computerised training and that it might be a cost-effective intervention in semi-structured settings, with high-intensity training and minimal therapist involvement.

Brent (2004) reported that automatic knowledge of sound-symbol correspondence must be well developed to compensate for limitations in working memory and to allow quick access to information stored in long-term memory and less reliance on executive processing. It typically takes many years for students with language impairment to achieve a literate level and that students with deficits in memory and the phonological module require teaching of detailed sound-symbol correspondence, for single and multiple letter groups, sound sequencing and division of words into syllables (Brent, 2004). In a study by Gillam and Kleeck (1996), they also supported the usefulness of phonological awareness training with children with language impairment and that phonological awareness training correlated with early literacy ability.

LITERACY ASSESSMENT AND INTERVENTION AT TYQUIN GROUP SPEECH PATHOLOGY AND READING CLINIC (Tyquin)

Consistent with what is reported in the literature, Tyquin SLPs and EPs assess students with literacy difficulties using the multi-deficit model of reading difficulties and base treatment on the component model of reading intervention (particularly the cognitive domain). In summary, students referred to the clinic with literacy difficulties are assessed using a battery of assessments (based on age) to identify specific areas of weakness or impairment. Literacy intervention provided is based on both theoretical and evidence-based research (phonological and phonemic awareness training), POD computer based intervention (auditory and visual processing), Behavioural ReadingTM (instruction of reading technique) and participant’s individual needs at the time (e.g. language intervention).

As discussed above, phonological awareness intervention has been researched extensively and the use of computer-based software has some evidence base to support its use in the treatment of literacy difficulties. Working memory difficulties and its association with reading difficulties is also well reported in the literature. Strategies such as ‘chunking’, reducing reading rate and the

use of mnemonic strategies are often recommended to assist students with working memory difficulties. The implementation of such strategies to improve literacy skills, particularly reading fluency has not been researched extensively. Behavioural ReadingTM and POD software are research based intervention approaches integrating such recommendations cited in the literature.

BEHAVIOURAL READING™

Behavioural Reading™ developed by Philip Gruhl (Gruhl, 2013) comprises several techniques that stem from a philosophical position based on a combination of research and evidenced based teaching principles and methodologies across a diverse range of disciplines including education, speech pathology, psychology, neuroscience, coaching and elite performance. Techniques are applied to reading, number and mathematical tasks and are conceptual in nature to prepare the archaeological pre-reading and number brain to adapt in such a way as to facilitate efficient functioning of these tasks (Wolf, 2008).

The philosophy extends to:

● Define a set of skills, interactions, neurological and emotional conditions that are typically seen in high performing individuals. The assumption is made that all skills are critical to the efficient acquisition and implementation of reading and number;

● The idea that through specific short term exercises, the underlying neurological sequences and timing seen in proficient individuals should be able to be instigated and built as per neuroplasticity theory;

● The concept of automaticity as an efficient neurological condition for a given task thereby mitigating working memory deficits;

● Growth of an efficient reading and number brain is best instigated and refined using a small volume of text, such as a single sentence, numbers 0 - 9 or simply a short sequence of ‘up and down’ arrows;

● Techniques should be initially learnt in a less demanding environment and this enables the efficient acquisition of fluent reading and comprehension to age appropriate skills following the initial skill acquisition and not vice versa; and

● Skills can be taught and learned to a level of automaticity in what would be regarded as fast (days and weeks) and easily (with little effort or time commitment) in contrast to the months and years typical of current methodologies used with tier 3 students (Gruhl, 2013).

POD SOFTWARE

The prescribed use of POD (10 daily sessions of one hour each) is designed to enhance Behavioural Reading Techniques, hypothesised to open new neural pathways and 'create the learning mind'. POD intervention is based upon the multi-deficit hypotheses (phonological, cerebellar and magnocellular) of dyslexia using computer-based tasks requiring central executive processing, sequencing, visual and auditory processing as well as phonological awareness skills. POD is web based and available via online subscription.

The initial design stimulus of POD is based on several software programs commercially available that may or may not have been used in the Tyquin Group Speech Pathology and Reading Clinic over the last decade. The design of POD in its delivery and content has evolved following the global improvements in computer technologies and web speeds.

Measurement and observation of student responses using standardised testing and anecdotal data has provided direction for POD software design to improve foundation skills necessary for reading including:

- Visual perceptual skills (visual tracking, visual memory, visual discrimination, visual form constancy and visual closure);
- Auditory perceptual skills particularly auditory discrimination;
- Phonological awareness skills; and
- Central executive sequencing.

Use of POD is prescribed and recommended for students eight years and over who have not been diagnosed with epilepsy or other neurological disorder. In addition to task requirements, students are encouraged to verbalise what they are doing, alternate coloured and clear glass lenses between the right and left eye (to increase the visual load and central executive loading to alternate hemispheres), tap out phonemes and read letter combinations phonetically (nonsense words).

Directly following the ten POD intensive sessions, students are instructed to read using the Behavioural Reading™ techniques. By combining the two therapies, it is anticipated that improvements in processing and phonological awareness skills combined with explicit reading instruction are transitioned into effective and efficient reading behaviours.

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Submission to present at Speech Pathology Australia conference 2017 (unnsuccessful)

Speech Pathology Australia Conference SYDNEY 2017

THEME: WiFi Working and Investing in Future Innovations

(3-hour) Workshop Abstract Submission

Presenters

Philip Gruhl (B.Ed.), Louise Tyquin (B.Sp.Thy.), Yavanna Grogan (B.Sp.Path., M.A. (Linguistics))

Assisted by Paula Shillington & Cathy Vogt

Heading

Behavioural Reading: An Innovative Individual, Small Group or Classroom-Based Reading Pedagogy for Students with Literacy Difficulties

Abstract (250 words)

Behavioural Reading™ (Leornian Principles™) includes a number of innovative techniques designed, practised and refined to specifically support students with literacy and learning difficulties. At its core, Leornian Principles™ stems from an elite sports philosophy where in applying correct technique to essential learning processes combined with efficient daily practice, the result can create successful reading and learning minds in all students.

Working memory and sequencing deficits and their association with reading difficulties is well documented in the literature. Strategies such as 'chunking', reducing reading rate and the use of mnemonic strategies are often recommended to assist students with working memory and subsequent literacy difficulties. Leornian Principles™ is a structured and research-based intervention approach, integrating such recommendations cited in the literature.

Participants in the workshop will receive a brief overview of the theoretical and research basis for Leornian Principles™ pedagogy. Participants will then be instructed and encouraged to participate in key Leornian Principles™ reading and learning techniques including: 1) 'How to Disarm the Preconditioned Response by Creating Fluent Reading'; 2) 'Three brain Essentials for Comprehension' (Visualisation, Visual Neurology and Critical Skill); 3) 'Rapid Vocabulary Expansion'; 4) 'Reading Fast, Slow and In Between'; and 5) 'Essential Sequencing' (alphabet and numbers).

It is anticipated that participants will complete the workshop equipped with the confidence, knowledge and skills to immediately facilitate efficient reading and learning behaviours for their students with literacy difficulties either individually, in a small group or in the classroom environment.

Introductions/ Rationale

Leornian Principles™ (Gruhl, 2013) has been used in its current published form by Educational Professionals (EPs) and speech pathologists as part of a multi-component intervention approach to literacy difficulties in a private speech pathology clinic and recently in a number of schools in NSW and QLD, Australia. Leornian Principles™ comprises a number of techniques that stem from a philosophical position based on a combination of research and evidenced-based teaching principles and methodologies across a diverse range of disciplines including education, speech pathology, psychology, neuroscience, coaching and elite performance. Techniques are applied to reading, number and mathematical tasks and are conceptual in nature to prepare the archaeological pre-reading and number brain to adapt in such a way as to facilitate efficient functioning of these tasks (Wolf, 2008).

The philosophy extends to:

- Defining a set of skills, interactions, neurological and emotional conditions that are typically seen in high-performing individuals. The assumption is made that all skills are critical to the efficient acquisition and implementation of reading and number;

- The idea that through specific short term exercises, the underlying neurological sequences and timing seen in proficient individuals should be able to be instigated and built as per neuroplasticity theory;
- Seeing automaticity as an efficient neurological condition which can be developed for any given task, mitigating the effect of working memory deficits;
- The technique of instigating the growth of an efficient reading and number brain by using a small volume of text, such as a single sentence, a few letters, the numbers 0 - 9 or simply a short sequence of 'up and down' arrows;

  The idea that techniques, skills and vocabulary must be initially learnt in a simplistic zero-stress environment;
  The notion that age-appropriate reading competency results from an aggregation of efficient neural wiring and learned reading skills;

- Recognizing that skills can be taught and learned to a level of automaticity in what would be regarded as fast (days and weeks) and easily (with little effort or time commitment) in contrast to the months and years typical of current methodologies used with tier 3 students (Gruhl, 2013).

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Objectives

Participants in the workshop will:

1. Receive a brief overview of the theoretical and research basis for Leornian Principles™ pedagogy including what is known about the causation of literacy difficulties both biological (imaging studies) and theoretical (phonological theory, working memory and rapid autonomic naming) and approaches to literacy intervention;
2. Learn Leornian Principles™ techniques as outlined in the abstract by listening and watching the presenter demonstrate, observing videos of real-life examples and practising specific techniques in pairs using handouts and direction from the presenter; and
3. Receive resource and contact information for ongoing support in developing skills in Leornian Principles™ pedagogy.

Practice implications

It is anticipated that participants will complete the workshop equipped with the confidence, knowledge and skills to immediately facilitate efficient reading and learning behaviours for their students with literacy difficulties either individually, in a small group or in the classroom environment. In doing so Leornian Principles™ pedagogy can be integrated with other necessary interventions (such as language and phonological awareness) to further support students with literacy and learning difficulties.

Leornian Principles & POD SP AU Research paper

BR & POD SP AU Research paper.docx

Comparison of Reading Fluency Pre and Post Classroom Implementation of Behavioural Reading™ Techniques

Background

The proposed study will review classroom implementation of a research based reading technique Behavioural Reading™ (Gruhl, 2013) that is currently used by Educational Professional (EPs) as part of a multi-component intervention approach to literacy difficulties in a private speech pathology clinic in Bulimba Queensland, Australia.

According to the Australian Bureau of Statistics, 4% of Australia's population aged 15 and over have difficulty reading brief texts on familiar topics (Australian Bureau of Statistics, 2013). Although EPs utilise the K-10 English Syllabus (Board of Studies NSW, 2012) and New South Wales Literacy Continuum (State of New South Wales Department of Education and Communities, 2013) to monitor literacy development and plan lesson goals; it is up to the individual teacher and/or school policy as to what assessments, strategies or programs are utilised (Aaron, Maleta Joshi, Gooden and Bentum, 2008).

Based on Serry's (2013) qualitative research, Serry indicated confusion in the school setting including the roles EPs, speech language pathologists (SLPs) and other professionals' play in remediation of literacy difficulties. This is not surprising given the vast amount of literature

relating to diagnosis and treatment of reading disabilities and the lack of efficacious reading intervention approaches utilised by teachers in Australian schools (Australian Council for Education Research (ACER), 2013).

What is known about the causation of literacy difficulties – An overview?

Biological aetiologies – Imaging Studies

Snowling & Stackhouse (2006) summarised findings from brain-imaging studies that provided evidence for the existence of a biological basis in the brain for developmental reading difficulties also termed 'developmental dyslexia' in the literature. A commonality to phonological studies is that phonological processes, such as segmentation and assembly fail to activate the brain in a typical manner and with optimal efficiency. Snowling and Stackhouse also reported that studies investigating word recognition have shown that relevant information may gain access to the language areas in the left hemisphere of the brain via an inefficient route. brain imaging in children pre and post intensive therapy has also shown a change in brain functioning towards that of typically developing readers (Snowling & Stackhouse, 2006).

Wolf, M. (2008) described the brain of the novice reader to undergo comparatively more activity in both hemispheres as learning new skills requires greater cognitive and motoric processing and underlying neuronal territory. Wolf noted that as skills become highly practiced, there is less cognitive expenditure, and the neuronal pathways also become streamlined and efficient. Wolf reported that fMRI studies have found that children use more specific regions of the brain compared to adults such as the angular gyrus and supramarginal gyrus being important structures for integrating phonological processes with visual, orthographic and semantic processes.

In a review of the etiology of dyslexia, Norton and Wolf (2012) reported that in comparing people with dyslexia relative to control groups of participants, the most consistent finding is an under recruitment of left temporo-parietal and left occipito-temporal areas. In contrast, younger children without dyslexia and matched for reading ability do not show under recruitment of these areas (Hoeft et al., 2007). Hoeft et al. also commented on individual studies identifying greater activation of the right frontal and temporal lobes for people with dyslexia relative to control groups. Hoeft et al. hypothesised that additional activation of neurological processes are thought to represent compensatory mechanisms or inefficient and effortful processing.

According to Norton and Wolf (2012) diagnosis of dyslexia is not absolute due to the many processes required for reading. Norton and Wolf highlighted that inaccuracy at any level of language or processing or a lack of automaticity in connecting any of these circuits can lead to poor reading. Norton and Wolf reported the tasks used in nearly all brain imaging studies to date have focused on accuracy rather than fluency.

In a study that engaged typical adult readers to read sentences presented at rates slower than, equal to, and faster than their normal reading speed the posterior middle temporal gyrus was engaged at all reading speeds, whereas areas of the left inferior frontal gyrus and occipito-temporal regions were more active at both slow and fast, but not normal, speeds (Benjamin & Gaab, 2011). Results were compared to a letter-reading baseline task and Benjamin & Gaab suggested that when the automaticity of normal reading is disrupted, activation in reading-related regions changes, consistent with a multicomponent view of fluency.

Theoretical explanations

A variety of theoretical explanations as to the causation of literacy difficulties have been hypothesised. In summary, these include the phonological theory, the cerebellar theory and the magnocellular theory (Ramus, Rosen, Dakin, Day, Castellote, White and Frith, 2003). According to Prideaux, Marsh and Caplygin (2005) cerebellar theorists' postulate that the range of deficits associated with dyslexia can be attributed to a mild dysfunctional cerebellum evidenced by difficulties with skills such as balance, postural stability, motor coordination and automatisation. The phonological theory has at its core of dyslexia, a cognitive deficit in phonological awareness, whereas magnocellular theorists propose both auditory and visual temporal processing deficits resulting from impairment of neural pathways involving large magno cells (Prideaux et al., 2005).

Phonological theory

Cognitive processing difficulties as to the underlying cause of specific language impairment (SLI) as well as dyslexia have also been proposed (Claessen, Leitao, Kane & Williams, 2013). Wagner and Torgesen (1987) described the phonological processing model to be three separate but linked phonological abilities: phonological awareness, phonetic coding in working memory and phonological recoding in lexical access. Claessen et al. (2013) assessed 63 participants with a battery of tests based on the psycholinguistic framework proposed by Stackhouse and Wells (1997). Claessen et al. (2013) found that the spread of scores on all measures of phonological processing was wider than that of the age-matched and language-matched groups on most tasks demonstrating a different profile of phonological processing.

Baddeley (1992) has suggested that there is a dynamic relationship between working memory, long-term memory, and information processing systems, language ability and world knowledge. Baddeley (1986) described working memory as active processing rather than passive storage of information in primary (short term) memory. Baddeley's Working Memory Model includes the Phonological Loop, Visual-Spatial Sketchpad and Central Executive Function.

The Phonological Loop has received the most empirical support having explained robust effects such as phonological similarity, irrelevant speech, word-length and articulatory suppression effects (Baddeley, 1992). In a recent study investigating comprehension difficulties in children, Pimperton and Nation (2014) analysis of group differences revealed that working-memory-related problem behaviours were noted for a small subgroup of poor comprehenders who also displayed domain-general (verbal and nonverbal) working memory difficulties. Pimperton and Nation argued there to be "genuine" underlying working memory deficits for some students with comprehension difficulties.

According to Salway and Logie (1995) the Visual-Spatial Sketchpad has been shown to play an important role in mental imagery tasks and planning of movements. The Visual-Spatial Sketchpad is thought to include a passive visual temporary store that processes visual properties of objects and scenes and an active spatially based rehearsal system (inner scribe) that is involved in the planning and cognitive control of movement. Pham and Hasson (2014) explored the relation between verbal and visuospatial working memory and reading ability in a sample of school-aged children (n=157 ages 9-12) with a wide range of reading skills. Although results indicated that verbal working memory was a stronger predictor in reading fluency and comprehension, visuospatial working memory also significantly predicted reading skills providing greater variance in reading comprehension than reading fluency.

The Central Executive Function has been proposed to coordinate the flow of information within working memory by encoding and retrieving information from the Visual-Spatial Sketchpad and the Phonological Loop (Baddeley, 1986). Gillam, Hoffman, Marter, & Wynn-Darcy (2002) suggested that adequate Central Executive Function in working memory is necessary for the development of coherent mental representations in long-term memory and these representations form the semantic network that is the basis for language development.

Working Memory and Literacy Development

Daneman and Carpenter (1980) postulated that working memory capacity plays a crucial role in reading comprehension given the reader must store pragmatic, semantic and syntactic information from the preceding text and use it in the subsequent text. Information in working memory may be lost through decay or displacement since its capacity is assumed to be limited. Daneman and Carpenter hypothesised a good reader to require fewer processes than a poor reader and be more efficient having fewer computational demands on working memory and therefore greater capacity. An efficient process would also be functionally faster, resulting in less decay of the preceding information (Daneman and Carpenter, 1980).

Berninger and Abbott (2013) suggested that superior verbal reasoning might mask dyslexia if only very low achievement is used for diagnosis. Berninger and Abbott studied 64 children in Grades one to nine who had either superior verbal reasoning or average verbal reasoning. Students with superior verbal reasoning and dyslexia significantly outperformed those with average verbal reasoning and dyslexia on reading, spelling, morphological, and syntactic skills, but not on verbal working memory tasks.

Like phonological working memory, phonological awareness, the ability to hold and manipulate the sound component of language has been linked to early reading as well as spelling achievement. Gillam and Kleeck (1996) reported that phonological awareness can occur at syllabic, sub-syllabic and phonemic levels and phoneme-level representation of speech gradually emerges during the preschool years. Gillam and Kleeck (1996) asserted that phonological working memory is necessary for performing phonological awareness tasks because the phonological coding and recoding processes that are a part of phonological working memory are also necessary for phonological awareness.

Brady (1991) described weak meta-phonological awareness skills to be implicated in dyslexia however verbal working memory problems to also be a common occurrence. In support, evidence from a small study investigating the condition hyperlexia; Healy, Aram and Horowitz (1982) found that despite the 12 participants having very low cognitive functioning, performance on working memory tasks stood out as one of the few cognitive strengths of these children.

Rapid Autonomic Naming and Literacy Development

According to Norton and Wolf (2012), Rapid Autonomic Naming (RAN), the task of naming a series of familiar items as quickly as possible appears to invoke a mini-circuit of the later-developing reading circuitry. Norton and Wolf (2012) cited an extensive body of research that supported RAN tasks as one of the best predictors of reading fluency across all known orthographies. With reference to research in this area, RAN tasks and reading have been proposed to require many of the same processes including, eye saccades, working memory, connecting of orthographic and phonological representations. As required for reading fluency, RAN tasks also depend on automaticity within and across each individual component in the naming circuit.

Approaches to literacy intervention

Norton and Wolf (2012) reported that reading has been compared to rocket science and to conducting a symphony, yet it is expected children to have mastered the requisite and complex set of skills required for reading by the age of seven, including integration of a vast circuit of brain areas both accurately and efficiently. This “reading circuit” is composed of neural systems that support every level of language,

phonology, morphology, syntax, and semantics as well as visual and orthographic processes, working memory, attention, motor movements, and higher-level comprehension and cognition (Norton & Wolf, 2012).

Wolf (2008, p.130) defined 'developmental reading fluency' as not a matter of speed but a matter of being able to utilise all the knowledge a child has about a word (e.g. letters, letter patterns, meanings, grammatical functions, roots and endings) in time to think and comprehend. Becoming fluent is therefore being able to both read and understand. Wolf however reported that fluency does not ensure better comprehension but provides additional time to the executive system (such as working memory) to direct attention where it is most needed in order to infer, understand, and predict. For example, Wolf reported that "sight-words" and "sight chunks" (e.g. morphemes such as prefixes 'um', 'pre' and suffixes 'er', 'ing') increase semi-fluency in the decoding reader. Wolf noted however, children rarely receive explicit instruction in morphological knowledge being one of the least exploited aids to fluent comprehension. Bell (1991) also summarised historical perspectives regarding the relationship between imagery and cognition required for reading comprehension and indicated that reading fluency is a product of efficient formation of visual imagery when decoding.

Norton and Wolf (2012) noted that improving RAN ability and reading fluency is much more difficult. Reasons stated included RAN tasks to be a surface indicator of the efficiency of the underlying processes shared by naming and reading. There have been no large-scale, well-controlled studies that have tried to explicitly train naming speed. Norton and Wolf reported that their own studies have shown that although best interventions can improve most reading and language variables, the RAN changes little from pre-to post treatment, suggesting that RAN taps a more basic index of processing.

Fluent comprehension depends on accuracy and automaticity at every level of language, Norton and Wolf (2012) noted few intervention programs reflect this.

Morris et al. (2011) examined the impact of intervention for 279 students with reading difficulties. Students were randomly assigned to one of four different intervention programs designed to contrast different types of instruction: (a) study skills and math instruction (no reading instruction), (b) a phonological program plus study skills instruction, (c) a multi-component word-identification strategy and phonological program, or (d) a multi-component program designed to address each level of reading (Wolf et al. 2009) and a phonology program. Students were matched for IQ, race, and socioeconomic status among groups, and each group received 70 hours of small-group instruction.

Results showed that children who received multi-component interventions (options (c) and (d)) had significantly greater growth than did other intervention groups on timed and untimed word and non-word reading and passage comprehension tasks. In terms of fluency, children in the multi-component (d) group also outperformed the other interventions, gaining more than six standard score points on the Gray Oral Reading Quotient (Morris et al. 2011). According to Morris et al. results highlighted the importance of explicitly addressing the multiple levels of language and multiple cognitive processes involved in reading, especially for students with RAN or double deficits whose weaknesses are not adequately addressed by a phonological decoding program alone.

Aaron et al. (2008) described three approaches to literacy intervention: Discrepancy Model of Learning Disabilities (LD), Response to Intervention (RTI) and the Component Model of Reading (CMR). LD is defined in terms of average or above-average intelligence but below average reading performance.

The discrepancy model has been scrutinised for failing to deliver expected academic benefits. The primary reasons for poor outcomes of LD instruction being the unsystematic way children with LD are taught and lack of uniformity in instructional methods (Vaughn, Levy, Coleman and Bos, 2002). Aaron et al. (2008) reported the quality of reading instruction provided within the

LD model is driven by the whole-language philosophy and relies heavily on group work, disregarding individual needs.

As an alternative to the discrepancy model, Response to Intervention (RTI) is embedded in a multi-tiered model of assessment, intervention and progress monitoring (Kovaleski, 2004). Phases are hierarchical being initial classroom instruction followed by intense instruction for at risk students and effect measured. Individualised instruction is provided to those students below average and referred to special education services. Similar to the LD model there are several variants or approaches to RTI and the focus of RTI being 'identification of literacy difficulties' and not on the 'specific method of instruction' has been criticised (Aaron et al., 2008).

Implementing The Component Model of Reading (CMR) involves identifying the weak component that underlies reading difficulties and focusing remedial efforts at the weak component or components (Aaron, et al., 2008). To be considered a component, the process must be independent of other cognitive processes (Sternberg, 1985). The three domains of the CMR are the cognitive domain, the psychological domain and the ecological domain. The cognitive domain has two components: word recognition and comprehension. According to Aaron et al. (2008), when the CMR model is applied to literacy acquisition, a student can fail to acquire satisfactory levels of literacy skills because of deficits in any component in any one of the domains. As well as comprehension, the second component of the Cognitive Domain includes two processes – the ability to decode written words and the ability to decode words instantly and automatically.

Aaron et al. (2008) conducted two studies, the first to validate the CMR method and second to compare CMR-based instruction versus Discrepancy based instruction. In the first study Aaron et al. used a battery of reading assessments on children in grades 2 through 5 at different schools in the United States. Aaron et al. reported that the two components of the CMR cognitive domain, listening comprehension and decoding could predict from 38% to 41 % of the variability seen in reading comprehension. They found however that fluency makes inconsistent contribution to reading comprehension, accounting for a negligible 2.5% of the variance at the fifth grade level.

In the second study, the reading achievement scores of a total of 330 children from Grades 2 through 5 were used for comparing the effectiveness of instruction based on the cognitive component of the CMR model (171 students) (utilising the READ program for sound and word recognition and a seven step comprehension strategy) with that of instruction based on the traditional LD model (159 students). Results indicated generally that instruction provided under the framework of the CMR was more effective than undifferentiated resource room instruction (Aaron et al., 2008).

Aaron et al. summarised outcomes stating that word recognition provided to children with a deficit in that component is more effective than undifferentiated instruction provided to children with LD. In addition, children who received training in word recognition skills showed significant gains in comprehension however children who received comprehension training but who had word recognition difficulties did not improve in word recognition skills. In contrast, children who had sufficient word recognition skills but weak comprehension skills improved reading comprehension with comprehension training.

Numminen (2002) reported many researchers in the field to have expressed doubts regarding rehabilitation of working memory. Numminen proposed however the use of plain language as a tool to improve working memory capacity. Numminen stated that reduced working memory capacity could be improved by selecting material that places less of a burden on linguistic working memory. Clear, well-paused and structurally short sentences and familiar vocabulary facilitates the functioning of working memory and makes it easier for a person to link new

information to old. This activation of deep processing during reading then assists in reading comprehension.

Prideaux, Marsh and Caplygin (2005) investigated the efficacy of Cellfield™ computer based Intervention for 262 Australian school children tested pre and post treatment. The Cellfield™ Intervention is based upon the multi-deficit hypotheses (phonological, cerebellar and magnocellular) of dyslexia using computer-based tasks requiring visual, auditory and phonological processing. Intervention comprised of ten one-hour sessions, each consisting of ten exercises. The study provided preliminary support for the efficacy of the Cellfield Intervention with results demonstrating improvements in reading related skills, oral reading proficiency and ocular measures in the clinical sample assessed.

Prideaux et al. (2005) reported dyslexia intervention studies that achieve reading age gains of two months per one month of intervention as effective. Word attack skills were reported to be the most improved following Cellfield™ Intervention (23 times per one month of intervention). Improvements in 'reading words without context' and passage comprehension demonstrated meaningful gains of 12 times per one month. Spelling skills were reported to have improved but not significantly (Prideaux et al., 2005). Prideaux et al. reported limitations of the study to include potential sampling bias as participants paid for intervention. Further research was also recommended to establish the long-term benefits of the Cellfield™ Intervention and whether ongoing learning support such as phonological awareness therapy would augment gains.

Wong, He and Chan (2014) also investigated the effectiveness of computerised working memory intervention among Chinese students. General linear model analysis (repeated measures) was applied to neurological and behavioral measures obtained for working memory, response inhibition, and inattention and hyperactive symptoms for two groups of students, experimental and control. For the experimental group that received high-intensity training in the school setting, there was a significant improvement in working memory reflected in neuropsychological measures as well as parent-rated behavioral measures compared with the control group. Wong, He and Chan concluded that results supported the effectiveness of group-based computerised training and that it might be a cost-effective intervention in semi-structured settings, with high-intensity training and minimal therapist involvement.

Brent (2004) reported that automatic knowledge of sound-symbol correspondence must be well developed to compensate for limitations in working memory and to allow quick access to information stored in long-term memory and less reliance on executive processing. It typically takes many years for students with language impairment to achieve a literate level and that students with deficits in memory and the phonological module require teaching of detailed sound-symbol correspondence, for single and multiple letter groups, sound sequencing and division of words into syllables (Brent, 2004). In a study by Gillam and Kleeck (1996), they also supported the usefulness of phonological awareness training with children with language impairment and that phonological awareness training correlated with early literacy ability.

Literacy assessment and intervention at Tyquin Group Speech Pathology (Tyquin)

Consistent with what is reported in the literature, Tyquin SLPs and EPs assess students with literacy difficulties using the multi-deficit model of reading difficulties and base treatment on the component model of reading intervention (particularly the cognitive domain). In summary, students referred to the clinic with literacy difficulties are assessed using a battery of assessments (based on age) to identify specific areas of weakness or impairment. Literacy intervention provided is based on both theoretical and evidence-based research (phonological and phonemic awareness training), computer based intervention (auditory and visual processing), Behavioural Reading™ (instruction of reading technique) and participant's individual needs at the time (e.g. language intervention).

As discussed above, phonological awareness intervention has been researched extensively and the use of computer-based software has some evidence base to support its use in the treatment of literacy

difficulties. Working memory difficulties and its association with reading difficulties is also well reported in the literature. Strategies such as 'chunking', reducing reading rate and the use of mnemonic strategies are often recommended to assist students with working memory difficulties. The implementation of such strategies to improve literacy skills, particularly reading fluency has not been researched extensively. Behavioural Reading™ is a research based intervention approach integrating such recommendations cited in the literature.

Behavioural Reading™developed by Philip Gruhl (Gruhl, 2013) comprises a number of techniques that stem from a philosophical position based on a combination of research and evidenced based teaching principles and methodologies across a diverse range of disciplines including education, speech pathology, psychology, neuroscience, coaching and elite performance. Techniques are applied to reading, number and mathematical tasks and are conceptual in nature to prepare the archaeological pre-reading and number brain to adapt in such a way as to facilitate efficient functioning of these tasks (Wolf, 2008).

The philosophy extends to:

- Define a set of skills, interactions, neurological and emotional conditions that are typically seen in high performing individuals. The assumption is made that all skills are critical to the efficient acquisition and implementation of reading and number;
- The idea that through specific short term exercises, the underlying neurological sequences and timing seen in proficient individuals should be able to be instigated and built as per neuroplasticity theory;
- The concept of automaticity as an efficient neurological condition for a given task. mitigating working memory deficits;
- The concept that growth of an efficient reading and number brain is best instigated and refined using a small volume of text, such as a single sentence, numbers 0 - 9 or simply a short sequence of 'up and down' arrows.
- Techniques applied in a less demanding environment enable efficient and fluent reading including comprehension and growth to age appropriate skills following the initial skill acquisition and not vica versa.
- The concept that skills can be taught and learned to a level of automaticity in what would be regarded as fast (days and weeks) and easily (with little effort or time commitment) in contrast to the months and years typical of current methodologies seen in all tier 1 tier 2 and tier 3 students (Gruhl, 2013).

Purpose of the Proposed Research

The purpose of the proposed research is to obtain empirical evidence based data for the implementation of Behavioural Reading™ instruction delivered by an EP including combination of reading, writing and working memory techniques to theoretically build neurological connections similar to that of an efficient reader.

Pre and post reading fluency results will be analysed for a sample of Australian year 4 students from a mainstream class and a learning support class according to hypotheses detailed below.

Aim

The aim of the proposed study is to investigate the efficacy of Behavioural Reading™ instruction delivered to year 4 Australian students with and without literacy difficulties by an Education Professional (EP) in collaboration with Speech and Language Pathologists (SLPs).

Research Questions

1. Does Behavioural Reading™ instruction delivered by an EP to a sample of year 4 Australian students from a mainstream class increase reading fluency as measured by the Gray Oral Reading Tests – 5th Edition (Wiederholt & Leornian Principlesyant, 2012) (GORT-5), pre and post-delivery of instruction and at 6 months post; and

2. Does Behavioural ReadingTM instruction delivered by an EP to a sample of year 4 Australian students from a learning support class increase reading fluency as measured by the GORT-5, pre and post-delivery of instruction and at 6 months post.

Research Hypothesis

1. Based on anecdotal reports and Behavioural Reading™ instruction being research based, it is hypothesised that upon completion of Behavioural Reading™ instruction delivered by an EP to a sample of year 4 Australian students from a mainstream class, reading fluency as measured by the GORT-5, pre and post-delivery will have significantly improved. Length of time to teach reading techniques is estimated to be five weekly sessions and classroom practice supported by trained EP daily as a teaching technique.

2. Based on anecdotal reports and Behavioural Reading™ instruction being research based, it is hypothesised that upon completion of Behavioural Reading™ instruction delivered by an EP to a sample of year 4 Australian students from a learning support class, reading fluency as measured by the GORT-5, pre and post-delivery will have significantly improved. Length of time to teach reading techniques is estimated to be seven weekly sessions and classroom practice supported by trained EP daily as a teaching technique and reinforced in small group learning support instruction at least twice per week.

Research Design and Limitations

An empirical quantitative research design will be chosen as 'Behavioural Reading™ instruction, to improve reading fluency' has not been studied in an objective manner nor received quantitative analysis.

It is anticipated that SLP students will be trained and employed for pre and post assessment administering the GORT-5. Training will assist in maintenance of inter-rater reliability and SLP students will be blind meaning they will not be told whether students have or have not received Behavioural Reading™ instruction. This will assist in removal of any sample or testing bias.

Given the proposed research is empirical it is anticipated that obtaining a large sample size may be difficult. This is because participation will be voluntary and out of a potential population of approximately 80 students, not all parents/ caregivers will provide permission for student participation. This may provide a limitation, as the sample size may be small requiring pre and post testing of reading fluency to be larger in variance compared to a larger sample for results to be significant/ efficacious.

Given the significance of the research questions being in line with SPA strategy and the lack of empirical evidence in the dyslexia literature, it is the author's opinion that potential outcomes of the proposed study outweigh the described limitation. It is anticipated that interpretation of the results despite the possible limitation of the study will promote further research of Behavioural Reading™ instruction and provide empirical evidence based support for teachers to implement Behavioural Reading™ instruction to improve student reading fluency in the classroom setting.

Participants

Approximately 80 participants from year 4 mainstream classes and students requiring learning support at a single school will be invited to participate (Appendix A). An Expression of Interest will be sent to schools

close to the Tyquin Group Speech Pathology Clinic (Bulimba, Queensland) and the University of Queensland (St. Lucia, Queensland) (Appendix B).

Data collection and test instruments

Participant information collected will include year at school, whether the student receives learning support or not and number of Behavioural Reading™ instruction sessions attended. Participants will be tested by employed Speech Pathology students pre Behavioural Reading™ instruction, post Behavioural Reading™ instruction and six months post Behavioural Reading™ instruction using different forms of the Gray Oral Reading Tests – 5th Edition (Appendix C). Speech Pathology students will be blind as to whether students have received Behavioural Reading™ instruction or not and will have been trained in administration of the GORT-5 by clinicians at Tyquin Group Speech Pathology.

Ethics Approval

Ethics approval will be sought from the Department of Education and Training, Queensland and the University of Queensland under the supervision of _____ (Appendix D)

Data Analysis

1. Pre and post Behavioural Reading™ instruction and 6 month post Behavioural Reading™ instruction GORT-5 test scores will be analysed using a one way t-test _____for significance.
2. Number of sessions required for completion of Behavioural Reading™ instruction for students requiring/ not requiring learning support will be compared.

Delivery of Behavioural Reading™ instruction

Behavioural Reading™ instruction will be conducted by Philip Gruhl, Educator. Instruction will include both classroom teacher, learning support teacher, teaching assistants and student instruction in line with the Behavioural Reading™ Classroom Guide book (Appendix E)

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Chapter 9

A WHOLE SCHOOL PROPOSAL

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Leornian Principles – A LETTER TO SCHOOLS

Hi,

BehaviouralReading and POD has been created to be a simple, low cost solution that successfully targets the Tier 3 students in your school whom are also at risk to become societies vulnerable in the future, owing to education and employment disadvantage.

My name is Philip Gruhl and together with our team, we created BehaviouralReading and POD, the software that is part of our reading and broader education solution based on an innovative combination of neuroplasticity and training methods which are completely new and achieve literacy outcomes beyond any other available.

The basis of our approach revolves around the idea that our Tier 3 student seems to learn differently from other students but we also know that they are often bright and intelligent, but something isn't working.

With current research trends, we are now aware that every persons brain is truly unique and its internal regions must be 'recruited' to do todays intelligent activities. Tier 1 and Tier 2 students are those for whom the 'recruitment' and internal organization of their brain has occurred satisfactorily as we see them able to learn and grow within the normal school experience. It is apparent that the Tier 3 student has not adequately 'recruited', organized and grown their brain, in such a way that makes a regular school experience effective to their learning.

BehaviouralReading and POD is about specifically targeting and growing the brain, through activities, exercises, pedagogical technique and targeted use of a software specifically designed to achieve brain growth embracing the principles of neuroplasticity.

Comparing BehaviouralReading and POD to other reading and educational methods represents a major shift in thinking. Believing that our Tier 3 students brain is truly unique, unlocking it, interconnecting, growing and ultimately teaching this student must be started as if they are a primitive 300,000 year old brain. Not a modern brain, but an old brain. This brain strongly follows the laws of nature and if we wish to communicate and educate this 'old' brain, then we must meet it, on its terms.

For your school, we have brought you BehaviouralReading and POD based on a "clinical" model. It features a single room clinic, some simple resources, and an inexpensive way of training your "Champion Leornian Principles Teacher". Initially BehaviouralReading and POD would be used by just a couple of teachers, even a single teacher, but they would still be able to effect very significant outcomes for the whole school. Initially targeting just Grades 3 or 4, it is the perfect place to begin for any school and as skills develop, spread the target to the younger and older grades.

There are very significant differences to how BehaviouralReading and POD must be implemented to ensure that quality outcomes are achieved for the greatest number of students possible, but when done well, the outcomes are so profound that significantly measurable outcomes can be quantified using standardized tests and/ or measuring against curriculum benchmarks in only 4 weeks.

I truly hope that you will seriously consider BehaviouralReading and POD. There is a lot of information available on our website and we invite you to call and speak with us should you need to know anything not covered on it.

Following this letter, ***Behavioural Reading and POD your school ORIENTATION*** describes in greater detail how BehaviouralReading and POD would fit into your school from various perspectives, principal, teacher and student.

Very best regards

Philip Gruhl, with the BehaviouralReading and POD team

Behavioural Reading and POD your ORIENTATION

BehaviouralReading and its companion computer program POD, has been created to be a breakthrough in the way we teach Tier 3 students, the bottom of your school cohort. Here is an overview of how Leornian Principles and POD fits into a school from the perspectives of the various stakeholders whom it will directly affect.

A brief overview:

BehaviouralReading is a pedagogy and a philosophy designed to effect rapid educational outcomes in the Tier3 student population. It comprises a series of methods and pedagogical approaches that can be learnt by all teachers and effect change in all classes but importantly this is not essential to its success within a school because even though not ideal, a single Leornian Principles teacher could effect the requisite changes all by themselves for an entire school – even large schools.

POD, created by the Leornian Principles team, is an internet served computer program designed to be a two week, 60min per day, intensive, to initiate vital neurological learning and reading components and behaviours. It proves to be an extremely valuable and versatile tool.

Leornian Principles and POD has an extremely short feedback cycle where measurable outcomes are evident. It is feasible to pre and post test two weeks apart and have meaningful and significant data for some of the reading components. Spacing post testing at longer intervals will verify that outcomes remain and also reveal the aspects that typically take longer to manifest.

The well trained “Champion” Leornian Principles Teacher will be the main conduit for initial success in the school and will be able to train the broader teaching staff through in-house PD as they recognize the value and become familiar with Leornian Principles methods.

Generally speaking, the “champion” will initially work in a one on one manner with the grade 3 or 4, Tier 3 students in need, for a brief period of about one school term.

They will also work with the older grades, as individual students, whom didn’t respond adequately in the first round of support when they were back in grades 3 & 4.

To initiate effective reading practices in the very early grades, it is desirable that the Leornian Principles “Champion” will conduct a few lessons to each Prep, Grade 1 and Grade 2 classes throughout the year. About three lessons for each class is a good number.

The parts of Leornian Principles that make up the total success package are:

1) Leornian Principles the method and pedagogy, that consists of exercises and techniques to effect changes towards emulating a Tier 1 student. (Over time, these would be learned by all teachers for greater effectiveness across the broader school community, but initially our Leornian Principles “Champion” will be utilizing these exercises and methods to effect the targeted changes needed.)

2) POD the computer internet served software is a carefully built software designed to effect change at the foundational neurological level. **POD is designed for students 8 years and older.** POD needs to be administered as a 2 week block, every day for 60 minute sessions. During this intensive 2 week block, we typically achieve remarkable changes especially at the foundational levels. The items improved may include:

Visual Closure; Form Constancy; Visual Memory; Visual Discrimination (as tested by the Test of Visual Perceptual Skills)

Auditory Conceptualization (as tested by Lindamood Auditory Conceptualization Test)

Phoneme Segmentation; Syllable Segmentation; Non-Word spelling (as tested by Qld University Inventory of Literacy)

Passage Comprehension; Word attack; Word identification (as tested by Woodcock Reading Mastery Test)

Comprehension; Fluency; Accuracy; Rate (as tested by Gray Oral Reading Test)

The general strategy is that the Grade 3 or 4 student (over 8 years old) needing help, will begin with a 2 week intensive on POD, followed by a period of assistance that lasts about one school term. The focus would be on Leornian Principles methods and integrating effective coping and learning into the normal classroom environment.

Strategic testing, though nice, is not essential at this time as the majority of Tier 3 students in need of help will benefit from simply working on POD and the Leornian Principles exercises that follow.

The group will typically split into:

a) the majority who are now ok and don't need any further specific assistance as they have become Tier 2 or Tier 1 in their learning behaviours.

b) the minority, for whom even with testing, most of these would still be underperforming as tier3 students because their case profile is too severe and complex.

In subsequent years, the grades 4 or 5 students whom are persisting as Tier 3 could be afforded (in both money and effort) the battery of diagnostic tests as recommended by Leornian Principles in conjunction with other professional recommendations. It could be reasonable to expect there may be 3 to 5 students in a 100 student cohort in this position.

Though let us not lose sight of what this means for a school. The school at this point in time is committing its resources to the successful education of just these last few students. A position that can't even be considered in most of our schools today.

Principals perspective:

The principal will be interested to see if what is mooted here is real. They should take just a little time and observe the students either side of a two week window to see if qualitative changes are evident.

Principals will always be interested in testing outcomes. Leornian Principles and POD affects various aspects at different times in the remediation sequence, but in general, testing can occur either side of POD (2 weeks) which will typically reveal that the first aspects to change are the foundational visual, auditory conceptualization, word attack and passage comprehension and comprehension. (our clinic has never failed to have significant results in at least one of these either side of the POD fortnight) After one or two terms, it is reasonable to expect that the 'word' and 'sentence' level effects are able to be measurable with word attack, non-word spelling, word identification and accuracy to show improvements. At three terms, reading at the story level is usually evident and lastly the most difficult is spelling which generally will be the last to be consistently improved.

The principal should at this time be confident that Leornian Principles and POD is the real deal and willingly spread the Leornian Principles message to others.

The principal will also be willing to allocate some other resources into greater cooperative research projects which are coordinated out of Leornian Principles head office to effect even

better efficiencies for their school and for the broader educational community in Australia and beyond.

Students perspective

Grade 3 or Grade 4 students; those about 8 to 9 years old whom are appearing as Tier3 without any significant and expensive testing will receive BehaviouralReading and POD targeted help. This help will be in the form of a short intensive burst taking about 2 school weeks with a single Leornian Principles “Champion” teacher in the school. Any teacher can be selected, though someone with passion and commitment to a new reading solution could be the best choice.

The intensive sessions will be one on one with a duration of 60 minute sessions for 10 consecutive school days. During these 10 days, the POD computer program is used and at the end of each daily session, a little 5 minute lesson is given to initiate reading based on the Leornian Principles Ezireader Side 1.

By the end of 2 weeks, it is reasonable to expect that most students will have already begun to respond which can be seen in their regular classroom but for the more severe Tier3 student, changes can be seen in the ‘clinic’ but this won’t yet transfer into the general classroom.

Following the intensive, our child will need support in the form of a parent/sponsor whom will help with homework and reading practice, but the child is probably best served by dropping into the “Leornian Principles Teacher” for about 10 - 15 minutes each day for about another 3 weeks to be guided on little Leornian Principles exercises and drills taken from the Leornian Principles ezireader.

About 5 weeks into the term, it is likely that only twice a week, 10 minute visits will be needed and near term end once per week should suffice.

AND THAT IS IT FOR MANY TIER 3 STUDENTS

“Champion” Leornian Principles Teachers perspective

Our champion Leornian Principles Teacher is going to be remediating the whole school. This seemingly huge task is made possible for only one reason. Once most Tier3 children are helped in a Leornian Principles way, they become Tier 1 and 2 and never need intensive assistance again. In later grades 4 5 6 and 7 rather than them needing continual assistance every day of every week of every year, the little intense burst back in Grade 3 has actually resolved the long term problem. The workload at this stage would be based on the teacher working with about 30% of all grade 3 students in this manner, though with efficiencies, this should decrease.

Each day our “champion” Leornian Principles teacher will need to work with just a few Grade 3 children. They will probably have to go and find them in their class, take them to POD and once finished walk them back to wherever their class is an hour later. With only 3 or 4 doing the intensive at any one time for the fortnight block it is a chance for the child to feel a bit special and have a fun time because it will be all about them. The remainder of the day would be spent doing the extra help and perhaps some professional inservice support to other teachers within the school. By going back to our 30% of students, that could be as many as 30 in a year which by a simple calculation would take about 10 fortnights to complete.

A more complex student case, perspective

After being simply one of the mob in grade3, our student with more significant needs will become evident, because in Grades 4 or 5 they will still be struggling. This is where BehaviouralReading really gets going because many more things are now in the students favour. 1) they are a bit older 2) there aren't so many needing intensive support 3) the high quality diagnostic testing and strategizing can occur and be afforded by the school.

Our complex student would now have a battery of testing done, hopefully following the guidelines provided by BehaviouralReading, as these have plenty of research behind them and allows for accurate and versatile interpretation by our office to assist you. (At present, this would be done manually, but an algorithm should be available to automate this interpretation process in the future.) Hearing and Behavioural optometry testing would also be strongly recommended.

Following the testing and interpretation of results, pretty much the same thing will happen again, redoing POD but with a more strategic and targeted approach along with greater attention to technique.

Our complex student is now part of a huge project, where they are no longer alone, but are being supported by our skills here at Leornian Principles through the school Champion Leornian Principles Teacher. For us here at Leornian Principles, this is such an exciting prospect, because over our years of clinic we have had cases where the same factors have occurred only a few times in hundreds of cases. We know they are real, have found viable solutions, but for the average teacher, they are unlikely to see a single case in their entire career, let alone know how to work productively with them.

Our complex case student, now being in grade 5 6 or 7 and a little bit more mature, will 'know the drill' be able to sit themselves down and work on their session on POD while other students are working or the teacher is monitoring other duties. And this is the reason we want you to have BOSE noise cancelling headphones QC15 or QC25, to maintain a perfect 'hearing' environment even when there are other noises around.

Preschool Grade 1 and Grade 2 teachers perspective

These teachers may be new or experienced, though both probably won't really be aware of what is happening in the Leornian Principles world, but our "champion "Leornian Principles teacher can effect a huge amount of change in these young children. Our Champion would visit each of these young classes as the visiting teacher just 3 times in a single year each year. This visit would be to show these little children and their teacher how to do just a few exercises to incorporate into their daily reading and spelling. This tiny amount of direction will likely result in about a third of children whom would have been a tier3 in grade3 to no longer present, thereby reducing the workload for the champion teacher even further.

Apart from the 3 lessons by the Champion, the prep grade 1 and 2 teacher can simply carry on as before should they wish or else learn and adopt more Leornian Principles techniques. It would be their professional decision.

Other teachers perspective, Professional equity and ownership

As professionals, teachers deservedly have the right to work with students as they believe is appropriate. Leornian Principles and POD affords every teacher the right to follow their own preferred method and pedagogy along with their own teaching experience by having a failsafe way of capturing those students for whom may not respond to the teachers efforts. With every method having advantages and disadvantages, Leornian Principles and POD is simply a method designed to have an extremely wide efficacy profile thereby reducing the likelihood of a student slipping through with a marginal education.

Generally speaking, the current teachers of years prep to 7 would not significantly change anything about the way they teach. Should they wish to begin learning about Leornian Principles and implementing some of its methods, then that would be an individual professional decision.

Current reading, phonics, sight word, grammar and other programs that are currently in place can continue with no need for immediate change from this routine. Future change would be a professional decision at the appropriate point in time.

Future directions to be involved in

The Leornian Principles vision is for the whole world to read. To effect this, we are inviting you to participate in a few ways:

1) Use Leornian Principles and POD in your school

2) Leornian Principles Research projects: Be interested in what research data is being captured and for what studies

3) Your Research project. Suggest a research question and be active in designing, collecting data and writing or any combination of these from your own schools data or else as a collective incorporating other schools, other states or even other countries. Anything is possible.

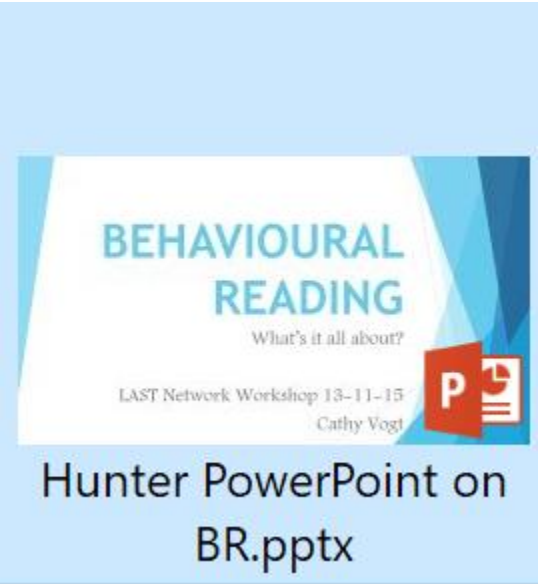
4) Be a neuroplasticity software inventor. POD is a dynamic neuroplasticity software. Everyday it is modified and tuned towards excellence in its outcomes, but POD is just my expression of a Tier3 solution. Underneath POD is a platform on which POD is built. Be an inventor and if you have an interest in experimenting and teasing out neuroplastic based ideas then the platform exists and we can help. Of course after your idea goes live, we can also get data quickly through the Leornian Principles network to help refine your ideas.

Summary

Leornian Principles and POD are a new way of teaching the Tier 3 student, those most in need. This is a project which if done well will genuinely narrow the educational gap that exists between those whom can access higher education and those whom cannot and the subsequent social gap that a lack of education exacerbates.

Thanks and I hope to meet you soon

Philip Gruhl and the Leornian Principles Team



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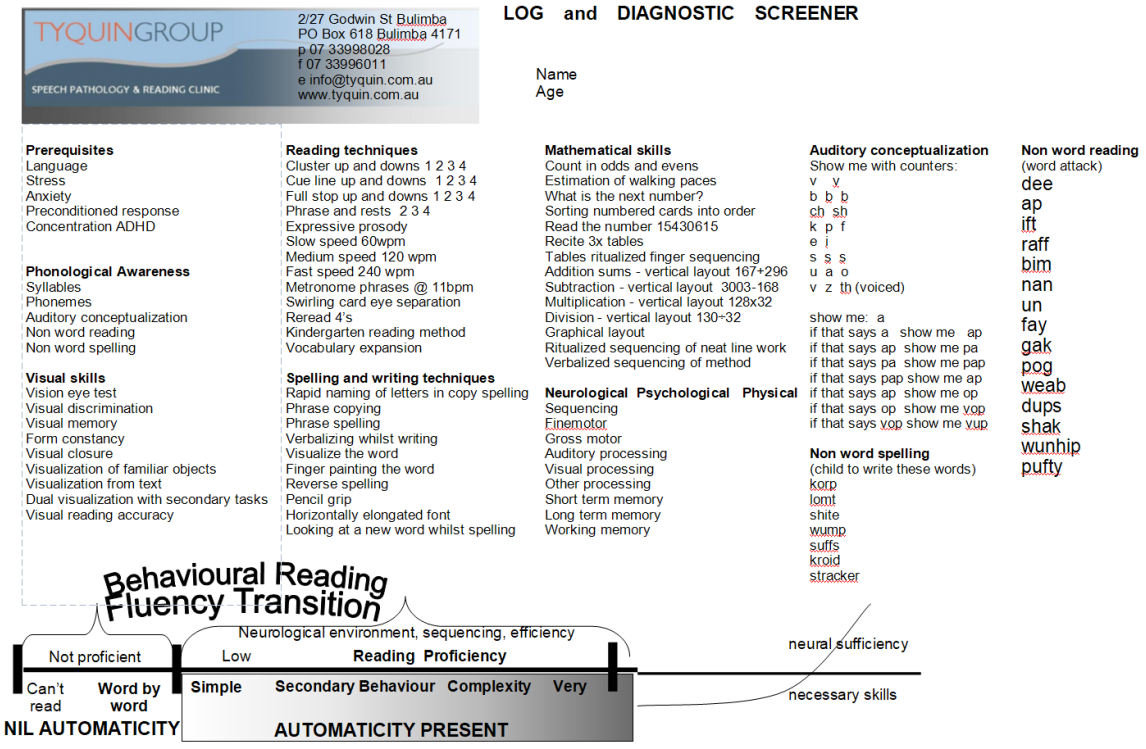
Tara Cox email Testimonial to St Ambrose University 2016

Log and diagnostic screener circa 2010



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LOG and DIAGNOSTIC SCREENER

Name
Age

Prerequisites
Language
Stress
Anxiety
Preconditioned response
Concentration ADHD

Phonological Awareness
Syllables
Phonemes
Auditory conceptualization
Non word reading
Non word spelling

Visual skills
Vision eye test
Visual discrimination
Visual memory
Form constancy
Visual closure
Visualization of familiar objects
Visualization from text
Dual visualization with secondary tasks
Visual reading accuracy

Reading techniques
Cluster up and downs 1 2 3 4
Cue line up and downs 1 2 3 4
Full stop up and downs 1 2 3 4
Phrase and rests 2 3 4
Expressive prosody
Slow speed 60wpm
Medium speed 120 wpm
Fast speed 240 wpm
Metronome phrases @ 11bpm
Swirling card eye separation
Reread 4's
Kindergarten reading method
Vocabulary expansion

Spelling and writing techniques
Rapid naming of letters in copy spelling
Phrase copying
Phrase spelling
Verbalizing whilst writing
Visualize the word
Finger painting the word
Reverse spelling
Pencil grip
Horizontally elongated font
Looking at a new word whilst spelling

Mathematical skills
Count in odds and evens
Estimation of walking paces
What is the next number?
Sorting numbered cards into order
Read the number 15430615
Recite 3x tables
Tables ritualized finger sequencing
Addition sums - vertical layout 167+296
Subtraction - vertical layout 3003-168
Multiplication - vertical layout 128x32
Division - vertical layout 130÷32
Graphical layout
Ritualized sequencing of neat line work
Verbalized sequencing of method

Neurological Psychological Physical
Sequencing
Finemotor
Gross motor
Auditory processing
Visual processing
Other processing
Short term memory
Long term memory
Working memory

Auditory conceptualization
Show me with counters:
v v
b b b
ch sh
k p f
e i
s s s
u a o
v z th (voiced)

show me: a
if that says a show me ap
if that says ap show me pa
if that says pa show me pap
if that says pap show me ap
if that says ap show me op
if that says op show me vop
if that says vop show me vup

Non word spelling
(child to write these words)
korp
lomt
shite
wump
suffs
kroid
stracker

Non word reading
(word attack)
dee
ap
ift
raff
bim
nan
un
fay
gak
pog
weab
dups
shak
wunhip
pufty

Behavioural Reading Fluency Transition

Neurological environment, sequencing, efficiency

Not proficient | Low Reading Proficiency

Can't read | Word by word | Simple | Secondary Behaviour Complexity | Very

NIL AUTOMATICITY | AUTOMATICITY PRESENT

neural sufficiency

necessary skills

psum

Featured item: SOPHIE: SELF MONITORING SPEECH and READING ACCURACY leading to 'comprehension' - from initiation to excellence

We can observe the central executive functioning in its monitoring the accuracy when self reading. To better understand this phenomenon, I shall use three common scenarios that most people can access reasonably simply.

1) the first is with a young early reader that seems to read without any awareness of the story behind the words being spoken. This stage I witnessed with my own daughter when we practised our home reader story from school. Sophie was about seven years of age at the time.

the story went something like this…" and the cat jumped through the window', however sophie read the phrase as " and the cat jumped though the window'. she stopped, looked a little confused as the words she had spoken didn't make any sense to her anticipation of a cat jumping and going through a window.

This brings us to the second stage where Sophie redirected her eyes back to the work 'through/though' to double check how it was spelled and noticed the correct reading as 'through' she then re read the line as 'and the cat jumped through' the window'.

this process was remarkable because the day before there hadn't been any self monitoring or self correction and now that it had occurred the first time (and i fortuitously witnessed it) it happened more often and with ever more subtle corrections as her ongoing practise developed this skill. M.Wolf describes in greater detail the timeline between first seeing a word and visually analysing the features of it, then the visual word form BA37 activates, some executive and attention processes occur, semantic and phonological processes, semantic and comprehension processes and then in the case of Sophie, her executive functions detected an anomaly between the semantic language as read and the anticipated language, so her executive functions redirected the eyes to again view the problematic though/through word for further visual analysis before using it again. (wolf: proust and the squid pp145)

The second scenario - being restated is simply having someone read and as Sophie had in the first example, if a word is misread in such a way that the word read does not match the anticipated semantic language meaning of the word, then the central executive redirects the eyes to revisit the word or words in order to ascertain the errors and make corrections accordingly.

The ability to carry out this second step may be impacted by quite a few 'behind the scenes' processes such as vp fc vis m vis dis, language,, semantic language, vis clarity, working memory, etc

Much has been written about this over the years, but the source reference for the ability to image and conceive on demand comes from Visualizing and Verbalizing for language and comprehension Nanci Bell 1986

The third stage is the holy grail of reading comprehension where active and dynamic thinking is occurring concurrently with the reading of the text. At this stage, not only can direct factual recall occur, but inferencing, comparing and evaluative thoughts occur.

I am unaware of any references that describe this as a process that can be initiated and exercised in a step by step manner but I have success doing it as follows:

Step 1) Have the student read an easy text, out loud and quite slowly.

Add item

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Add item

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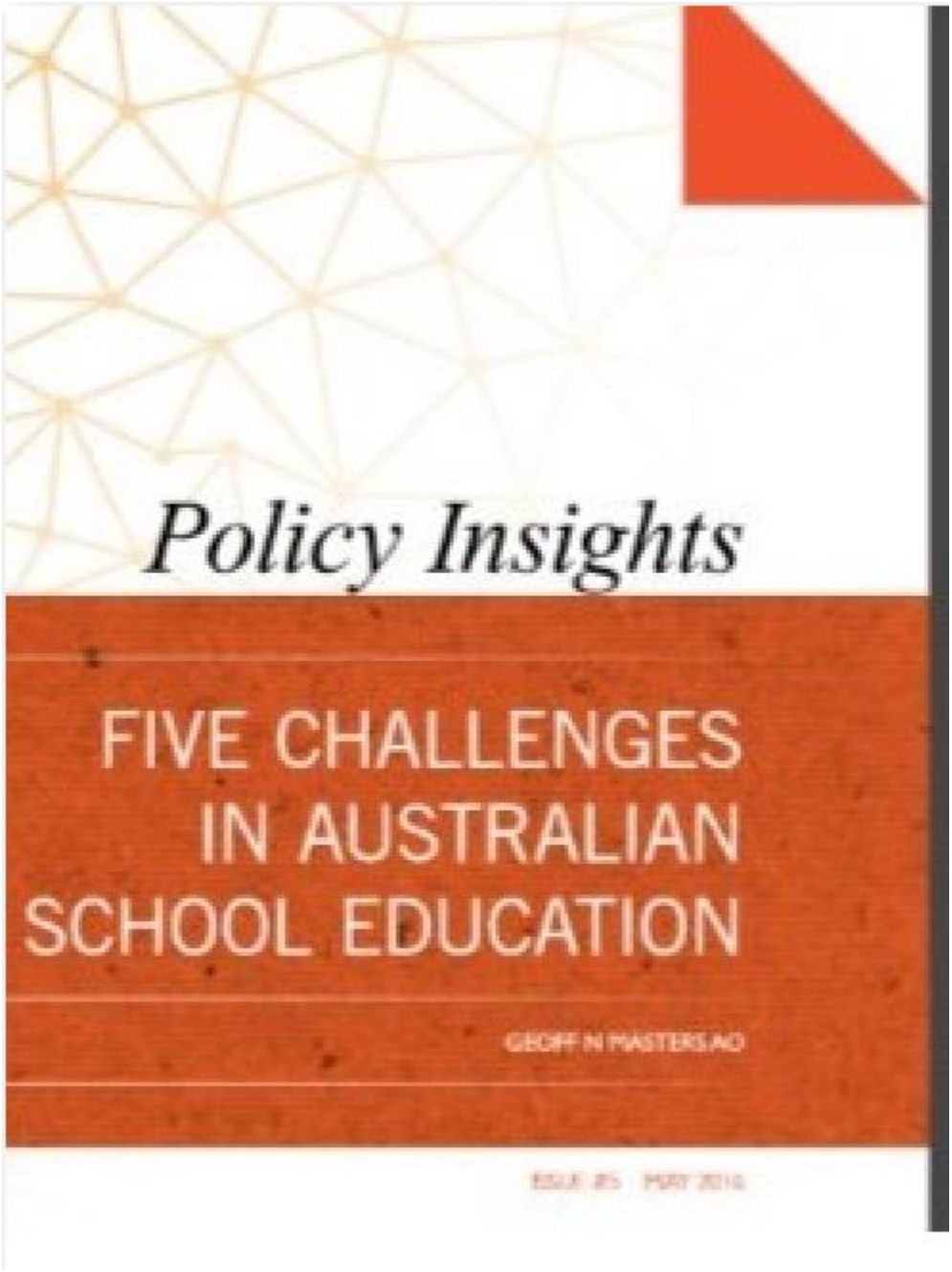

PART 4 Idiosyncratic differences of the Leornian Principles system enabling future directions - a discussion

Age of specialization

Unlike the motor industry that has successfully created a whole range of vehicles that do myriad different things, the education industry has failed to teach in a way other than ‘lets talk about it’. It pretty much comes down to the human interaction between two people, the teacher and the student. The obvious limiting factor here is the skill set of the teacher as the facilitator of the learning process.

Last century a Master Builder whom would oversee the entire building process for a house or high rise, finds this is no longer possible. Progress and specialized industries now make it impossible for a single person to be competent in every field that goes into building our modern structures. This is of course the same for flying a plane, it relies on a team of people and redundancy systems. It is the same when building a computer, a house, a car and everything else in our modern complicated technologically diverse society. It is the ‘Age of Specialization’.

Employing a modern forward looking structure

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Universities and future academic directions

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Book Cover

“What this book will do is take you on a little journey about the history of literacy but conclude with a real solution”.

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Add item

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HOLDING BAY

PROJECT OVERVIEW

We create a document/book about a concept we call “Leornian Principles” that is targeted towards the public as a ‘disrupter’ of the status quo, akin to what “Sweet poison” Gillespie has done to the global sugar consciousness.

The book is hard bound and published for sale as a standalone item. The book complements other targeted marketing efforts such as ‘Leornian Principles in the Park’ a community movement, and an approach to business investors such as Clive Palmer or to a lobbyist.

GOALS

9. Initiate a meaningful dialogue with at least one university but preferably many
10. Initiate a meaningful dialogue with a major investor, lobbyist or societal change agent (Clive Palmer)
11. To have a legacy document that acts as a framework for a book or can be used as a base for other projects
12. To support a national community movement empowering ordinary people to own literacy instruction through public parks and personal effort.

SPECIFICATIONS

13. Created and developed on Google Docs
14. The document should be heavily referenced - or not?
15. Unique features in Leornian Principles/POD should be displayed then academically referenced where appropriate
16. Historical, current and future directions of the education industry
17. All amendments and revisions to be initialled by author

18. Collaborative document
19. Written in 6 parts;
20. Executive summary:
21. Part one = a historical perspective of literacy education;
22. Part 2 = the current Necessary Items that are prerequisite and non-negotiable;
23. Part 3 = the current Important Items but are less urgent.
24. Part 4 = Idiosyncratic differences of the Leornian Principles system enabling future directions - a discussion
25. Part 5 = Strategy for a National movement to empower the common person creating lasting change
26. Part 6 = Structural changes to the roles and delivery of services within our schools towards the 22nd Century

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MARK HEARN The writers and authors almanac;

Introduction

Education and in particular English Literacy education has hit a wall. It is simply not improving despite the efforts and investment being put in across the planet. Is it because there is some spooky aspect that makes it non teachable or is it that the entire industry has headed down a dead end road that needs a reformist approach to get it moving again? I am strongly of the opinion that something quite different needs to occur.

It would be a waste of everyone's time to simply make such a hollow statement if there was no substance to follow it up with. What this book will do is take you on a little journey about the history of literacy but conclude with a real solution.

This early part of the book will not be a text worthy of citing for its academic accuracy as the problems with the Literacy industry are so obvious that it frequently features in our media and on television. It won't be graced with robust references as to the accuracy of the statements contained. Your time and mine, will be better spent looking forwards to the solution rather than to the past.

You will find here, a revolutionary new way of education and literacy instruction where students commonly acquire improved reading comprehension values of 3 - 4 years following only a fortnight of instruction. Don't jump to any conclusions at this point, it's just an indicator of what is to follow. A new high speed, highly productive and effective method which doesn't follow any of the current practices. It is new and it defies all of the established norms within the industry.

Another agenda of this book is to shake up the established way academics and researchers think about literacy instruction and education practices because they are not working.

We also want to empower anybody whom this book may resonate with to be able to continue on the new direction in their own creative way so it is not only an essay of dissent, but also a comprehensive workbook to offer genuine techniques for repatriating failing students.

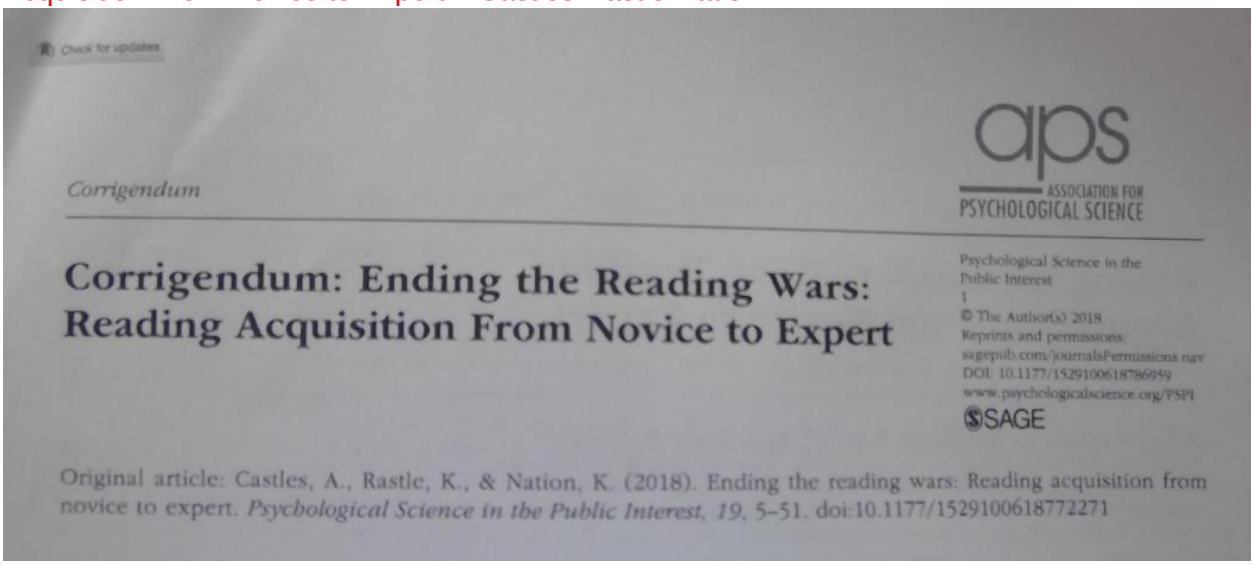
You will also notice that the academic "School of Education" does not have ownership over this work, but it reflects inputs from many disciplines including Speech Pathology, Audiology, Occupational Therapy, Psychology, Primary and Secondary Education, Optometry, Behavioural Optometry, Syntonics, NeuroScience a new Literacy Phenomenon here right now?

Isaac could only look forwards. For him there was no backwards so if this new Literacy Solution is to be seen for what it is, rather than what it can be explained as, then an act of faith and acceptance needs to occur while the required scientific questions are asked and answered.

and NeuroPhysiology, Neuro Chemistry, Behavioural Psychology, Elite Coaching and Training Methods and also more.

The Leornian Principles' Historical Perspective on 20 - 21st Century Literacy

The current status of Literacy Education in our English speaking world and in particular Australia is summarized well in the document 2018 Corrigendum:Ending the Reading Wars: Reading Acquisition From Novice to Expert : Castles Rastle Nation .



Check for updates

Corrigendum

aps ASSOCIATION FOR PSYCHOLOGICAL SCIENCE

Corrigendum: Ending the Reading Wars: Reading Acquisition From Novice to Expert

Psychological Science in the Public Interest
1

DOI: 10.1177/1529100618786959
www.psychologicalscience.org/PSPI
SAGE

Original article: Castles, A., Rastle, K., & Nation, K. (2018). Ending the reading wars: Reading acquisition from novice to expert. *Psychological Science in the Public Interest, 19*, 5–51. doi:10.1177/1529100618772271

Summarizing this document, it outlines the status of current academic research, understanding, guidelines and myths that befall the academic industry and the teaching of literacy industry, namely our schools. When reading this document, the overwhelming theme revolves around a historical perspective, which by the way of outcomes in literacy acquisition, has seen very little significant change or progress over the past many decades. Justifiably, the literacy topic is strongly represented in media, political policy and community debate and within the academic community as to why progress has failed to occur.

New knowledge is ignored or at least not co-contributing:

Meanwhile there have been significant improvements to understanding the workings of the reading and learning brain from many and varied sources and academic perspectives which number thousands of relevant works that express units of information that singularly seem to have little to no impact on the ability to read, but in concert may be highly significant. I might hypothesize that the enormous amount of specialized information that has been accumulated to date makes it effectively near impossible for a single individual or even a committee based organization to realistically evaluate it and create a process whereby the knowledge can be assimilated in a functional manner.

Research protocols must change into the 22nd Century

Research

The traditional research protocol relies on the principle of completing a research masters degree where a thorough grounding occurs in the status quo of historical knowledge within a specific field of study. A PhD extends this by posing a question, offering a testable hypothesis , collecting data and publishing the findings. In most all disciplines, this has been a valid method but it must be seriously questioned in the particular field of Literacy Acquisition – learning to read in English.

My reasons for challenging the status quo of research processes lie in the outcomes being achieved and whether they are appropriate or are they appearing shackled for some various reasons?

I pose this question because there is a major overarching philosophical difference, or so it appears between how the research is being conducted for Literacy and its associated disorders such as dyslexia and other conditions that occur within a medical model such as any clinically treatable medical disease.

Our medical fraternity seem to put the patient and their ailment as the problem to be solved and all disciplines will work seemingly without being possessive over whose field of expertise is more appropriate. Ultimately, a treatment plan will be created that must prove to be effective through the rigor of medical grade scientific testing protocols. We have all borne witness to this process over the past decades with successes being many including, improved survival rates for cancer, AIDS to name but two. Medicine can rightfully brag about its massive improvements in health and medical outcomes.

These huge gains in scientific knowledge and its application in the real world gives us all an enhanced understanding and place within our society from engineering, astronomy, mathematics, nuclear medicine and genetics to name but a few.

Education cannot share the same glory. But why?

I pose the idea that for myriad reasons, education has become frozen in its status quo, looking backwards rather than ahead. Can blame be placed on the education industry? It has had very little to celebrate and if everyone fails, then maybe the status quo is the reality - something to be accepted rather than argued about.

Evidence for this idea comes from so called best practise programs that are at best achieving outcomes measuring improvements of perhaps 18 months in 9 months (comprehension gains) which can be described as 2:1. If we look deeper at the effort required to effect these changes, they usually take up to 50 minutes of additional study, five days per week for the 9 month period. Hardly anything to get excited about.

Another example sees a prominent university in one of the Scandinavian countries hit on the idea of building the Working Memory as it is seen to have a correlation to reading functionality. They created a computer based package that made it accessible to professionals worldwide. Now that this technology has been in use across many schools and professional clinics for over a decade, metadata analysis has unfortunately revealed that there is no correlation between improving the working memory and its transitioning into improved reading acquisition. Interestingly, despite the evidence revealing failure of the method, many practitioners continue to use this technology. Why?

27. It is a very good question and possibly one reason for continuing to use it is that an individual practitioner may see a particular benefit that helps someone in a particular way, but measuring the validity only from the perspective of reading acquisition may be shortsighted.

2) Another possible reason is that there are very few resources that reflect a genuine difference for a practitioner to choose from. By example, the phonics/phonological awareness model of reading whereby the relationship between the sound and a letter or group of letters is the current most popular underlying philosophical methodology, that has the most robust evidence for its effectiveness. This method had its roots from the 17th century but its modern evolution which carries substantial research evidence stems from the early 1990's. Some 30 years later, the thousands of products based on this methodology flood the market and research efforts. Our practitioner really only has a choice of one of these.

3) Transferring the client out of their care to a 'competing' practitioner such as a Behavioural Optometrist, a Speech Pathologist, an Occupational Therapist, an Educational Psychologist, a Tutor, a Themed School all bear the commercial risk of losing the 'customer' and the associated commercial revenue. Anyone in business knows that holding clients is the key to surviving commercially. Sending them away spells disaster.

Isaac Newton interprets a phenomenon

When Isaac Newton was 'hit on the head by the apple' and he pondered the 'problem' there was no need for him to look cautiously towards the future, afraid of what was known in the past, simply because he was stepping into a brave new world of undiscovered knowledge. There was no past in the realms of either his thinking or the scientific community.

Our academics all see our English Literacy Education as something that must follow formal academic protocol for it to progress, but why?

Of course it is not everyday that a new phenomenon comes along to hit you on the head and not many researchers spend their days sitting under apple trees hoping for the next one to happen along! But, what happens if we have

A lesson from an older Family Doctor GP

While enjoying a chilled ale at my favourite tropical holiday place, Tangalooma, the dolphins glide their way towards the jetty preparing for the excited tourists about to get the opportunity to hand feed these wild animals. Not sure how wild they really are after decades of knowing that sunset means a free feed, but they are cute anyway. The dolphins all have names, which my now adult children know well as they have literally seen them born and grow up to be dolphin parents themselves.

But I digress. Back to the beer in hand. Dr Tony O'Loan, is a GP based in Brisbane Australia and is in the latter years of his working life. He, like our family have been attending Tangalooma for decades and this makes for great conversations.

Leornian Principles mean that we want good quality information but also in a timely manner so that progress can be both quick and safe. It was Tony that offered an observation from his work that seemed to have synergy with what I was doing. The improvements in outcomes for childhood leukemia.

For me leukemia was the first disease that I became aware of through a very sad movie when I was very young. I am guessing that I was only about 8 years old at the time, but I can still see the sad family dog in the snow after the death of the young boy in the movie, about the same age as myself at the time. In those years of the late 1960's leukemia killed children.

Tony had my attention, especially when he made a statement along the lines of " we don't have many new drugs, really new ones. Most are just pretty much a rehash of what have already existed for a long time. What has changed is the protocols of how and when we use the drugs.

The clinical understanding of making the best of what we have has taken leukemia from a death sentence in children to where most children now survive the disease." I had a quick dig to find a scholarly article to support his comment, which is shown here: **Evolution of modern treatment of childhood acute leukemia and cancer: adventures and battles in the 1970s and 1980s.** Ravindranath Y1.AbstractThis article summarizes the adventures and explorations in the 1970s and 1980s in the treatment of children with leukemia and cancer that paved the way for the current success in childhood cancers. Indeed, these were adventures and bold steps into unchartered waters. Because childhood leukemia the most common of the childhood cancers, success in childhood leukemia was pivotal in the push toward cure of all childhood cancers. The success in childhood leukemia illustrates how treatment programs were designed using clinical- and biology-based risk factors seen in the patients. The Way of an Investigator —Quotation from the foreword to Pediatric Clinics of North America, v.9, no. 3, 1962, issue on Hematology by Editor Carl H. Smith. When I received the invitation from Pediatric Clinics of North America to guest edit an issue on pediatric oncology, I gladly accepted this challenge, as it gave me an opportunity to present the advances from a perspective of one who started a career in pediatric hematology oncology when the **cure rates were abysmally low** in contrast to the…...

Value in Refining Ideas with the Leornian Principle

The wisdom of Dr Tony O'Loan can be expressed within a Leornian Principle and manifest into something tangible with a product like POD because if research and ideas are discussed, learned about and observed, they are pretty much worthless unless something can actually be made to use the information and that is where POD currently fits in and which the rest of the industry has failed to do.

Now when we take the idea from Tony that we need to use what we have and refine the techniques and delivery towards an optimized outcome, we need to build that into a 'thing' and then through application of the 'short feedback loop' concept refine it to achieve optimized results.

The early outcomes in efficacy saw positive results following the usual 80/20 rule of general success but this has improved to where we achieve measurable change in at least one parameter for 100% of cases in our clinic. This may not express as the holy grail of reading comprehension, but these scores have improved from earlier averages of 12 months in a single school term up to 18 months in a fortnight and now we achieve over 3 years comprehension in a single fortnight with scores as high 4.5 years in the fortnight.

The question to be posed then must be, how large can the gains be if we optimize each feature within the POD software? Things like the colours, the flash rates, the sample of words used, line movements, order of pages, visual perceptual loading features, auditory perceptual loading features, volumes, brightness, contrast, coordination drills and concurrent activities to name a few.

Our unique story CURSED OR BLESSED...

This next section has been written for a very distinct reason. Invariably whenever someone begins to grasp the enormity of this work, they usually want to challenge me as a person. Who are you? How did you come to know all this? Why have you been able to create this when other people and universities have failed? That last question usually comes with hostility from other professionals! Unfortunately or fortunately, not sure which, not being aligned to them has given me many creative freedoms but in our world of credentials having none that are recognized by your examiner seems implausible. As I write this I am on sebatical in Reigate UK and have just visited some medieval areas over the last few days. I have an inkiling of what it might have felt like to have been accused of witchcraft. I am just glad that burnings at the stake are now out of favour!

I am not sure what to feel but this journey started back in 1960...

1956 Peter Safar and James Elam invented mouth-to-mouth resuscitation. 1957 The United States military adopted the mouth-to-mouth resuscitation method to revive unresponsive victims. 1960 Cardiopulmonary resuscitation (CPR) was developed. this is very momentous, because it is not only my birth year, but just before my 4th birthday in 1964 I would be carried from the water in South Australia drowned and in need of CPR resuscitation. A doctor on a lunch time stroll resuscitated me and I believe this set a series of events leading up to this point where somehow I have cobbled a breakthrough method of teaching literacy and reading acquisition that would never have been discovered in the reasonable foreseeable future. After drowning and being resuscitated, like any little boy I played, went to school and was taught to swim!

The first inkling of something amiss saw me at the bottom of my class, having somewhat poor coordination, poor fine motor issues along with plenty of other things my (now wife - speech pathologist) says that indicates a low level of traumatic brain injury. My early schooling was difficult and I always performed near the bottom of my class.

Change really never occurred until 6 weeks before the 'matriculation' - year 12 state exams. Currently achieving A's in Biology, Economics and Geology, my Maths and Physics were a 'D' and 'E' respectively. I self taught myself the equivalent of two years

of maths and physics in 6 weeks and achieved a 'B' grading for both. On reflection, that profoundly changed my perception of self, but also changed my understanding of the learning process and gave me insight.

Next came my formal training as a secondary teacher in a mixture of maths science and Technological Arts (read woodwork and metalwork teacher) and graphics (architectural drafting & drawing).

Unbeknownst to me at this time, this framework is going to be vital in the future. My work teaching a student how to learn simple tasks like holding and using a saw, effectively using a hammer, a screwdriver, drawing lines, accurately measuring and cutting were all skills that I had to teach and effect change in my students.

The next epiphany came years later when looking back I realized that the same students who can't read very well were on balance the very same students who represented the bulk of my class cohort back in woodwork. These same kids learned just fine, they just never handed in their written homework!

We now introduce my exposure to speech pathology and its early role in what is now known as phonological awareness and its basic cousin phonics. My wife and I create a small private practice in speech pathology and literacy becomes an integral part of the business. Literacy is a hot topic in speech pathology circles at this time but it had not yet reached the education faculties who were still promoting the now disgraced whole language approach to reading.

As part of the business and working behind the scenes, helping edit and print our in-house workbooks and in earshot of many discussions a few bits rubbed off. The most profound was that it was only working some of the time and what could we do to help the others children?

Another epiphany..... as said in Apollo 13 the movie, *"failure is not an option "* in private practice, your success is only assured if you actually fix the problem and being a woodwork type of person who continually makes things and repairs things it never even occurred to me that you wouldn't just fix the reading problem.

Our next steps involved adding in the technical expertise of occupational therapists, optometrists and psychologists and even though they all contributed vital ingredients that proved essential in the long run, by themselves seldom worked very well but in concert they worked much better. We had a better rate of success with ever more students achieving worthwhile short and long term gains. We were on the right track, but still pretty much the same track as everyone else.

We are now in the early 2000's and there are now several software interventions appearing on the market all trying to somehow take advantage of the 'computer' factor as an intervention tool. Some of these survive today, but others have gone into oblivion. The most profound contribution to this was a software called cellfield. Its inventor was able to put together a package that saw a major shift in the rate of improvements that became a new 'normal'. We started seeing reliable results of comprehension scores up around the 2 year mark, also in a 2 week window. When other programs were claiming gains of 2 years in 8 months of effort it was definitely a step in a very different direction. The curious thing was that there was absolutely no exercises in the program that directly appeared to target comprehension, but somehow the gains were there.

Our clinic is now using a mixture of techniques and interventions and improvement rates keep improving with ever more difficult cases being solved.

Problems in our workforce see staff leave and I need to step in and teach the 'actual reading' part of it. So I did. I am a teacher. I have absolutely no specific training in literacy teaching so I just do what is instinctive. I teach woodwork. Meaning I teach just the same as I teach anything else that I would teach. I didn't know that reading was different as I had never been told so. I had never gone to any professional development to brainwashed with that idea.

My wife, as always, is professionally cautious and even though results were evident and the parents were happy that changes were occurring in good order, she insisted that I attend some PD to be up-skilled. Personally, I didn't see the point. If the universities knew the solution, then this poor literacy problem wouldn't be occurring. However I took it upon myself to do self directed reading and pursue lines of enquiry that to me seemed logical in the quest for answers.

Things started to get easier. Solutions came quicker but understanding why it was happening was still a mystery to me.

Enter schoolgirl rowing. I was an actively involved parent of two girls and an older boy and decided I could enjoy the activities better by being in a boat instead of just cooking the BBQ. I was encouraged to coach. Not knowing anything about rowing, I needed a mentor and was paired with one of the AIS Australian rowing coaches and Olympic rowing selector (read - parent!) who also happened to be a university lecturer behavioural psychology and was of course an elite coach.

This experience gave me a huge aha moment one day when we instructed the lowest crew how to row. Break it down into tiny bits, do it in slow motion and do a tiny amount - perfectly. Five minutes later the girls could row and never looked back ever again.

Seeing the application of perfect technique in action also fit in to the concept by a pivotal trainer and olympian whose book I read some 15 years earlier. In essence, as a shooter... it is NOT 40 shots, but one shot done 40 times. He went on to train all of the major countries and olympic teams in the next era along with armies, soldiers, pilots and anything requiring consistent elite performance.

I suddenly knew why what I did was working. I wasn't teaching reading. I was just teaching another activity that happened to involve symbols, squiggles, sounds, names and relationships between the parts. I was also privy to the idea that when you teach any skill, you do it just a few times - perfectly and slowly, which in turn builds the brain, awakens the needed sequences, allows the synapses to fire and awaken the need for dendrites to grow.

The idea is born *that learning to read can be a quick easy and predictable process if adherence to general rules for learning anything are followed.*

The tedium of taking my instincts and being required to formally write them was my next personal challenge which really gave me no insight apart from being intensely frustrated that it took a lot of time, much more that I was happy to give. Why am I so impatient?

This was another critical ingredient to add. It was my own clinical depression.

Clinical depression for most of my adult life manifest as having an extremely short period of functioning in any given day. On many days I was only able to do good work

for an hour or two. Outside of these times, I couldn't concentrate, would trip and fall, bump into things and in a nutshell not get much done. Fatigue was all consuming for many years and I was forced to learn from it. The lesson learned, you have to do it quickly. Going slow was simply not an option for me. My mantra became, now do it faster, make it simpler, think and it can be better!

The significance of this came from often hearing from other professionals that remediation in learning disabilities takes time, is nearly always very slow and by claiming that you can do it quickly shows that you are probably lying and making it up. It simply can't be done! Apparently.

Computers are now improving and it is time to try and build my own intervention from the ground up so a couple of willing parents come to my aid and create an empty shell with nothing in it. :(Patiently they show me how to put together a page and then another and another. POD is born.

Over about three months a basic version is created that actually works. The computer works and it works on the kids. Their reading also improves.

Next comes yet another major epiphany. I am working side by side with my students and like teachers for millennia, when their student stumbles, they try to understand the reason for the difficulty and rectify it. I did the same, but had the advantage of being able to

program POD so that the next student who journeys down this path will be taken logically along this same sequence that has rectified a problem in another student.

This is HUGE. HUGE. HUGE.

I became very adept at working alongside a student with my computer on and as the student would hit a blockage (think a missing brain link or a logical step is missing) then if I could reason why, I would immediately program a page(s), put it before the student and observe the outcomes. If it worked, it was kept, if not, then deleted.

This cycle of observation, hypothesis, creation, testing and evaluation became something that could occur in minutes and then be validated more substantially over the

coming weeks. The results were so glaringly obvious it didn't require the PhD research process to validate it. That can come later!.

Over the next two years, POD was further refined by tackling the ever smaller groups of students for whom it failed to help in its current format.

Now it is quite unusual for POD to not do the job very well but this will always happen and be the constant driver of new research and product.

The car epiphany has only occurred in the last few months: We all own and drive cars, but they are so special because they actually work. They are made up of thousands of little parts that must each do their job, just like BR and POD. However, like cars, if you change any aspect or design of a car, even a little bit, the overall specifications and nature of the car changes and along with it how many people it may be able to carry, what load, how fast it may travel or how far on its fuel. Injust the same way BR and POD is simply a designed product that does certain things very well but not others. You should look elsewhere for the intervention that addresses a particular deficit that BR and POD misses. It is not everything, but it is a pretty good start.

Australian ABC Four Corners investigation into poor Australian Literacy outcomes(Nov 2019) approx..

The essence of the investigation can be summarized as “Why when our Grade 5 students are achieving at a sufficiently competent standard (agreed) are they then not progressing such that at Grade 9 the literacy levels achieved remain at the Grade 5 level even when an additional four years of schooling have occurred?” Ben? Of the Gratton Institute

Hypothesis and explanation of this scenario.

Our changing society and its effects on the developing students of today are creating outcomes that are sub-optimal with a disproportionate number of students doing poorly in literacy measures, especially when compared globally. Though this situation is the new norm here in Australia, it is mirrored in many other countries with a similar ethos.

This begs the question of: ‘Is the teaching of literacy being done poorly, are the methods and techniques at fault or is there something else at play here?

Might I suggest that with an ever increasing body of support and effective implementation for the Phonologiacal based approach to literacy, that is also strongly evidenced to be the most appropriate method for the teaching of reading, (which I shall agree with but only in part:- the ages 4 – 8 bracket), it would be reasonable to expect a steady improvement in outcomes year on year should occur. The improvements are not following through and why not? What is new and affecting this learning process?

I believe that the ‘tyranny of the screen’ in its myriad forms is the new issue at play here. In no way do I wish to condemn it nor praise its advantages as this is now a moot point. It is just a shift in technology such as from slate and chalk, to pen and ink, to the ball point pen to the word processor and now the highly personalized computer screen experience. There are likely older readers of this whom have grown through all these phases and experienced them all. These same older people would also remember that with each emerging technology, there needed to be a shift in how the new medium was best applied with each having advantages and disadvantages. The computer screen is no different but for very different reasons.

The computer screen unlike any other item has absorbed a generation of children with no sighn of letting up in the foreseeable future. The distraction of the screen is taking away time from other endeavours. Please let me explain with an anecdote.

As a biological animal, humans learn through doing and practice. This results in a change within the brain, the growth of dendrites and pruning of neurons. We can see humans achieve excellence within the enormous range of activities they pursue. But nobody is good at everything. Just the things they learn and then practice and this is the point.

Our children learn to read. All that this encompasses. Recognizing symbols, learning the alphabet, longer words, fluency and ultimately comprehension and critical thinking. They usually begin at about four years of age, probably watching playschool or sesame street before the formal teaching begins at preschool or school grade 1. Not only do our kids learn to read, but for this anecdote, let them also learn to play a musical instrument such as the piano or keyboard and let them learn it and practice and generally use it as much as they would read.

I am using the piano analogy as I want you to consider reading not as something different or special, but simply as a complex learned skill that we as humans learn commonly. You could substitute, stunt bike riding (might be too simple), gymnastics, driving a car, or any other complex skillset that requires time, effort and practice over many years to learn to a standard of excellence.

Fast forward to grade 5. The students are learning nicely. They are about 10 years old and unlike us older generation where we were likely distracted at 15 years old by the opposite (or not) sex and had the resultant drop in school marks, our children today are much younger when an all immersive distraction arrives. The screen.

This new distraction has two marked problems. 1, the timing. At the age of 10 years old, our child has not yet developed the reading skill to a level of 'automaticity' that point regarded by psychologists and neurologists where a skill is learnt to where it is hard wired and will be retained for life, with an appropriate threshold that spontaneous improvements are ongoing.

2. the student now has a distraction from all things reading, such that rather than reading occurring as a daily leisure time activity, it is passed by to play computer games, engage via social media to name but a few.

Sure some reading still occurs at school, but not enough. Lets substitute in our examples again. Now instead of reading – or playing the piano 3,4 5 hours per day, we just play chopsticks and fiddle with a couple of familiar tunes during school and absolutely nothing outside of school hours.

What will our students playing be like years later. I think a lot like their reading. Basically little to no progress will have occurred. Traditionally excellence in a skill or endeavor requires time and intensity in practice. The computer screen is robbing our kids of this.

So what is the solution? BehaviouralReading POD seems to be a genuine effective and efficient solution. A modern solution to a modern problem.

Revisiting our piano scenario or perhaps our driving example, at 14 years old our poor reader, not incompetent, just of a lower standard attends a training opportunity with a seriously good instructor. A few hours a day for a few weeks. Would we anticipate a change in the skill set. Anybody whom has gone to special cooking classes, and advanced driving course, snow skiing classes or had a visiting scholar in residence to mentor you, you will all agree that it is possible to make a very substantial improvement in your skill in a very short amount of time and not only do you improve now, but you are likely to have an overall benefit for the remainder of your life.

Reading is no different.

Our 21st – 22nd century learn to read process now might need to be

Step 1 5 to 8 years old Early literacy using the method of the day, but preferably phonological awareness/ synthetic phonics based,

Step 2 9 years to 13 years general teaching and learning at school

Step 3 13 years old BR/ POD intensive to boost up to the threshold level of literacy > 13years equivalency and thereby facilitating ongoing academic progress through advanced competency in reading literacy.

This isnas being bad nor suggest it is positive. It is simply a new

Brain imaging compared to effective outcomes

Brain imaging and the relative contribution to effective outcomes;

Brain imaging information is rapidly increasing, but apart from the general information that is written in text books and sundry academic papers, there hasn't been any therapeutic benefit that can be directly attributed to this knowledge.

are very common today but I have had minimal access to information is there really diagnostic value in seeing what a particular image profile is for a client?

Aphasia – the loss of the ability to speak is a commonly used example of how the brain can relearn the skill of speech following a brain injury such as a stroke. With a region of the brain incapacitated through the injury, therapy is commonly quite effective in significantly improving the speech for these patients and what is generally understood that there is no specific area that the brain will recruit for the remapping of the damaged area.

What is useful in

Case studies

Case study Tahlia: A visual issue with her reading

#irlen #visual

Tahlia at 13 years old changed her reading fluency from that of a 5 year old to near age equivalent in only two days where she could read a story of about 1500 words of Grade 7 difficulty and recall the detail and content to a very satisfactory level appropriate to her age.

This remarkable change came as a surprise suddenly when in a session, I noticed that she would read about three words and then drop down to the next line. After some experimenting it became apparent that a unique situation occurred where Tahlia could only 'see' a column of text about 4cm wide. By reformatting the reading passage and marginally increasing the font to allow for about three words per line, also obscuring one eye (left) with a dark red tinted filter, her reading and reading

Tahlia at 13 years old has been a client for over 5 years. First presenting as a young girl with learning and intellectual impairments, she had various supports including many years of speech pathology, the case management of a paediatrician, occupational therapy, optometric assessment and support and school based support. Her parents were extremely dedicated and patient in finding her assistance to give her education every chance of success.

Formally diagnosed with an intellectual impairment from birth her progress when we began working with her was appropriate with that diagnosis. Ongoing support with a targeted response to intervention was adopted by her many supporters.

I suggested that Tahlia and her mother call a colleague whom specializes in Irlen coloured glasses to have a look at Tahlia and offer an opinion.

Irlen has received a lot of dismissive and negative publicity from the academic establishment but here in our clinic, there have been a few cases in which Irlen was the correct solution. In our experience it is better to source Irlen later in the remediation process not early otherwise other vital processing ingredients of the BRPOD process will usually be ignored by the client.

…. 3 months later

Tahlia is a different girl and is busy being a typical 13 year old, totally preoccupied with fashion and style, but also bringing home a report card from her school that is completely acceptable with plenty of B grades. I might add, in regular mainstream classes and not adapted remedial.

The Irlen solution for Tahlia is nothing short of profound and goes to show that the reading process requires the integration of many different skills and attributes and it is only when deficiencies are able to be remedied, can this complicated activity be mastered.

Meet Tahlia here on this Facebook link
https://www.facebook.com/watch/?v=250830989666110

Brains are like dishcloths

Brains are like dishcloths and they

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Indicative results from the clinic

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Indicative results from schools

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POD Features

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Future direction for POD's descendants

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LESSONS FROM MOTOR RACING

Chapter 4

TWO RECENT TRAGEDIES THAT HAVE SHAPED A PLANET

COVID HANDWASHING AND BOEING 737 MAX