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adolescent success

HINT

Editorial

Transition involves moving from a current to a future state and, as such, can be fraught with difficulties. Change is never easy! Whilst it is possible to plan for some aspects of the change, there are always challenges that could not be anticipated. A conversation with students who moved from primary to secondary school earlier in the year would no doubt reveal that the students could predict and plan for some challenges whilst others were less easy to manage. Similarly some transitions can be anticipated whilst others also arrive with a speed that tests individual resolve and resilience. As we near the end of 2020, it is interesting to reflect upon the many transitions that, as educators and members of communities, we have been forced to negotiate during the year.

It is an understatement to say that it has been quite a year but the outstanding way that students, teachers and school leaders were able to respond to challenges that they confronted is noteworthy. What is very clear is the important place that schools have as entities within their communities. Indeed, schools did not miss a beat. Students continued to learn, teachers continued to teach and schools remained open and functional in a time of great turmoil. The role of teachers and school leaders has never been more important.

As per normal the variety of articles in this edition of the journal showcases the extent of both research and varied approaches adopted by schools to meet the needs of our early adolescents. The first of the refereed articles by Day is aimed at teachers of mathematics and explores the concept of algebraic reasoning. The second explores how the use of digital technologies can be used effectively to promote the re-engagement of gifted learners in the middle years. In the non-refereed section, a number of contributions share stories and insights gained from practice. Brunzell, Witter and Abbott explore the notion of trauma-informed positive education as a means to assist students who struggle with behavioural and learning difficulties at school. In keeping with the theme of engagement, Forwood shares insights about the move to remote learning and the framework used to shape teaching and learning at Camberwell Girls Grammar School. Dray shares a novel approach to the development of critical thinking used at his school – the World Peace Game. The next article shares the experience of Swan Christian College in introducing the Rites of Passage program. Finally, the theme of transition, both into and out of middle school, is explored by Matthew who shares the approach adopted at her school.

As always, I would really encourage readers of the journal to consider sharing examples of different initiatives that are occurring at their own schools. It is with deep gratitude that I thank the contributors to this edition of the Australian Journal of Middle Schooling. Finding the time to conduct research and share practice in what has been an extremely busy and taxing year is no mean feat. That teachers have continued to explore the best ways to maximize the opportunities for student learning is a testament to the dedication of all who work with our middle years students.

Dr Anne Coffey
Journal Editor
Adolescent Success

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President's Annual Report
2019-20

Our last AGM was held during our 2019 International Conference, which was an outstanding success. It was the last time we were able to gather a large group of educators in one space, to share experiences and to network. Since then, we have, as have all people, been faced with an extraordinary circumstance. As an association of educators, this has meant that we have had to be agile and flexible., and whilst it has provided us with some challenges, our Executive Director – Angela White has worked both innovatively and diligently to keep our association on track.

Unfortunately, COVID has meant that we as an Association have had to budget carefully and have had Government support to assist us in that domain. I thank our Treasurer and Executive Director for managing and sustaining Adolescent Success during this time.

COVID has also impacted some of our partners financially, but we continue to support them during this time. We are dedicated to working with Latitude Travel and Queensland EDVentures when more normal times return and will continue to investigate partnerships with other businesses and organisations. The difficulties of partnering at this time are obvious, and we are ever grateful for the support of Furnware who have maintained their contribution and partnership during 2020.

Whilst we set our strategic priorities for 2019-2020 as enhancing and maintaining our website, updating policies and procedures, offering two International Study Tours (to Bali Green School and High Tech High in San Diego), and embarking on a series of Professional Learning Events throughout the country, we had to rethink many of our processes in order to achieve these goals. As such, we had to cancel all face-to-face events, international travel and thus, made some significant changes to the way we have worked this year on all levels.

We have developed a strong set of policies and procedures which are now in place, and it is believed that these will ensure the ongoing and effective management of our Association.

In addition, to ensure we are known as a leader and present a dynamic product in the middle years' environment, our focus for 2020 shifted towards staying connected with our members through events hosted online. This became the priority.

As such, we purchased a subscription to Zoom, which has allowed us to conduct a number of online professional learning events and conversations. As we were aware that educators in Australia, New Zealand and throughout the world were working extremely hard, developing online courses for their students, we offered a number of free COVID Coffee Conversations to enable collaboration across the country. These free events were run by our Executive Officer with members of the Management Committee and with of our partners.

I personally thank our partners; Latitude Group Travel, Furnware, EdVentures and Andrew Fuller, as well as members of our management committee for offering their services to engage with our members during this time. All presenters provided valuable insights and advice on working remotely with young adolescents and maintaining their wellbeing during this challenging time. In addition, to support teachers further, we developed a comprehensive list of digital resources for remote learning.

Our social media platforms have continued to be utilised, in particular our Twitter and Facebook platforms, with a move into Instagram and LinkedIn. These have been utilised extensively to promote any of our online professional learning opportunities and share resources and readings.

It continues to be a high priority for us to consider options for generating income for our association. Our Executive Director applied for a Queensland Government Grant with the Rural and Industry Development Authority to update our website. We were successful in this application and will receive $10000. The project for the update and improvement of our website to include a platform for online professional learning modules for members will commence shortly. We are looking to apply for more Government Grants in the near future.

As our national events were unable to proceed, we have run a number of online workshops and professional learning events where members and others have signed up for a variety of Keynotes, Workshops, and Teacher Practitioner sessions during our August Extravaganza and on a number of other occasions.

The August Extravaganza spanned each Saturday during August. Participants could sign up for one, some or all of the sessions being offered, as a variety of price points were offered. Sessions ranged from free conversations up to the Keynotes priced at $129. We made a minimal profit through this event but were able to maintain connection with current and new members and develop relationships with some international and national speakers.

The Keynote speakers were:

- Professor William Pinar
- Pasi Sahlberg
- Sanna Leinonen
- Phlyllis Fagell
- Andrew Fuller

Each of our current Partners presented a session during the Extravaganza.

On behalf of the association, I offer thanks to our Ambassadors for their ongoing support of our Association:

- Paul Browning, who presented his Leadership Workshop during our August Extravaganza – 'Why Trust the Leader'
- Andrew Fuller who presented a keynote and workshop during the August Extravaganza – 'From Surviving to Thriving', and
- Jandamarra Cadd, who ran his first artist workshop for us – 'Inviting Unity through Art'.

In addition, we thank Karlie Ross, Katherine Main and Madonna King for their contributions to the event, along with a number of our Management Committee and members who shared their practices. It would not have been as diverse and relevant without the input from these experienced practitioners.

Whilst the Extravaganza was successful, we have taken away a variety of learnings from it and will build upon this experience as we move towards development of our events for 2021. We are in discussion with Donna Pendergast and Katherine Main with the aim of facilitating another Action Research Project which will be entirely online. This will be open to groups of teachers within schools to plan and implement a project that will benefit their students in their context. We plan to publicise this in 2021.

With 2021 being our International Conference year, we have had to think differently about how we facilitate our major event, given the conditions surrounding COVID. As such, we are in the process of launching what will be a unique and exciting Professional Learning Conference during 2021. Knowing that educators need to continue to collaborate, connect and learn, we are reimagining what and how our International Conference will look like to ensure we are operating in a safe and dynamic way. This will be advertised in the coming days.

As part of our 2019 conference, we connected with and supported the Indigenous Literacy Foundation. We have donated over $600 to this very worthy cause since then and we hope to continue to support this charity moving forward.

Finally, I would like to thank our Executive Director, the members of the Executive team and Management Committee for their contributions to Adolescent Success. Their work is highly valued and appreciated. 2020 has been challenging for all educators and their students and has meant new ways of working and connecting. Whilst we have been physically distanced, we have endeavoured to remain socially connected, maintaining contact through phone and through online platforms, working to ensure that we are serving our members and sustaining our association.

I wish all members of Adolescent Success continued safety and health for the remainder of 2020 and look forward to continuing to serve our young adolescents into 2021.

Debra Evans
President

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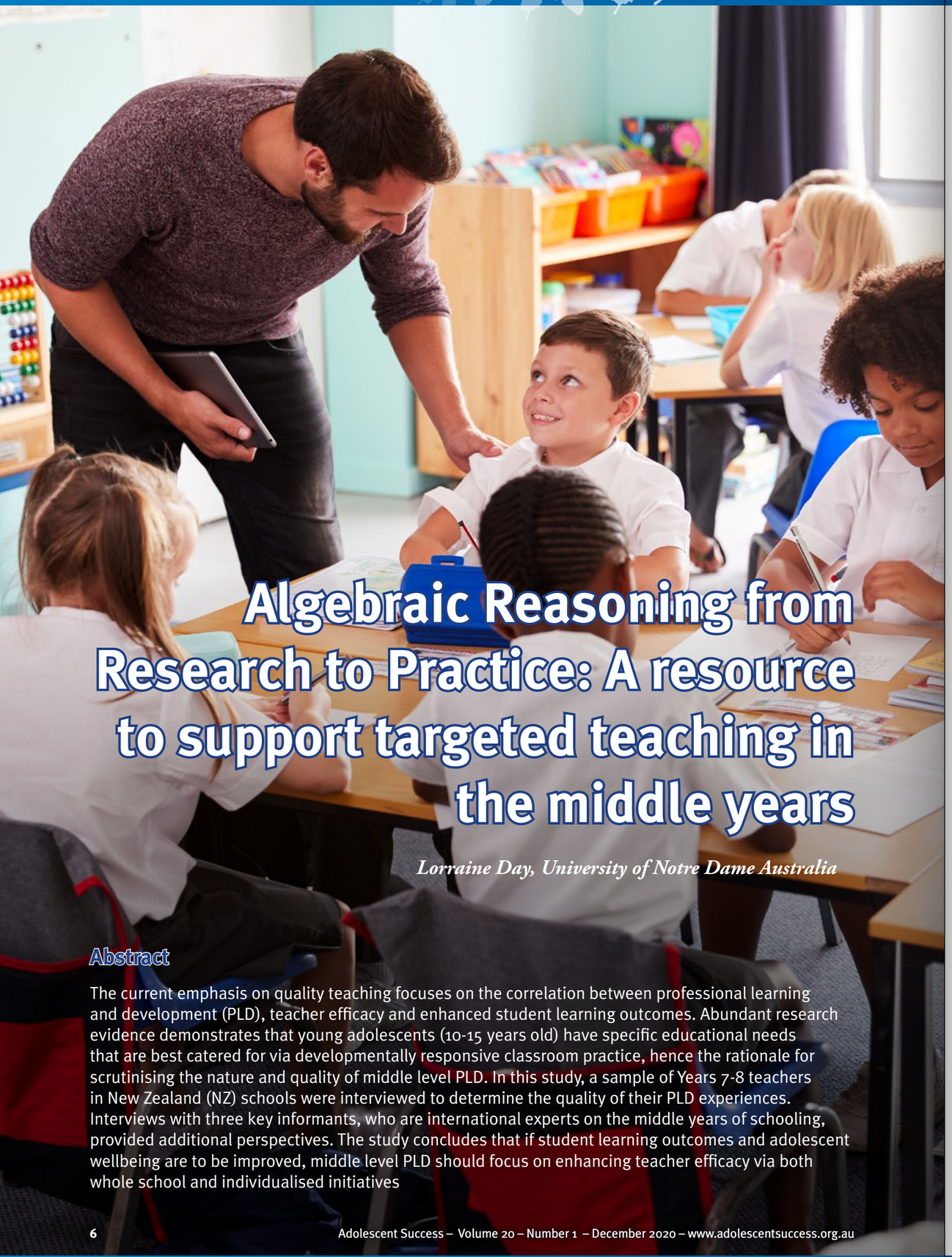

Algebraic Reasoning from Research to Practice: A resource to support targeted teaching in the middle years

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Abstract

The current emphasis on quality teaching focuses on the correlation between professional learning and development (PLD), teacher efficacy and enhanced student learning outcomes. Abundant research evidence demonstrates that young adolescents (10-15 years old) have specific educational needs that are best catered for via developmentally responsive classroom practice, hence the rationale for scrutinising the nature and quality of middle level PLD. In this study, a sample of Years 7-8 teachers in New Zealand (NZ) schools were interviewed to determine the quality of their PLD experiences. Interviews with three key informants, who are international experts on the middle years of schooling, provided additional perspectives. The study concludes that if student learning outcomes and adolescent wellbeing are to be improved, middle level PLD should focus on enhancing teacher efficacy via both whole school and individualised initiatives

Introduction

The Australian Curriculum: Mathematics (ACM) (ACARA, n.d.) consists of three Content Strands; Number and Algebra, Measurement and Geometry, and Statistics and Probability. Sullivan (2012) referred to these as the 'nouns' of the curriculum. Included in the ACM are also four Proficiency Strands; Understanding, Fluency, Problem Solving and Reasoning. Sullivan (2012) referred to the Proficiency Strands as the 'verbs' of the curriculum. The notion of these Proficiency Strands as being the actions of mathematics was shared by Askew (2012) who suggested these proficiencies should be enacted when learning mathematics, not just when applying it. Yet, despite the importance given to the Proficiency Stands in the ACM, teachers of mathematics still tend to focus more on the Content Strands of the ACM rather than on the actions of mathematics, the Proficiency Strands (O'Neill, 2018; Shield & Dole, 2013; Siemon, Bleckly, & Neil, 2012; Sullivan, 2012).

This paper reports on one section of the Reframing Mathematical Futures II research project (RMFII) which aimed "to build a sustainable, evidence-based, learning and teaching resource to support the development of mathematical reasoning" (Siemon & Callingham, 2019, p. 103). The RMFII project built on the earlier work on multiplicative reasoning (Siemon, Breed, Dole, Izard, & Virgona, 2006) to extrapolate into mathematical reasoning. For the purpose of RMFII, mathematical reasoning was seen to encompass:

i. Core knowledge needed to recognise, interpret, represent and analyse algebraic, geometric, statistical and probabilistic situations and the relationships/ connections between them;

ii. An ability to apply that knowledge in unfamiliar situations to solve problems, generate and test conjectures, make and defend generalisations; and

iii. A capacity to communicate reasoning and solution strategies in multiple ways (i.e. diagrammatically, symbolically, orally and in writing) (Siemon, 2013).

Three separate mathematical reasoning strands were developed as part of RMFII; algebraic reasoning, geometrical reasoning, and statistical reasoning.

This article focuses on algebraic reasoning in the middle years of schooling, an important predictor of later success in school mathematics. It describes the process used in RMFII to design an evidence-based Learning Progression for Algebraic Reasoning (LPAR) based around three big ideas; Pattern and Function, Equivalence and Generalisation. The LPAR may be used by teachers in the middle years to determine where students are in their learning journey, and where they need to go next. Teaching advice is provided to assist teachers to know how to help students to progress in their algebraic reasoning journey.

Literature Review

There has been a world-wide press for the actions of mathematics, to be given more attention in mathematics classrooms (Kilpatrick, Swafford, & Findell, 2001; National Council of Teachers of Mathematics (NCTM), 2001;

Stacey, 2010; Sullivan, 2012; Swan & Burkhardt, 2012). In Australia although the Proficiency Strands (the verbs of mathematics (Sullivan, 2012)) are placed at the heart of the national mathematics curriculum (ACARA, n.d.), the reality in many classrooms is that a narrow, skill-based approach to mathematics still prevails (Shield & Dole, 2013; Sullivan, 2011). Due to this teaching approach, rather than exploring mathematics as a connected set of big ideas with the Proficiency Strands at the forefront, many students still see mathematics as established, disconnected ideas that need to be learnt and reproduced (Siemon & Callingham, 2019). Further, this valuing of performance over process, in turn, leads to narrow forms of assessment being purveyed, that Swan and Burkhardt (2012) portrayed as "What You Test Is What You Get (WYTIWYG)" (p. 4).

The Alice Springs (Mparntwe) Education Declaration, the collective national vision of educational goals for young Australians (Council of Australian Governments Education Council, 2019) used the terms "assessment for learning, assessment as learning and assessment of learning" as first coined by Earl and Katz (2006, p. iv), to explain the different purposes of assessment. There has also been a recognition that any assessment, if used to inform teachers' decisions about their teaching, is formative (Callingham, 2010; Masters, 2013; Wiliam, 2011). Using quality assessment in a formative manner is recognised as a way to improve the educational outcomes for students (Masters, 2013; NCTM, 2001, Wiliam, 2011). Furthermore, when teachers are able to ascertain and understand the mathematical needs of their students, they are better equipped to know where to start teaching and how to move their students forward by building on what they know (Callingham, 2010; Clarke, 2001; Siemon, 2019).

Building on the mathematics that students know is the cornerstone of the research into learning progressions and learning trajectories (Confrey, McGowan, Shah, Belcher, Hennessey, & Maloney, 2019; Sarama & Clements, 2019; Siemon, 2019; Tzur, 2019). Popham (2007) defined learning progressions as "carefully sequenced set of building blocks that students must master en route to mastering a more distant curricular aim" (p. 83). Confrey et al. (2019) use the metaphor of a climbing wall to emphasise that there can be a variety of starting points, multiple pathways, footholds, obstacles and challenges when climbing through the trajectory. "However, these pathways are predictable, and when used to formatively assess students' understanding, can inform teachers' instruction and guide students' learning" (p. 79). Rather than identifying every possible foothold that may be encountered along the way, learning progressions concentrate on the 'big ideas' of mathematics teaching and learning (Popham, 2007; Sarama & Clements, 2019), and align curriculum, teaching and assessment (Pellegrino, 2008; Swan & Burkhardt, 2012).

In conjunction with the interest in learning progressions and concerns about the narrowing of curriculum (Askew, 2013), there has been a resurgent push for a big ideas approach to mathematics teaching and learning (Hurst & Hurrell, 2014; Siemon, Bleckly, & Neal, 2012. The Association of Mathematics Educators dedicated its entire 2019 Yearbook (Toh & Yeo, 2019) to the big ideas of mathematics. Charles (2005) referred to a big idea in mathematics being "a statement of an idea that is central to the learning of mathematics, one that links numerous mathematical understandings into a coherent whole" (p. 10). Siemon, Bleckly, & Neal (2012) suggested that a big idea in mathematics was one that "without which students' progress in mathematics will be seriously impacted" (p. 22).

Using the actions of mathematics, especially problem solving and reasoning, assist teachers to use a big ideas approach to mathematics teaching and learning (Askew, 2013). While the importance of the problem solving and reasoning is central to the ACM, there is little evidence that they are a focus in teaching and learning in classrooms (REF). Results from large-scale research studies (e.g. Siemon, 2016) and international assessments (e.g. Thomson, De Bortoli, & Underwood, 2016) have shown that students in the middle years of schooling in Australian schools experience difficulty with reasoning when solving unfamiliar problems and explaining and justifying their mathematical thinking. It should be noted that a focus on mathematical reasoning will also include elements of fluency, understanding and problem solving, as all elements of the Proficiency Strands are intertwined and each is reliant on the others to become evident (Kilpatrick, Swafford, & Findell, 2001).

ACARA (n.d.) states that

> Students are reasoning mathematically when they explain their thinking, when they deduce and justify strategies used and conclusions reached, when they adapt the known to the unknown, when they transfer learning from one context to another, when they prove that something is true or false and when they compare and contrast related ideas and explain their choices. (p. 6)

Lannin, Ellis and Elliot (2011) explained that mathematical reasoning is an evolving process. The development of a classroom culture where students are encouraged to take risks by sharing their reasoning (Clarke, Roche & van der Schans, 2012) and where the quality of the mathematical justification is valued as much as a correct answer will support a change in practice from low-level, procedural exercises to teaching based on a deeper understanding of the big ideas and the connections between them (Siemon et al., 2018; Sullivan, 2011). A climate where students feel safe to share correct and incorrect ideas allows students to develop an "increasingly sophisticated capacity for logical thought and actions" (ACARA, n.d., p. 6). If students are to reason mathematically, they need to be engaged in mathematically rich, investigative tasks that allow them to explain their thinking, justify the strategies they use and the conclusions they reach, adapt the known to the unknown (Boaler & Staples, 2008; Day & Hurrell, 2013; Stein, Smith, Henningsen, & Silver, 2009) and demonstrate varied solution strategies (NCTM, 2014). One particularly important branch of reasoning is Algebraic reasoning, as it underpins all mathematical thinking and allows and encourages the exploration of the structure of mathematics (Ministry of Education Ontario, 2013).

Algebraic reasoning is known as a 'gatekeeper' for students to progress in mathematics and science (e.g. Edwards, 2000; Ministry of Education Ontario, 2013). Introducing algebraic reasoning early in students' education has been shown to provide more opportunities for students in later mathematics, science and career choices, as well as supporting the transition to formal algebra in secondary schools (Kaput & Blanton, 2005; Kieran, 2018), which research has shown to be difficult for most students (Fonger, Stephens, Blanton, Isler, Knuth, & Murphy Gardiner, 2018). It is recognised that traditional approaches to teaching algebra have met with limited success (Kaput, 2008; Norton & Irvin, 2007) and Carraher, Schliemann and Schwartz (2008) warn that early algebra is not the same as traditional algebra, taught early. Blanton and Kaput (2016) stated that "algebraic reasoning can be viewed as a way of thinking that include generalizing, representing, justifying and reasoning with mathematical relationships and structure" (p. 123). Generalisation lies at the heart of algebraic reasoning and involves noticing mathematical structure and relationships (e.g. Blanton & Kaput, 2016; Mason, 2008).

Method

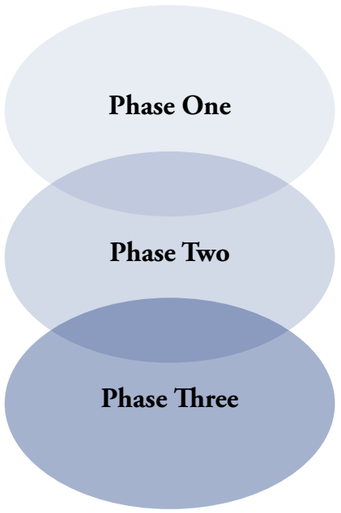
Design-based research methods (Barab & Squire, 2004; Design-Based Collective, 2003) were identified as the most appropriate for this project. Design-based research methods allow teachers and researchers to work together as collaborators to produce meaningful change in schools. When such partnerships are operational across various schools, the different variables that exist in different classroom contexts may be identified and this assists in the refinement of key components of an intervention (Design-Based Collective, 2003). The research consisted of three distinct but overlapping phases as shown in Figure 1.

Phase One

In Phase One of the Algebraic Reasoning component of the RMFII Project the first step was to develop a Hypothetical Learning Progression for Algebraic Reasoning (HLPAR) by carrying out an extensive literature review to determine how students' ways of thinking about the 'big ideas' of algebra become increasingly sophisticated (Fonger et al., 2018; Sarama & Clements, 2019).

Based on reading of the literature the three big ideas in algebraic reasoning identified in the RMFII project were Pattern and Function, Equivalence, and Generalisation. Although the focus was to be on algebraic reasoning it was considered appropriate to identify the progression in terms of algebraic content, as students need content about which to reason and teachers tend to have a strong commitment to the algebraic content. Underpinning this content focus, however, was the understanding that to reason algebraically students need to be able to visualise, move flexibly between multiple representations and have the mathematical language to describe their thinking (Day, Horne, & Stephens, 2019).

Pattern and Function is based on the notion of structure and includes the structure of arithmetic, the identification of relationships and inverse relationships, variable and constants. Its aim is to encourage the fluid movement between multiple representations and includes the ideas of continuous and discrete functions, domain and range, rates of change and families of functions. Pattern is seen as the foundation on which to build functional thinking. Equivalence has at the centre the notion of balance and includes such aspects as the meaning of the equals sign, relational thinking, equivalent expressions and equations. Generalisation strongly connects arithmetic and algebraic thinking by focusing on similarities and differences. Generalisation includes moving from the specific to the general as well as moving from the general to the specific. This includes using a variety of representations such as models, words, pictures, and/or symbols. The structure of arithmetic, number and algebraic laws, patterns, functions and equivalence situations can all offer opportunities for generalisation, as can the meaningful use of language and symbols.



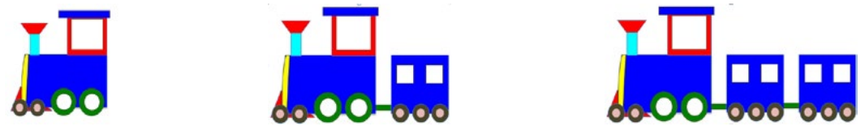
- Identification of Hypothetical Learning Progressions (HLP) from the research literature
- Professional learning for teachers on targeted teaching in middle years
- Development and trialling of rich tasks
- Using Rasch analysis to refine Draft Learning Progression (OLP)
- Preparation and use of multiple assessment forms for mathematical reasoning
- Analysis of student and teacher surveys
- Development of Learning Progression for Algebraic Reasoning
- Development of teaching tasks and teaching advice
- Development of professional learning modules
- Dissemination of information and feedback from non-project schools
- Development and publication of project outcomes
- Final project reports
- Opportunities for further research

Figure 1. *Phases of RMFII Project*

While the Hypothetical Learning Progression for Algebraic Reasoning (HLPAR) was being developed, 32 schools from all states and territories in Australia were identified to be involved in the RMFII Project. In keeping with the funding arrangements, the schools were in low socio-economic areas and were selected with the assistance of education departments (or Catholic Education in Queensland) in each of the states. A Specialist teacher was selected by each participating school and supported by the project team to work with four to six other teachers in their school to trial assessment tasks and reasoning activities and support a targeted teaching approach to mathematical reasoning in Years 7-9. Project schools were visited by members of the project team at least twice a year from 2015 to 2017, online professional learning sessions on developing algebraic, spatial and probabilistic reasoning were offered monthly and three two-day residential professional learning conferences were provided by members of the research team (Siemon & Callingham, 2019).

After the HLPAR was determined from the research literature (Day, Horne, & Stephens, 2019), the algebraic reasoning team began to design, adapt and develop a range of rich assessment tasks and associated rubrics, based around the HLPAR. An example of a rich assessment task is seen in Figure 2. The assessment tasks were then trialled with the 3500 students from the project schools and an additional 1500 students in Years 5-10 from other schools around Australia who volunteered trialled the materials. Scoring rubrics, using a partial credit model, which valued algebraic reasoning were developed for each of the tasks. Teachers in the project schools marking the work were asked to work collaboratively within their schools to mark the tasks. Many teachers

reported that this consensus marking, in itself, was a valuable professional learning activity, as there were many rich discussions about how students were reasoning and what misconceptions were being seen. One of the purposes of the scoring rubrics was to indicate to teachers what they should be looking for, so they could foster the types of classroom discussions and feedback to assist their students to become better algebraic reasoners (Day, Horne, & Stephens, 2019). The marking rubric for the Trains task is seen in Figure 3.



Toy Train Size 1 **Toy Train Size 2** **Toy Train Size 3**

The engine of the train has 8 wheels, 4 on each side, and each carriage has 6 wheels, 3 on each side.
The table shows the number of wheels on each train:

Train size	1	2	3	4	5	6
Number of wheels	8	14				

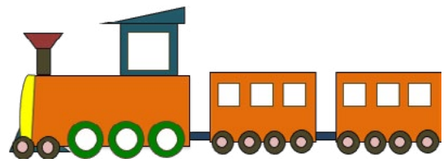
[ATRNS1]
Fill in the table to show the number of wheels for the trains size 3, 4, 5 and 6.

[ATRNS2]
The largest train set in the toy shop is size 15.
How many wheels does the size 15 have? _____
Show your reasoning.

[ATRNS3]
Ben says his train has 60 wheels. Can Ben be correct? _____
Explain your reasoning.

[ATRNS4]
Write down in words or symbols a rule for working out how many wheels any sized train would need.

[ATRNS5]
The toy shop decides to introduce a new Super Train set. In the new train set the engine has 10 wheels and each carriage has 8 wheels.



Super Train Size 3

How many wheels does a Super Train Size 7 have?
Show your reasoning.

[ATRNS6]
Write a rule in words or symbols for working out the size Super Train given any number of wheels.

Figure 2. *Six items from the Trains task*

ATRNS1

SCORE	DESCRIPTION
0	No response or irrelevant response
1	At least two entries correct
2	Table completed correctly (20,26,32,38)

ATRNS2

0	No response or irrelevant response
1	Correct response (92) with no explanation/working or incorrect response with working to show some understanding of pattern or incorrect with working to show minor calculation error
2	Correct response with an explanation that reflects the use of an additive strategy (e.g., goes up by 6 or continues table to a train size of 15)
3	Correct response with an explanation of a multiplicative approach expressed in words or as a rule but not in simplest form (e.g., you multiply 6 by 14 and add 8 or 6 x 14 + 8)
4	Correct response with an explanation of a multiplicative approach expressed in words or as a rule in simplest form that recognises the 6 wheels in the engine (e.g., you need to times 15 by 6 and add 2 or 15 x 6 + 2)

ATRNS3

0	No response or irrelevant response
1	Correct response (No) but with no explanation
2	Correct response with reasoning to support conclusion (e.g., 60 – 8 is 52 and 52 is not divisible by 6 or a size 9 train would have 56 wheels and a size 10 train would have 62 wheels so you can't have a train with 60 wheels.

ATRNS4

0	No response or irrelevant response
1	General statement (e.g., it goes up by 6) OR incorrect but some evidence that multiplication involved, may or may not recognise addition
2	Rule correctly expressed in words (e.g., you multiply 6 by one less than the train Size number and you add 8) or in symbols but not in simplest form (e.g., N = 8 + 6S – 6 or N = 8 + 6 (S – 1))
3	Rule correctly expressed in words or symbols in simplest form that recognises the 8 wheels in the engine (e.g., you need to times S by 6 and add 2 or N = 6S + 2)

ATRNS5

0	No response or irrelevant response
1	Correct response (58) with little/no explanation/working OR incorrect response with working to show some understanding of pattern, may involve a minor calculation error
2	Correct response with an explanation that suggests the use of an additive strategy (e.g., goes up by 8 or uses a table for Super Train Sizes from 1 to 7)
3	Correct response with an explanation that indicates a multiplicative approach expressed either in words (e.g., you multiply 8 by one less than the Size and you add 10) OR symbols (e.g., 10 + 6 x 8 or 2 + 7 x 8)

ATRNS6

0	No response or irrelevant response
1	Incorrect but some evidence of multiplicative thinking (e.g., recognises division is involved but unable to specify correctly, may or may not recognise subtraction)
2	Correct rule with reasonable explanation either in words (e.g., you take 2 from the number of wheels and divide by 8) or in symbols (e.g., S = (N – 2)/8)

Figure 3. *Rubrics for the Trains Task*

The trial data were analysed using a partial credit Rasch model (Masters, 1982). These trials allowed the team to modify and re-trial tasks so they could be validated. The Rasch analysis provided a set of ordered lists of item rubrics that were used to refine the HLPAR. The analysis also prompted the redesign of some items and rubrics, as well as the design of additional tasks to further test and elaborate the progression, which was now known as the Draft Learning Progression for Algebraic Reasoning (DLPAR) (Siemon & Callingham, 2019).

Phase Two

Phase Two of the project focused on the design and trialling of additional assessment items, particularly in the areas where there were some perceived gaps in the DLPAR. The teachers in the project schools marked the forms using the rubrics supplied by the research team and forwarded the de-identified data to be analysed. By the end of the third round of assessment, it was evident that the scales produced as a result of the Rasch analysis were stable. Once the stable construct was established, judgements about approximate Zone boundaries within the DLPAR were made using the ordered lists of item difficulties using a variable map (Siemon & Callingham, 2019). To further consider the Zone boundaries and what they actually meant in terms of what students could do at each Zone, the corresponding scoring rubrics were added to the ordered lists of items. The academics involved in the Algebraic Reasoning team met to consider what was meant by student performance evidenced at similar levels of difficulty on the scales, the similarities and differences in each Zone and to consider the nature of the reasoning that could be assumed. Once an agreement was reached the Zone boundaries were set and a general description of the typical observed behaviours at each Zone were written to form the Learning Progression for Algebraic Reasoning (LPAR) (Day, Horne, & Stephens, 2019).

The next step of the project was to provide teaching advice targeted at the zones to assist teachers to provide suitable teaching experiences to assist, and appropriately challenge, students to reach the next zone in the progression. The description of each zone provided examples of the specific behaviours of students typical in that Zone. The intention was to provide advice to teachers for targeting their teaching for students in each Zone. Rasch modelling allows both students' performances and item difficulty to be measured using the same unit and placed on an interval scale (Bond & Fox, 2015). Student performances are located on the scale where they have more than a 50% chance of gaining the score required for the items below that point but less than a 50% chance of scoring at the level required for items located above that point. What this signifies is that there are some facets of the behaviours identified with a Zone that need to be consolidated and established to extend students' understanding and others that need to be introduced and developed to progress their learning to the next Zone (Siemon & Callingham, 2019). Alongside the development of the Teaching Advice, five professional learning modules addressing the three 'big ideas' of algebraic reasoning were developed.

Phase Three

Early in 2017, the final year of the RMFII Project, a decision was made, based on results available at the time, to prioritise the validation of the scales over investigating the efficacy of adopting a targeted teaching approach to mathematical reasoning in the latter half of 2017. The research team was of the view that it would be preferable, and in the long-term interests of schools and mathematics education, to spend the limited amount of project time remaining on ensuring that the Learning Progressions, the assessment tools and Teaching Advice, were solidly based on empirical data (Siemon, 2018). There leaves further opportunities for research to investigate the efficacy of adopting a targeted teaching approach to mathematical reasoning.

To assist in the dissemination of information and collecting of feedback from non-project schools, Roadshows were held in all the states and territories participating in the RMFII Project. The aim of the Roadshows was two-fold: to provide targeted professional learning on mathematical reasoning and to source feedback from teachers about the evidence-based materials (Assessment forms, scoring rubrics, Learning Progressions and Teaching Advice) that had been prepared as a result of the design-based research. These Roadshows were designed for teachers from the project schools as well as teachers from other schools who were interested in improving mathematical reasoning in their schools. Members of the RMFII team were also extensively involved in reporting project outcomes at State, National and International research and professional conferences.

Results

The variable map for algebraic reasoning produced as a result of the Rasch analysis is shown in Figure 4. Item responses are ranked from easiest at the bottom of the map to most difficult at the top of the map. Those items with similar levels of difficulty were interrogated by the research team to identify similarities and differences in the reasoning required. Responses indicating similar levels of reasoning were grouped together to form eight ordered Zones. For example, ATRNS4.3 indicates a correct response, coded at three on the scoring rubric (Figure 3) to the item ATRNS4 (Figure 2). It is located in Zone 7 beside AHOT2.2 which asked students to correctly convert degrees Fahrenheit to degrees Celsius using a conversion formula in which Degrees Fahrenheit was the subject of the formula. The highlighted codes in the variable map relate to the scores for the Trains task (Figure 2). It should be noted that tasks should not be looked at in isolation, so this highlighting is only to indicate how this particular task had responses that spanned the entire eight zones. It can be seen clearly that the questions that required sophisticated reasoning were found to be the most difficult by students.

	.											ZONE 8
			|	ASAND.2								
			|			AHAB3.4						
	.		|	ABBUY3.2		ATILP3.4						
2	.		+	ATRNS6.2	ATILP3.3	ABOX3.3						
	.		| T	ARLGR4.2	AHOT2A.3	ATILP4.4	ATILP4.5					
	#		|	AEQEX5.2								
	.	T	|	AHOT2.2	ATRNS4.3							ZONE 7
	.##		|	AHOT2A.2	ATILP4.3	ATRNS2.4	ARELS7.2	ARELS4.3	ACONS2.2	AMUST.3		
	#		|	ARLGR2.2	ARELS6.2	ABOX2.3	ACART1.3	ARLT1.3	ABBUY2.3			
1	.##		+ S	ABRT4.2	AHOT1.2	ATILP2.3	ABRT3.2					
	.###		|	AHOT2A.1	ATILP3.2	ATILP1.3	AHOT2.1	ALEM3.2	AHAB3.3	ARELS1.3		ZONE 6
	.####		|	ASAND.1	ABOX3.2	ABBEQ.3	ABBUY3.1	ARELS3.2	ARELS6.1	ARLGR3.2		
	.##		|	ARLGR4.1	ATILP4.2	ATRNS5.3	ATILP2.2	ABOX2.2	ATRNS4.2	ABBUY2.2	ATILP1.2	
	#####	S	|	AEQEX5.1	AEQB2.2	ACART1.2	ARLT2.2	ARLGR2.1				
	######		|	ATRNS6.1	ABBEQ.2	ATRNS2.3	AHOT1.1	ARELS3.1				ZONE 5
0	##########		+ M	ATILP3.1	ARELS5.1	ABOX3.1	ARELS7.1					
	######		|	ABOX2.1	ABOX1.2	ALEM3.1	ARLGR3.1	ABBEQ.1	ALEM2.2	ARLGR1.2		
	######		|	ABBUY1.2	ARELS4.2							ZONE 4
	##########		|	ARLT2.1	AEQB2.1							
	##########		|	ABBUY2.1	ATRNS3.2	ABOX1.1	ARELS2.1	ATILP1.1	ABRT4.1	ARELS4.1	ATRNS5.2	AHAB1.3
	##########	M	|	ATILP2.1	AHAB3.2	ALEM2.1	ACONS2.1	ATRNS2.2				ZONE 3
-1	##########		+ S	ATILP4.1	ARLT1.2	AEQB1.3	AHAB2.1	ARLGR1.1				
	######		|	ARLT1.1	ATRNS4.1							
	##########		|	ACART1.1	ATRNS5.1							
	#####		|	ALEM1.1	AEQB1.2	ACONS1.1						ZONE 2
	######		|	ATRNS2.1	AMUST.2	ARELS1.2						
	###		| T	ABBUY1.1	AHAB1.2	ATRNS3.1						
-2	#####	S	+	AHAB3.1	ABRT3.1							
	####		|	AMUST.1	ARELS1.1							
	##		|	AHAB1.1	ABRT2.1							
	###		|	AEQB1.1	ATRNS1.2							ZONE 1
	###		|									
	###		|	ATRNS1.1								
-3	.		+									

Figure 4. *Variable map of the responses of the algebra items*

Having agreed on where the Zone boundaries would be located, broad descriptions of the behaviours apparent within each Zone were developed and used to consider the implications for teaching and learning. The zone descriptions, shown in Table 1, form the Learning Progression for Algebraic Reasoning (LPAR).

Table 1.

Learning Progression for Algebraic Reasoning

Zone 1	Can continue simple patterns, but is likely to build them additively. Reasoning is confined to specific incidences and numerical examples of simple physical situations. Arithmetic thinking is used. Abstraction and generalisation are not evident at this stage.
Zone 2	Beginning to recognise patterns and relationships and conjecture about these. Able to identify numbers that vary and numbers that stay the same. Engages with the context, but arithmetic reasoning, typically based on calculations, is still being used. Recognises some multiples and some relationships like 6 more/6 less, while not necessarily recognising equivalence. Can work with simple scales and transfer from a table of values to a graph.
Zone 3	Beginning to use symbolic expression and elementary reasoning. While still using arithmetic approaches there is evidence of relational reasoning with the numbers and providing some explanation. Beginning to recognise simple multiplicative relationships. There is some evidence of co-ordination of two ideas. Explanation and justification is limited. Algebraic expressions are used rather than equations. Beginning to recognise equivalent relationships. Can explain simple generalisations by telling stories, manipulating materials and very simple use of symbolic language.
Zone 4	Beginning to work multiplicatively and simultaneously co-ordinate variables, although still uses specific examples to convince. Able to reason and generalise in simple situations. Can recognise and interpret the relevance of range from table and/or graphs and to recognise functional relationships. When faced with more complex algebraic situations is unable to use the full range of explanation or handle all of the information simultaneously. Beginning to transition to abstraction by inserting a number for a pronumeral.
Zone 5	Able to use multiplicative reasoning in simple situations. Can reason with more complex additive situations involving larger numbers and subtraction but usually by examples. Has moved from algebraic expressions to using equations. Can derive a strategy that maintains equivalence, but cannot yet generalise the situation. Able to use symbols to express rules. Can follow, compare and explain rules for linking successive terms in a sequence. Recognises and represents simple functional representations. Can justify an argument using mathematical text. Beginning to generalise using words or using some symbolic generalisations in simple situations, usually building on in context.
Zone 6	Can use and interpret basic algebraic conventions to represent situations involving a variable quantity. Beginning to explain using logical language and to use if … then reasoning. Uses symbolic language but the need for simplification is still being developed. Able to generalise arithmetic relationships with justification, including simple multiplicative relationships, but are often still context bound. Can show why several expressions are equivalent, typically employing numerical (non-symbolic) justifications.
Zone 7	Is able to use and interpret algebraic conventions for representing generality and relationships between variables. Beginning to use sound logical reasoning with appropriate reasoning language (e.g. if … then, must) evident. There is more co-ordination of multiplicative thinking and the associated language to notice algebraic structure. Can recognise and use the relationships between multiple entities and connections between and within different representations. Is able to establish and describe equivalence explaining relationships using the distributive property and the inverses of addition and multiplication. Can generalise quite complex situations and in more direct situations is beginning to use simplest form.
Zone 8	Is able to combine a facility with symbolic representation and an understanding of algebraic concepts to represent and explain mathematical situations. Explanations are sophisticated using logical thought and the language of reasoning. Can use multiple representations in a co-ordinated manner to solve, analyse, convince and conclude. Can visualise the form and structure of a function, at least graphically, from a real context. Is able to work in a context free environment using symbolic language and treat algebraic expressions (e.g. 3x + 2) as single entities. Can generalise more complex situations. Is able to establish and describe equivalence involving the four operations explaining relationships in symbolic terms. Can use abstract symbols to solve problems in context with multiple steps.

The LPAR was used to create the Teaching Advice for algebraic reasoning by the research team considering the question "If students located in this Zone are doing …, what is needed to help move them to the next Zone?" (Siemon, et al., 2018, p. 42). An example of the Teaching Advice for Zone 4 is displayed in Table 2. Suitable tasks from well-respected sources were included, in italics, to help teachers to identify suitable classroom activities. As it was recognised, that in any classroom, students would be operating across a range of zones, whenever possible tasks that could be used across multiple zones were included to assist teachers to work with the diversity in their classes. For example, Garden Beds from Maths300 (AAMT, 2017) mentioned in the Zone 4 Teaching Advice, is suitable for use with students who are operating at Zones 3 – 7.

Table 2. *An Example of Teaching Advice for Zone 4*

ZONE 4 Description	Teaching Implications
Beginning to work multiplicatively and simultaneously co-ordinate variables, although still uses specific examples to convince. Able to reason and generalise in simple situations. Can recognise and interpret relevance of range from table and/or graphs and to recognise functional relationships. When faced with more complex algebraic situations are unable to use the full range of explanation or handle all of the information simultaneously. Beginning to transition to abstraction by inserting a number for a pronumeral. **Pattern and Function** Can recognise more complex additive relationships and apply them, but may not be able to support with reasoning or necessarily identify the inherent multiplicative relationship. Can apply multiplicative thinking in input/output situations (e.g. ABBEQ 1.2) Beginning to work with ratios. Can recognise and interpret relevance of range from table and/or graphs (e.g. AHAB2.1). Able to recognise that variables (what changes) and constants (what stays the same) need to be treated differently. Beginning to recognise functional relationships (e.g. ALEM2.1). **Equivalence** Can recognise the impact of operations (eg. subtraction and addition relationships behave differently.) (e.g. ARELS4.1). May attempt to 'solve' symbolic algebraic expressions by giving the variable a numerical value. **Generalisation** Able to work intelligently with composite units (what changes and what stays the same). Provides 'Proof' by examples. Beginning to transition to abstraction by inserting a number for a pronumeral.	**Consolidate and Establish (from Zone 3)** Recognise and work with more complex patterns including squares and other multiplicative ideas, and fractions. Move between different forms of function and in real contexts and informally identify the meaning of the range and domain Identify what varies and what is constant in relation/function situations. Identify similarities and differences in relational thinking situations when using different operations and use missing numbers on both sides to generate generalisations. *(Maths300: Arithmagons; nRich: Super Shapes)* Move from specific examples to generalisations and generalisations to specific examples Justify arguments and generalisation by using specific examples. Discuss how many examples you need before you are "sure". *(nRich: Magic Vs 6274)* Explore both complex additive and multiplicative relationships using tables, symbols, graphs and words and discuss the connections between them Use appropriate representations of discrete and continuous situations informally within a context. Does it make sense to join the dots? In what other contexts would it make sense? *(Maths300: Garden Beds)* Work with domain and range informally within a context. Does it make sense to extrapolate? Is it appropriate to interpolate? Identify variables (what changes), recognise that a letter can stand for multiple numbers. Identify strategies for solving proportional reasoning problems involving ratios and rates. Recognise equivalent expressions by substituting numbers > generalisation. *(Maths 300: Garden Beds)* Work with 'proof' firstly by single example > proof by multiple examples > Proof in general sense. Record and describe situations in multiple ways (multiple representations). **Introduce and Develop** Move to a different representation with simple functional representations such as input/output tables, graphs or symbols, particularly relating to continuous graphical situations. Identify non- integer points as well as interpolating and extrapolating values. Use simple real relationships to explore the shape of graphs – e.g. distance time relating to going for an actual walk. Relate the structure of a situation to the function generated *(Maths300: Unseen Triangles)* Explore different strategies for maintaining equivalence Use relational thinking ideas with subtraction and large numbers as well as with missing numbers on both sides to enable generalisation Explain and justify using both words and mathematical text In solving worded problems focus on the relationships between the quantities in the problem Investigate relationships containing number using concrete materials to see how patterns are structured. *(e.g. Max's matchstick problems, Mountain Range Challenge, Garden Beds)* Move from just recognising patterns to identifying relationships. *(Maths300: Heads and Legs)* Notice structure to form generalisations Work with Function Machines both forwards and backwards to identify inverse operations. *(Maths300: What's My Rule)* Unpack equations with attention to their structure. Notice structure in relational thinking situations. Use thinking strings to see different structures. Identify variables and constants by recognising what changes and what stays the same Use multiple embodiments to help move away from context. Explain and justify using mathematical text and diagrams in a variety of contexts.

Although the focus of the research was to develop an evidence-based LPAR, there were some incidental results that were interesting. The following results are between the third round of assessments (MR3) and the fourth round of assessments (MR4) after only approximately eight weeks of targeted teaching in algebraic reasoning had taken place. Table 3 shows the summary statistics for MR3 and MR4.

Table 3. *School level data for MR3 and MR4*

Group Statistics

	SEX	N	Mean	Std. Deviation	Std. Error Mean
ANCALGabMR3	M	696	-.4501	1.06505	.04037
	F	766	-.2318	.94443	.03412
ANCALGabMR4	M	178	-.0780	.88179	.06609
	F	241	.1023	.81442	.05246

MR3 t = -4.15, df = 1480, p = .000**
MR4 t = -2.18, df = 417, p = .031**

There was a significant difference in both MR3 and MR4 Algebraic Reasoning in favour of females. These analyses are based on school level data. The year level of the students also made a difference (see Figure 5). There were significant differences overall but at MR3 these could be attributed to differences between Year7 and Year 10, and between Year 8 and Year 9 and Year 10. In MR4 the differences were significant between Year 7 and all other Year Levels. There were no other significant differences.

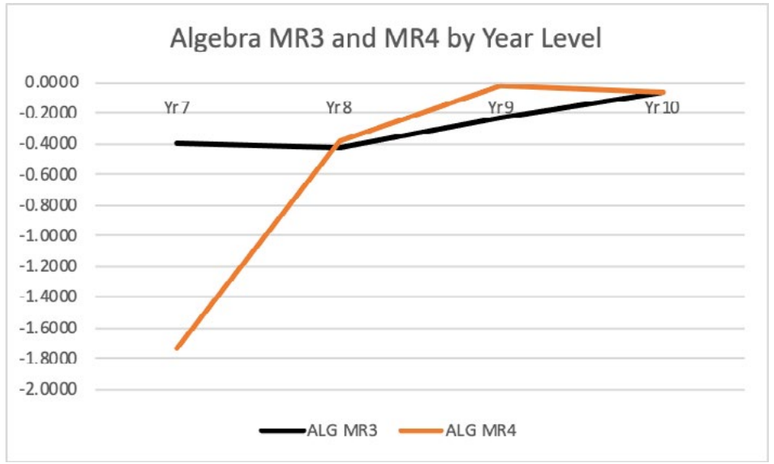


Figure 5. *Algebraic reasoning MR3 and MR4 by year level*

These results suggest that involvement in the intervention, even though it was for a very short time, improved students' performance in algebraic reasoning in Years 8 and 9, which are important years for algebraic development (and when we often see a decline in algebraic reasoning). Significant differences between Year 7 and Year 10 data were expected, as the level of algebraic knowledge should be significantly increased.

A sample of 279 students could be matched from MR3 to MR4. Although there was no statistically significant difference in the mean performance (df = 278, t = 0.929, p = .35), the overall trend was positive, as can be seen in Figure 6.

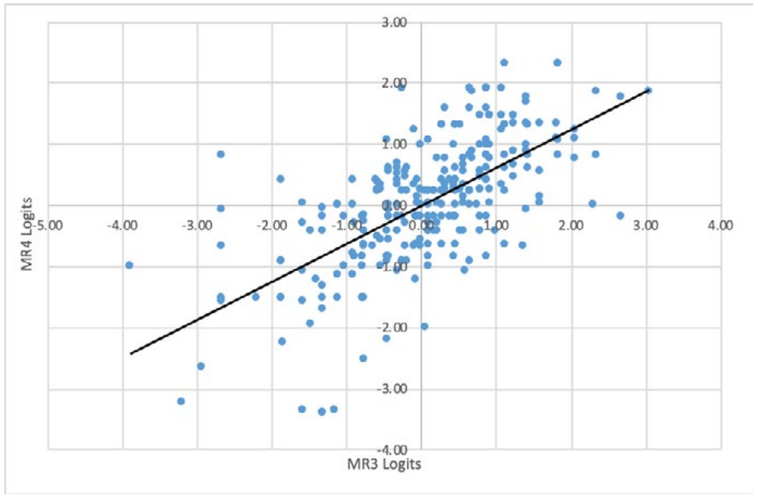


Figure 6. *Individual differences MR3 to MR4*

Discussion

In order to directly inform the work of teachers in schools, the RMFII Project overtly involved teachers throughout the research process to design valuable, evidence-based resources that could be interpreted by teachers at scale (Cobb, Jackson, Henrick, Smith, & the MIST Team, 2018). The focus on algebraic reasoning was seen as being very important, as traditional approaches to algebra that focused on simple, routine exercises, had not been improving student outcomes (Kaput, 2008; Norton & Irvin, 2007) or encouraging students to pursue further mathematical study. Over the last few decades, there has been a steady decline in senior secondary students' enrolments in high level mathematics courses (Barrington & Evans, 2014; Hine, 2018). It was felt that a change in practice to include deeper understanding of the big ideas of algebraic reasoning and the connections between them was overdue (Sullivan, 2011). The big ideas in algebraic reasoning identified were Patten and Function, Equivalence, and Generalisation.

The commitment to work with teachers had to be pragmatic as well as theoretical which was why design-based research methods were seen to be the most appropriate (Barab & Squire, 2004; Design-Based Research collective, 2003). Design-based studies are conducted in natural settings to better understand the "messiness of real-world practice" (Barab & Squire, 2004, p. 3). The research team worked with the project schools to assist them to choose assessment tasks and teaching activities relevant to what they were teaching at the time. Tailoring the research to the individual programs in the schools, meant that the teachers were more likely to provide feedback and make suggestions about how the tasks and activities could be improved. The feedback from teachers was particularly useful in refining the scoring rubrics to clarify meaning and promoting discussion among teachers. These rich discussions during the professional learning sessions assisted teachers to deepen their own knowledge of the algebra and the connections with other aspects of mathematics.

The Proficiency Strands are a key aspect of the Australian Curriculum: Mathematics and each proficiency is illustrated through the content descriptors at each year level of the curriculum. For example, at Year 9 reasoning includes "following mathematical arguments, evaluating media reports and using statistical knowledge to clarify situations, developing strategies in investigating similarity and sketching linear graphs" (ACARA, n.d.). Except for a general statement about reasoning, there is little advice provided to teachers to suggest what might be involved in developing mathematical reasoning or the kinds of difficulties students might have in deducing, justifying and explaining their thinking. It

was evident in the RMFII Project that many students have had limited experience in explaining their reasoning processes. For these reasons, it was sensible to work alongside teachers to construct an evidence-based resource that draws out information about student learning with respect to important mathematical ideas and processes, in this case algebraic reasoning, and provides research informed teaching advice about how to use that information in the classroom.

There were many practical implications that came out of this research. Although the evidence-based LPAR originally focused on Years 7-10 (12-15 year olds), the assessment trials in non-project schools demonstrated that the LPAR is relevant for Years 5 and 6 as well. One of the most practical aspects of the LPAR is that it identifies big ideas that underpin the content descriptors in the ACM. It should be noted that not all content descriptors in the ACM are equal and having a feel for the big ideas and the connections between them helps teachers to prioritise and make well considered choices. Another practical aspect of the LPAR is that it provides teachers with a stronger indication about where students are in their learning journey and where they need to go next in relation to the big ideas of algebraic reasoning. By showing how algebraic reasoning develops over time, the LPAR effectively provides a navigational tool for the curriculum that supports a deeper, more connected approach to teaching algebra in Years 5-10.

Another practical implication which emerged from the research process was the development of the validated assessment forms. There were 20 algebraic reasoning tasks developed, trialled and validated to construct the LPAR. Generally, the tasks comprised more than one item and scoring rubrics were designed for each item to reflect the definition of algebraic reasoning used in the project. The tasks were designed to be low entry tasks (tasks for which the mathematics is as undemanding as possible to allow all students the possibility of at least starting the problem) so that all students had the opportunity to exhibit their reasoning. Assessment forms included five to seven tasks per form. Four assessment forms with their accompanying scoring rubrics were developed. Maximum score totals are different for each form to prevent the inappropriate use of raw scores. In order to place students on the LPAR, a raw score translator is provided with each form, that provides a range of scores for each Zone. The forms can be used as pre-tests to establish where students are in their learning with respect to the LPAR and the information gained from this can inform teachers' planning for learning experiences. A parallel form can then be used as a post-test to see if there has been a shift in student performance and to provide feedback to the teacher on the efficacy of the planning and teaching.

The evidence that underpins the LPAR was used to develop interpretations of what students are able to do (and what they may find difficult) at each zone of the LPAR. This supported the development of targeted teaching advice for each zone. The Targeted Teaching Advice explains what content and reasoning should be consolidated and established as well as what key ideas and strategies should be introduced and developed to assist students to progress to the next zone. To make the Targeted teaching advice more classroom friendly, a range of rich, investigative or problem solving tasks that can be used with mixed ability groups to address features from more than one zone were collected or produced. Many of these multi-zone activities were drawn from existing, well-known resources such as maths300, reSolve or nrich. For example, Mountain Range Challenge (adapted from Unseen Triangles, lesson 20 maths300) uses the context of a mountain range to explore a visual growing pattern based on equilateral triangles. It is referred to in the teaching advice for Zones 3, 4, 5 and 6 of the LPAR.

In order to sustain an evidence-based approach to teaching and learning it is of critical importance that professional learning is provided (Wiliam, 2011). During the RMFII project three annual residential conferences were held and there were regular online professional learning sessions offered. As well as these provisions, members of the research team offered professional learning for individual schools involved in the project. In partnership with the Australian Association of Mathematics Teachers (AAMT) members of the research team developed a series of online professional learning modules to support school-based teacher learning communities to understand, explore and use the RMFII materials. In this way it is hoped that teachers will be better prepared to make informed decisions about how they may teach algebraic reasoning to engage their students in meaningful learning of algebra.

Conclusion

The Proficiency Strands are a key focus of the Australian Curriculum: Mathematics. However, international assessments of mathematical literacy suggest that two of these strands, mathematical reasoning and problem solving are areas of difficulty for Australian students. The aim of the evidence-based Learning Progression for Algebraic Reasoning, developed as part of the Reframing Mathematical Futures II Project, is to provide practical, teacher-friendly resources to inform a deeper, more connected approach to teaching algebra. All of the resources including the assessment forms, the LPAR, targeted teaching advice and professional learning modules will be freely available through the Australian Association of Mathematics Teachers.

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Leveraging digital technologies for (re)engaging gifted students in the middle years

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Abstract

Recent research has identified that gifted middle years students are becoming increasingly disengaged in Australian classrooms, and as a result their potential is being lost. Evidence suggests that there are substantial patterns of underachievement among gifted middle years students which can lead to disengagement from school. Middle school is a pivotal time to for the onset of underachievement in gifted students. Online digital technologies offer promising opportunities to address this underachievement and disengagement to support personalised learning which enhances gifted learners' schooling experiences and outcomes. Neihart and Betts' (2010) six *Profiles of the Gifted and Talented*, provide one way of viewing some of the unique characteristics and ways of learning for this heterogenous population. This article uses these six profiles and strategically maps them to digital technologies, which can be used to (re)engage gifted students in the classroom; potentially addressing underachievement for middle years gifted learners. The article concludes by providing some key connections between gifted student profiles and digital technologies which can be used to empower teachers in their classroom practice to effectively support and (re)engage gifted middle years learners.

Keywords: Gifted students, student engagement, digital technology, underachievement, middle years, student disengagement

Introduction

Digital technologies and online learning opportunities have been associated with an increase in learner engagement (Bergdahl, Nouri, & Fors, 2020). Importantly, the positives of using digital technologies for gifted students has been recognised in the literature as addressing their unique learning needs, which are often overlooked in traditional classroom settings (Ali & Alrayes, 2019; Eriksson, 2012; Kontostavlou, & Drigas, 2019). Facilitating and enabling continued engagement for middle years students is an important role for educators due to the well-known transition issues (e.g., school disengagement), associated with middle years learners (Bond et al., 2020). It is well established that most students, regardless of their diverse learning needs, enjoy and are interested in using digital technologies to learn (Bergdahl et al., 2020). Opportunities for engaging gifted students lie with embedding digital technologies in everyday classroom learning for these learners.

Digital technologies (e.g., video materials, online chats, wikis) provide new opportunities for teaching practice in engaging gifted students, through provision of suitable resources, technologies and pedagogies (Abakumova, Bakaeva, Grishina & Dyakova, 2019). The present article aims to extend previous work in this field (Ali & Alrayes, 2019; Eriksson, 2012; Housand & Housand, 2012) with the goal of personalising learning. It will examine gifted learner characteristics in detail and map Neihart and Betts' *Revised Profiles of the Gifted* (2010) (profiling and describing general characteristics for a cross-section of gifted learners) to the three engagement dimensions (behavioural, emotional and cognitive). This is turn will help support teachers in their selection of digital technologies for (re)engaging middle years students who are gifted and/or talented and to meet their individual learning profile needs to address underachievement.

Gifted and talented students

While gifted students are heterogenous, they share some general characteristics, such as: curiosity, critical thinking, diverse interests and abilities, high-energy, large vocabularies, keen sense of humour, idealism, and a strong sense of social justice (Callahan, 2018; Housand & Housand, 2012). Other general characteristics are a preference for working alone, perfectionism, high levels of frustration, high expectations (of self and others), and a propensity for non-conformist behaviours (Davis, Rimm & Siegel, 2017). It is important to note that characteristics of gifted students are "malleable and variable" (Callahan, 2018, p. 153) over the course of a person's education (and life).

In Australia, giftedness is defined using Gagné's (2013) *Differentiated Model of Giftedness and Talent* (Merrotsy, 2017). Gagné defines *gifted* students as those who show outstanding potential in natural abilities in the top 10% of age-peers, related to any number of the following domains: *Intellectual* (e.g., verbal, fluid reasoning); *Creative* (e.g., originality); *Social* (e.g., leadership); *Perceptual* (e.g., hearing); *Muscular* (e.g., endurance); and, *Motor Control* (e.g., speed and agility). Conversely, Gagné (2013) describes *talent*, as *competencies*, or *achievement* in the top 10% of age peers in *Academics; Technical; Science and Technology; Arts; Social Service; Administration/ Sales; Business Operations; Games; and, Sports and Athletics*. For this article we are focusing on middle years gifted students because it is well recognised in the literature that the middle years of learning (Years 5-9), are a time of transition when students can disengage from learning (Pendergast, 2017). Furthermore, research focusing on middle years students has suggested convincing patterns of underachievement and disengagement from school, and this is also reflected among gifted middle years students (Ritchotte, Matthews & Flowers, 2014).

Middle school curriculum and associated learning activities need to be engaging and challenging, particularly for gifted students so they do not become bored, disengaged and consequently underachieve (Ritchotte, Matthews & Flowers, 2014). Equally, gifted students can be unexpectedly challenged by learning as they move into the middle years of schooling as the curriculum becomes more demanding, where underachievement can result from increased need for effort and persistence. Ritchotte et al. (2014) posit that primary schooling does not often provide opportunities for gifted students to develop crucial academic skills to persevere through learning obstructions. Without the requisite skills needed by the time they reach middle school, some gifted leaners develop poor self-efficacy resulting in disengagement and underachievement.

For abilities to be developed into talents several *catalysts* are involved in this developmental process. For example, the talent development process is highly regulated by *intrapersonal* and

environmental catalysts; these include individuals (e.g., peers and teachers), educational provisions (e.g., pedagogy), and elements such as personality traits, motivations, perseverance, effort, and resilience (Gagné, 2013). Student engagement at school and in their learning, are important aspects of this developmental process, which is impacted by both intrapersonal and environmental catalysts. These catalysts can either enable or impede the development of a student's giftedness into talent (Gagné, 2013).

Engagement and gifted students

Middle school is well-recognised a crucial time for the onset of gifted underachievement and resultant disengagement, which then persists for the length of a student's secondary schooling (Ritchotte et al., 2014). When exploring the concept of middle years' student (dis)engagement, it is useful to unpack the different dimensions involved. There are three interconnected dimensions: *behavioural* (e.g., participation in class); *emotional* (e.g., sense of belonging in school); and, *cognitive* (e.g., use of metacognitive strategies) (Gibbs & Poskitt, 2010). A summary of these engagement dimensions is outlined in Table 1. Commonly, schools tend to focus only on one small aspect of engagement, that is student *attendance* or *presence* (i.e., one element of behavioural engagement). While it is of course, important that students attend class to learn and engage across the dimensions, there is much more to student engagement than simply attendance.

Table 1. *The Three Engagement Dimensions* (adapted from Gibbs & Poskitt, 2010)

Dimension 1: Behavioural Engagement	Dimension 2: Social-Emotional Engagement	Dimension 3: Cognitive Engagement
• Participation in learning • Presence in the classroom • On task behaviour • Compliance with school rules • Effort and persistence • Contributes to class discussion • Persistence to complete tasks • Involvement in school activities	• Positive or negative responses to peers and teachers • Attitude to school and learning • Values learning • Interest and enjoyment in learning • Happiness at school • Identification with school • Sense of belonging at school	• Learning by choice • Investment in learning • Deep learning and mastery • Self-regulation • Setting goals • Uses metacognitive strategies • Favours challenge • Resilient • Sense of agency

The engagement dimensions are interrelated through increasing levels of investment and commitment to learning (Gibbs & Poskitt, 2010) (Figure 1).

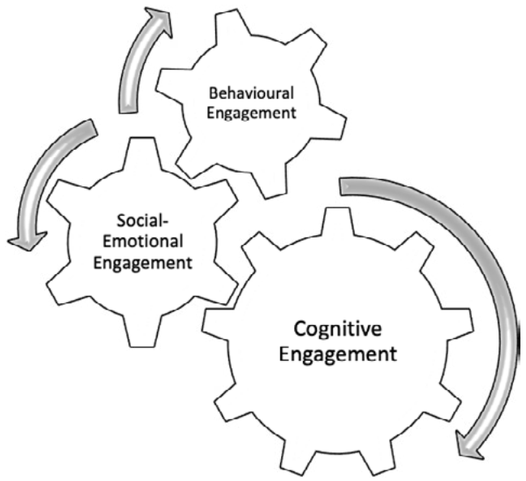

Figure 1. *The Three Interrelated Engagement Dimensions Showing Increased Level of Commitment to Learning* (adapted from Gibbs & Poskitt, 2010)

Profiles of Gifted, Talented, Creative Learners

The potential of digital technologies to motivate gifted students, (motivation is one element of emotional engagement) has been recognised in the literature (Housand & Housand, 2012). Furthermore, it has been suggested that the unique affordances of digital technologies can be linked to some general characteristics of gifted learners, such as preference for challenge and autonomy (elements of cognitive engagement) (Housand & Housand, 2012). However, there is a need to focus on extending this across all the engagement dimensions, which can be undertaken by leveraging digital technologies to more specifically support different gifted learner profiles.

According to Neihart and Betts (2017), there are six profiles that are useful in understanding the complexities of gifted students, which draw on extensive research and are known as the Profiles of Gifted, Talented, Creative Learners. These are generalised characteristic profiles as gifted learners are multifaceted individuals who may have some of these traits but may not fit in any one specific profile. The purpose of these profiles is not to define all gifted learners; it is to provide some common understanding of the sub-populations of gifted individuals. Nonetheless, these profiles can be useful in informing more personalised support for engaging gifted middle school students. The six profiles are illustrated in this section in relation to gifted learner characteristics, behaviours and the three engagement dimensions.

Type I: Successful gifted learners

The Successful middle years gifted learner has a sound academic self-concept, works consistently to reach the expected grade requirements, is extrinsically motivated, can be complacent, eager for approval, and fearful of failure. These learners can be (dis)engaged across the three dimensions in several ways (e.g., related to elements of all three dimensions, such as effort), and they can be particularly reliant on extrinsic motivation and teacher approval for engaging in learning. Yet, paradoxically they can be self-regulated and able to set and meet learning goals, providing an enigma for both themselves and their teachers. This reflects the sometime contradictory nature of gifted middle years learners. Table 2 outlines some engagement and disengagement features of this learner profile.

Table 2. *(Dis)engagement Features of the Successful Gifted Learner Profile* (adapted from Neihart & Betts, 2010)

Type	Examples of Behavioural (Dis)Engagement	Examples of Social-Emotional (Dis)Engagement	Examples of Cognitive (Dis)Engagement
Type I: Successful	• Seeks teacher approval • Extrinsically motivated • Follower of others • Stays in comfort zone • Chooses safe activities	• Reduced self-awareness • Self-critical • Eager for external approval • Liked by peers and teachers • Non-assertive	• Self-regulated • Good at goal setting • Avoids academic risks • Gains good grades but underachieves • Limited independent skills

Type II: Creative gifted learner

Creative gifted middle school learners are highly imaginative and have fluctuating self-esteem. They easily become bored, have a high tolerance for ambiguity, are unsure of social roles, and can be impatient. Gifted learners with the Creative profile can be (dis)engaged across all the three interrelated engagement dimensions. Behavioural engagement can be particularly evident through discipline issues relating to impulsivity and limitations around development of interpersonal skills. However, they can be persistent in areas of passion and personal interest, particularly evident through their creative pursuits. Table 3 lists examples of some of the elements of (dis)engagement for students with the Creative gifted profile.

Table 3. *(Dis)engagement Features of the Creative Gifted Learner Profile* (adapted from Neihart & Betts, 2010)

Type	Examples of Behavioural (Dis)Engagement	Examples of Social-Emotional (Dis)Engagement	Examples of Cognitive (Dis)Engagement
Type II: Creative	• Challenges teachers • Questions rules • Honest and direct • Discipline issues • Impatient (can mask giftedness)	• Fluctuating self-esteem • Psychologically vulnerable • Impulsive but easily bored • Honest and direct • The 'class clown' • Limited interpersonal skills	• Persistent in areas of interest • Not seen as gifted (limited academic achievement) • Underestimated (by others) • Creative • Highly tolerant of ambiguity

Type III: Undercover

Undercover gifted middle school learners seek social belonging, often have a diminished sense of self, are ambivalent about their achievement, and are susceptible to the "forced choice" dilemma. Note: we have renamed Neihart & Betts Type II, from *Underground* to *Undercover* due to deficit overtones of the former name. The forced choice dilemma is a belief held about achieving at school as being a betrayal of their social group, so these gifted learners strive to fit in by denying and playing down their abilities (Jung, McCormick & Gross, 2012).

Generally, gifted learners with this profile avoid challenges. A gifted student with the Undercover profile can be (dis)engaged across all of the three engagement dimensions, particularly in the emotional dimension, where evidence of their insecurities and guilt around the forced choice dilemma can impact of their cognitive engagement, and subsequently demonstration of their gifted abilities in the classroom. Because these learners can view academic achievements as a betrayal of their social group, this can lead to them feeling disconnected and lacking in a sense of belonging due to their desire for social belonging at school. Table 4 lists some examples of the respective (dis)engagement features across the dimensions of Undercover gifted students.

Table 4. *(Dis)engagement Features of the Undercover Gifted Learner Profile* (adapted from Neihart & Betts, 2010)

Type	Examples of Behavioural (Dis)Engagement	Examples of Social-Emotional (Dis)Engagement	Examples of Cognitive (Dis)Engagement
Type III: Undercover	• Uncertain direction • Seen as quiet/shy • Forced choice dilemma • Reduced effort • Limited participation in class and small group activities	• Insecure and unsure of emotional agency • Internalises conflicts • Anxious • Guilt as a result of forced choice dilemma • Desire for social belonging	• Ambivalent about achievement • Views some achievement as betrayal of social group • Rejects challenges • Disconnected from peers • Group work limited

Type IV: At-Risk

At-Risk gifted middle years students can have a poor academic self-concept, be resistive to rules and authority, are not motivated by extrinsic teacher rewards, can be defensive, and often have creative interests outside school. Gifted learners with the At-Risk profile are often seen for their behavioural (lack) of engagement, which is evidenced by intermittent attendance, disruptive behaviour in class and distractibility. However, when cognitively engaged in their areas of interest these students can show high levels of creativity. Table 5 lists some examples of the respective (dis)engagement features across the dimensions of the At-Risk profile.

Table 5. *(Dis)engagement Features of the At-Risk Gifted Learner Profile* (adapted from Neihart & Betts, 2010)

Type	Examples of Behavioural (Dis)Engagement	Examples of Social-Emotional (Dis)Engagement	Examples of Cognitive (Dis)Engagement
Type IV: At-Risk	• Causes disruptions and thrill-seeking • Intermittent attendance • Seen as rebellious • Physically present in class but not engaged • Respond defensively	• Defensive and critical of self and others • Distracted by outside interests • Withdrawn and not accepted by peers • Can be antisocial • Poor relationships in school	• Often creative • Not motivated for teacher-driven rewards • Low academic achievement • Inconsistent attitude to class work • Low performance

Type V: Twice-exceptional gifted learner

A *Twice-Exceptional* gifted middle school learner is a student with both giftedness and one or more disabilities (e.g., autism spectrum disorder, dyslexia) (author name withheld for blind peer review). Students with this profile enjoy novelty and complexity, are good problem solvers, yet, often have poor academic self-concept, learned helplessness, are recognised for their disability rather than giftedness, and are frequently underestimated for their gifted potential. They require educational adjustments to accommodate their disability, so they can demonstrate and develop their capabilities.

Gifted learners with this profile are generally perceived for what they cannot do, rather than for what they can do. The interrelatedness of the three engagement dimensions is particularly evident for these students. Once their disability accommodations are in place, these generally address areas of behavioural and emotional (dis)engagement, such as being disorganised, and learned helplessness. This leads to improved cognitive engagement and demonstration of their adept problem-solving abilities and application of transferrable knowledge which they can be very skilled at. Table 6 lists examples of some of the elements of (dis) engagement for students with the Twice-Exceptional gifted profile.

Table 6. *(Dis)engagement Features of the Twice-Exceptional Gifted Learner Profile* (adapted from Neihart & Betts, 2010)

Type	Examples of Behavioural (Dis)Engagement	Examples of Social-Emotional (Dis)Engagement	Examples of Cognitive (Dis)Engagement
Type V: Twice-Exceptional	• Off-task • Disorganised • May appear disruptive • Learned helplessness • May feel 'dumbed down' by inclusion in pull out programs	• Limited perseverance • Limited coping strategies • Reduced sense of belonging • May not be able to cope with gifted peer group • Increased risk of being bullied	• Do not view themselves as academically successful • Makes conceptual connections easily • Inconsistent attitude to work • Good problem solvers • Underestimated for potential

Type VI: Autonomous Learner

An *Autonomous* gifted middle years student is self-confident, intrinsically motivated, shows tolerance and respect for others, is successful across diverse environments, resilient, and displays self-regulation. Gifted learners with this profile may not view academic learning as their highest priority. At first glance, it may not be obvious where Autonomous gifted learner (dis) engagement may be addressed, however, learners with this profile often need more support rather than less (ACT Education

Directorate, 2014). Because learning and achievement tends to come naturally to these learners, they may underachieve and disengage from learning. In the primary years they can often cruise along, but as the work becomes more challenging in middle school, this disengagement can worsen as they may have missed foundational skills. Importantly, many middle years learners who underachieve have been deemed as academic achievers in their early primary years (Ritchotte et al., 2014).

Despite the Autonomous gifted learners' outward achievements, they may be at risk of disengagement particularly in the middle years, which is a common point of disengagement from school for many learners (Centre for Adolescent Health, Murdoch Children's Research Institute, 2018). Academic acceleration (in its many forms; e.g., subject acceleration), may be suitable for the Autonomous learner to keep them engaged and sufficiently challenged. Table 7 outlines some examples of (dis)engagement features of this learner profile.

Table 7. *(Dis)engagement Features of the Autonomous Gifted Learner Profile* (adapted from Neihart & Betts, 2010)

Type	Examples of Behavioural (Dis)Engagement	Examples of Social-Emotional (Dis)Engagement	Examples of Cognitive (Dis)Engagement
Type VI: Autonomous	• Optimistic • May not view academics as a priority • Learning new content comes easy to them • Successful in diverse environments • Intrinsically motivated	• Good at self-regulation • Follows areas of passion • Good social skills in the classroom • Shows tolerance and respect for others • Well-liked by peers and teachers	• Strongly self-directed • Seeks challenge • Willing to fail and learn from challenges • Can be prone to underachievement • Disengage due to knowing the content

Gifted students and digital technologies

Digital technology can be used to engage gifted students in the classroom (Ali & Alrayes, 2019; Eriksson, 2012; Kontostavlou, & Drigas, 2019). Over 90% of gifted students are using technology daily, both at home and at school (Ozcan & Bicen, 2016). They use the internet (e.g., via mobile phones, computers, tablets), for social communication, schoolwork, homework, and entertainment. Digital technologies are well-recognised for their potential in supporting gifted learners (Periathiruvadi & Rinn, 2012; Uzunboylu, Ozcinar, Kolotushkin, Kalugina & Zulfugarzade, 2019), and as such, these technologies can be implemented as suitable interventions to address the "chronic phenomenon" (Ritchotte et al., 2014, p. 183) of gifted middle school learner underachievement and disengagement.

> Here, we define digital technologies (or online) learning as:
>
> Any instructional practice that uses digital technology to connect teachers and students... [Digital learning] encompasses a wide range of digital tools and practices, including instructional content, interactions, data and assessment systems, learning platforms, online courses, adaptive software, personal learning enabling technologies, and student data management systems.
>
> (Evergreen Education Group, 2015, p. 5)

For gifted middle years students, technology can engage them by *enhancing* the quality of gifted education practices in schools; *enabling* gifted education to expand service capabilities; and, *transforming* gifted education by creating new possibilities and directions for provision (Chen, Yuan Dai, & Zhou, 2013). Gifted education comprises a unique circumstance for leveraging the learning and (re)engagement opportunities founded in digital technologies and transforming the teaching and learning components of gifted educational practices. For example, Chen et al. (2103), emphasises how using technology in gifted education, can "enable, enhance, and transform" (p. 167) the educational environment for gifted students because it can improve the quality of gifted education by creating new experiences, directions, and possibilities.

Learning with digital technologies is appealing for gifted middle school students for several reasons (Housand & Housand, 2012; Potts, 2019). For example, digital technologies provide autonomy where students can manage their own learning and online projects. This provides opportunities for increasing challenges such as taking on group leadership roles to accelerate their learning. Online opportunities also foster teamwork, social interaction and cooperation, while also enhancing the development of communication skills (Kontostavlou & Drigas, 2019). This in turn allows possibilities for innovation and creativity, where gifted students can find a wide range of learning resources online and gain external recognition and feedback from industry experts. Students can also explore their curiosities about the world, share their discoveries, and create authentic products beyond the boundaries and restrictions of the physical school walls (Ali & Alrayes, 2019; Eriksson, 2012). All these features can be leveraged to support underachievement and potentially address middle school gifted students' disengagement from learning, *before* it impacts negatively on their secondary education.

Although there is an abundance of existent research on the role of technologies in gifted education, little work has been undertaken to investigate how digital technologies can be leveraged to specifically engage, and re-engage, gifted middle years students *that target individual learner characteristics*, so students can realise their full potential (Bergdahl et al., Nouri & Fors, 2020; Ali & Alrayes, 2019; Kontostavlou & Drigas, 2019). In addition, it is well-known that gifted middle school students are becoming increasingly disengaged at school, and this is leading to "a loss of potential for both the individual and society as a whole" (Morawska & Sanders, 2009, p. 163). There is a gap in empirical knowledge about how gifted middle years students are engaging with digital technologies; and how this can be best leveraged for addressing underachievement and disengagement in the classroom (Uzunboylu et al., 2019; Periathiruvadi et al., 2012).

Mapping Neihart and Betts (2017) gifted profiles to engagement through digital technologies

The potential of digital technologies for supporting the engagement of gifted middle years learners depends upon the way they are leveraged through pedagogical decisions being made in classrooms (Housand & Housand, 2012). Neihart and Betts' (2010) gifted profiles illustrate the diversities of gifted students, and when connected with the three engagement dimensions, for each gifted profile, these can uncover different options for personalising learning when using digital technologies. Indeed, research has highlighted that gifted students prefer independent, self-paced learning with digital technologies because it offers online, advanced, and complex content that can be self-paced (Housand & Housand, 2012; Kontostavlou & Drigas, 2019; McVey, 2008). Such technology-enhanced learning provides multiple engagement opportunities relating to challenge (*cognitive engagement*), motivation (*behavioural, social-emotional, and cognitive engagement*), academic success (*through cognitive engagement*) and validation for gifted students.

Teachers can be further empowered to make informed pedagogical decisions when selecting digital learning technologies for gifted students to support their engagement in school (Little & Brian, 2011; Periathiruvadi et al., 2012). The following vignettes describe and apply important connections, along with relevant examples of digital technologies that have the potential to provide new affordances for (re)engaging gifted middle years learners with their specific learning profile characteristics. In turn, these technologies will support the social, emotional and cognitive development of gifted students, through what Gagné (2013) terms as the talent developmental process; where their gifted abilities can be systematically developed into talents.

Vignette for Type I Successful gifted learner profile

A *Successful* gifted middle years learner (Neihart & Betts, 2010), achieves academically in the classroom but works significantly below their ability. They tend to remain in their comfort zone and select safe activities to engage in that do not extend or challenge. These learners would benefit from acceleration programs in subjects and topics that interest them. One digital technology that could challenge a successful learner and stimulate their creativity and academic risk taking is the "Contraption Maker" (http://contraptionmaker.com/). This online resource provides

hands-on problems to solve and encourages independent learning and decision making whilst meeting curricula outcomes. For example, it can provide activities (e.g., creating wacky machines), about cause and effect systems through puzzles and brain teasers. Such stimulating digital experiences opens rich and complex conversations between students, their peers and teacher and would help extend and challenge the Successful gifted learner.

Vignette for Type II Creative gifted learner

A *Creative* gifted middle school learner is very interested in making and producing new things. If the Creative learner is not provided with creative opportunities and experiences, they can easily become bored. Their tolerance of ambiguity highlights their curiosity to explore their environment. Digital technologies such as "Explain Everything" (http://explaineverything.com/) can provide a multimodal space for the Creative learner to design animations, annotate, narrate, screen cast and upload a range of items of interest, which can complement what they are learning in class. Creating slides with colours, moving, scaling, copying, pasting and rotating digital objects are some of this tool's features that can engage the Creative learner's imagination. Explain Everything also provides opportunities for collaborating, sharing work and connecting with peers. Such experiences allow an individual to become confident to explore, create and represent their ideas in positive ways, which affirms their personal strengths and abilities necessary for middle years students who will be transitioning into secondary education.

Vignette for Type III Undercover gifted learner

An *Undercover* middle school gifted learner is keen to connect with peers to form friendships and gain a sense of belonging. Their avoidance of new challenges, which arise during collaborative projects with their peers can reduce their cognitive engagement and academic growth. Digital technologies such as Voki (http://www.voki.com/) can support the Undercover learner's self-confidence and provide opportunities to initiate their connection with peers. Voki is a digital tool that can be used to enhance engagement and understanding. It also provides a virtual platform for Undercover learners to reach out to others and share their achievements through the creation of different characters. For example, a student may select an historical figure that inspires them, or their favourite animal, and then use their own voice and script. Through avatars they can present their topics in unique and novel ways.

Vignette for Type IV At-Risk gifted learner

The *At-Risk* gifted middle school learner finds it difficult to stay on task in the classroom and their level of participation in group projects and activities is limited. Providing diverse ways to initiate, stimulate and maintain their interest in a safe and structured environment would support engagement across the three dimensions for these learners. Digital technologies like website development tools, such as Weebly (https://giftedtalentedusu.weebly.com/weebly.html) allow an At-Risk learner to hone in on a topic of individual interest and create an online platform that they can continue to build over time and share with peers. The sequential steps followed in website development can help a student navigate a set of short-term goals that are achievable, leading to enhanced cognitive engagement.

Vignette for Type V Twice-exceptional gifted learner

A *Twice-Exceptional* middle school learner is gifted and has one or more disabilities (e.g., dyslexia, autism spectrum disorder, visual impairment) (author name withheld for blind peer review). Activities that involve novelty and complexity are highly regarded by these learners and they are good problem solvers (according to Neihart & Betts, 2017 profiles). Their struggle with being organised in class also influences their cognitive engagement making it more difficult for them to keep track of their learning goals and compete tasks. A digital-project based tool such as XMind (http://www.xmind.net/) contains mind mapping activities that can help support behavioural engagement and cognitive engagement. This can be achieved through online learning activities such as brainstorming, notetaking, problem solving, and planning. Through its stimulating colours and images, XMind can help Twice-Exceptional learners better manage, organise documents and extend ideas, while encouraging them to record their creative ideas in a visually clear user-friendly format.

Vignette for Type VI Autonomous gifted learner

An *Autonomous* middle school learner may not view academic learning as a priority because it often comes easy to them. As such, they may not yet realise their true abilities as a learner which in turn may hinder the enhancement of their academic growth and cognitive engagement. They have the ability to mentor their peers if provided with purposeful and collaborative opportunities in the classroom. A digital technology that provides a platform for Autonomous learners to mentor others is *Flipgrid* (https://info.flipgrid.com/). This digital space allows mentors and mentees to connect virtually and share ideas online in synchronous and asynchronous ways. For example, an Autonomous learner can lead a virtual Flipgrid session by posing a question or problem (e.g., global issues), or facilitating a group discussion (e.g., book reviews, sports demo, mystery games). Such an online platform allows Autonomous learners to enhance their academic risk-taking skills and proactively share their knowledge and ideas with others in fun, meaningful, and interactive ways; leading to improved investment and commitment to learning (Gibbs & Poskitt, 2010) (cognitive engagement dimension).

Examples of digital technologies for (re) engaging gifted students

This article has explored how online digital technologies can be leveraged to engage and personalise learning to match specific gifted learner profiles (i.e., successful, creative, undercover, at-risk, twice exceptional, and autonomous). Such a personalised approach in the classroom has the potential to address how we may better use digital technologies in the classroom to reduce gifted learner underachievement. In contemporary education contexts there are also other innovative digital technologies, for example 3D printing (Chien; Hsiao; Chang; & Lin, 2018; Trust & Maloy, 2017), Virtual Reality and Augmented Reality (Nguyen, Jung, & Dang, 2019; Pilgrim & Pilgrim 2016; Siegle, 2019), which should be considered as these tools have the potential to foster student engagement across gifted learner profiles and allow interaction with content in new ways. A summary of examples of current online digital technologies that teachers can use to engage different gifted learner profiles are outlined in Table 8. This is not an exhaustive list, and links to these digital resources can be found by using an online search engine.

Table 8. *Examples of Online Digital Technology Resources Matched to Learner Profiles*

Profile Type	Online Digital Technology Resources
Type 1: Successful	• Google Meet (group collaboration) • Socratic Seminars and debating • NearPod (student engagement platform live lessons aligned to topics) • Canva.com (create flyers, posters, stories, book and album covers) • Lucid Press (online print and digital design program) • Contraption Maker (solve problems, puzzles and brain teasers while creating whacky machines) • InCell VR (virtual tutorial tour of a cell inside the body) • JigSpace app (augmented reality view of objects e.g., Mars base camp)
Type II: Creative	• Game platform (e.g., Minecraft) • YouTube for research • Creating, critiquing and sharing videos • Drawing, painting, designer and creating apps • Explain Everything (design, screen casting, interactive whiteboard tool for annotating, animating, collaborating and narrating) • Tinkercard (3D printing design tool) • Smithsonian Artefacts (3D printing models)
Type III: Undercover	• Online Break-out rooms for friendship and socialisation • Collaborative Discussion Platform • Joint student group creation of a business • Google Hangouts (make video calls, phone calls, message – groups, mentors) • Padlet, blank wall for sharing ideas, photos, videos • Voki (create talking characters e.g., historical figures, animals) • SamRohn 360 VR (virtual tours of factories, museums) • Thingiverse (3D printing digital designs for Physical Objects)
Type IV: At-Risk	• PearDeck (Student Engagement Platform) • Collaborative writing activities using (e.g., shared google doc platforms) • Google Slides and Google Meet • Appear In (video conferencing for collaborative small group activities e.g., mentoring) • Technology, entertainment and design themed podcasts • Weebly (interactive web development tool) • Google Streets (360-degree views of world sites take and share pictures)
Type V: Twice-exceptional	• Coding programs (e.g., Scratch) • Wonderopolis (ask 1,000 questions) • Google Scholar (e.g., for research and creating digital historical timelines) • My Study Life (organise classes, task, assignments and exams) • LibriVox (online digital library of free public domain audio books) • XMind (mind mapping tool e.g., relationships, summary, labels, comments and notes) • Sites in 3D Virtual Tours (3D views of cultural sites in Europe and Asia)
Type VI: Autonomous	• Khan Academy and individualised online topics • WorkBench (project-based learning platform for STEAM activities) • WolframAlpha (computational knowledge engine that answers questions in real-time) • TED talks and videos (Inspirational ideas and topics worth spreading) • SchoolTube (safe video sharing and management specifically for schools) • Flipgrid (Video recording platform interest topic talks) • Kids World Citizen (virtual tours around the world to explore other cultures) • Froggipedia app (augmented reality experience of frog life cycle)

A special note about online safety

When engaging in online learning it is important that middle school teachers and students are aware of the need for vigilance to ensure safe online practices. Teachers and schools have their own guidelines and policies for such practices and both students and teachers need to understand and implement these. There are several useful resources available for both students and teachers on the eSafety Commissioner (2020a) website. The eSafety Commissioner's (2020b) website also has a number of useful professional learning opportunities for supporting teachers and developing currency around safe online practices in their teaching.

Conclusion

Although there is a range of research on the use of digital technologies for supporting gifted students in the classroom, little work has been undertaken to investigate how, or which digital technologies can be leveraged for engaging gifted middle years learners with specific learner profile characteristics in order to personalise their learning. Engagement across the three dimensions (behavioural, social-emotional, and cognitive), is facilitated through a technology-rich curriculum, which is differentiated to meet student interests and diverse learning needs, and through pedagogies that are personalised, where the focus is on the individual gifted student. Concepts discussed in this article are key to connecting broad gifted learner profiles with potential digital technologies that can re(engage) individual middle years gifted students in the classroom. Such an approach has the capacity to provide teachers with a road map to strategically select and use digital technologies to provide stimulating ways to help gifted students realise their full potential. Harnessing such learning resources in new ways will pave the way for engaging and inspiring our middle school gifted students for the future.

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Toward meaningful engagement: Trauma-informed positive education strategies for struggling students

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Abstract

When seeking to increase school engagement with middle school students who struggle with behavioural and learning difficulties, a school's teachers must consider engagement factors both external and internal to the classroom. It is important to acknowledge the systemic and intergenerational reasons why some students and their families struggle to engage meaningfully with education. However, this article narrows focus on what teachers can do within the walls of their own classroom to increase engagement through two pathways: (1) designing curriculum and providing feedback to optimise flow conditions and (2) revisioning their own classroom as an effective therapeutic milieu wherein the classroom itself is positioned as the most viable and consistent place to support the unmet learning needs of students. Drawing on paradigms of both positive education and trauma-informed education, first, this article will introduce our adaptation of flow theory (Csikszentmihalyi, 2009) as a set of useful strategies for student engagement within curriculum design and delivery. Then, we will introduce trauma-informed strategies arising from our own research and practice to create the conditions for engagement in the service of effective student learning and everyday accomplishment.

The Need for New Perspectives on Student Engagement

Middle school years are a time of learning, growth and potential disruption for all students. From biological and neurological perspectives, middle school students experience a critical period of growth in their brain and physical development (Arain et al., 2013); they experience increasing threats to mental health (Soneson et al., 2020); and they find themselves at an important juncture when forging viable education pathways for themselves (Hill & Wang, 2015).

Researchers and practitioners have long sought to increase middle school engagement with learning. Skinner and Belmont (1993) suggest a classic definition of classroom engagement which includes both behavioural and emotional components wherein engaged students show sustained behavioural involvement in learning activities with positive emotional tone. Specific to vulnerable learners, relevant practice approaches have sought to increase middle student engagement including hands-on project-based enquiry learning (DeMink-Carthew & Olofson, 2020), increasing emotional bonds between student and teacher (Roorda et al, 2011), instilling intercultural understanding (Gimpel, 2015) and taking an interdisciplinary approach to middle years curriculum design (Harrison, Hurd, & Brinegar, 2020).

The opposite of engagement is disaffection wherein students are passive, show decreasing effort, and give up on tasks that they are capable of finishing (Skinner & Belmont, 1993). Disaffected students either realise that their inherent strengths are not applicable to learning or not worthy of leveraging for future educational goals (Brunzell & Abbott, 2015; Brunzell, Stokes, & Waters, 2016; Norrish, 2015). Learning requires each student to manage their moment-by-moment escalation and uncertainty; and we know that disaffected students within our own practice are quick to give up.

However, this is only what can be seen on the surface—as in, what we can visibly observe within the classroom. Below the surface, we know that students are often struggling to meet their own basic needs (Deering, 2013; Maslow, 1943/1971), learning tasks are not accessible to their current independent learning levels (Witter, 2013), they do not feel safe in the classroom to take healthy learning risks (Brunzell, Stokes, & Waters, 2016), and they struggle to manage their own escalated stress responses when encountering speedbumps or listening to feedback (Stokes et al., 2019).

There are many helpful ways to consider the contributing factors that impact successful engagement. We can parse engagement into external factors and internal factors both outside and inside the classroom. It is useful for teachers to consider that many external engagement factors occurring outside the classroom are beyond their daily control. For instance, teachers may have little impact over students' diet (Haidar et al., 2019), sleep habits (Fonseca & Genzel, 2020), and weekly home routines (Smith et al., 2019) all of which have been shown to positively impact a student's ability to learn.

Taking an even bigger perspective through systems-aware approaches (see for example Bronfenbrenner, 1979; Kern et al., 2019), we know there are many systemic factors that negatively impact students' ability to successfully engage with education. Students we are most concerned about struggle due to intergenerational poverty and adversity (Kershner & McQuillan, 2016); the compounding systemic and longstanding impacts of generational trauma and racism (Ladson-Billings, 1995); and ongoing negative effects of COVID-19 (Sonnemann & Goss, 2020).

While teachers must be aware of these systemic engagement factors, we argue that teachers be encouraged to understand (and collectively work towards addressing) these factors while simultaneously prioritising what they can control within their classroom to increase student engagement. We propose here specific strategies that teachers can do to build upon systems-informed responses.

Our praxis is guided by Hattie's (2012) findings that having high expectations for student engagement means creating classroom environments which help students set high expectations for themselves. Within a classroom environment based on engagement principles, students should have the opportunity to accurately assess their current capacities within a task, set their own goals, assess their own goals, then set new goals—thereby increasing expectations for their own future potentials.

Students in Flow for Maximum Engagement

For the last 20 years, a useful turn in the exploration of engagement and the conditions which facilitate states of engagement has been situated within the paradigm of positive psychology, the scientific pursuit to understand and enable the conditions of flourishing for individuals, communities, and societies (Seligman & Csikszentmihalyi, 2000) and the implementation of positive psychology interventions in the classroom known as positive education (Kern et al., 2015; Norrish, 2015; Norrish et al., 2013; Waters, 2011). Within these paradigms, Shernoff, Csikszentmihalyi, Schneider and Shernoff (2002) define engagement as sustained concentration, interest and enjoyment. When these conditions are met, the individual can settle deep into task absorption and sustained attention. In short, they want to keep going, keep practicing, tackle the next sentence or the next problem—and when they check the clock, it feels like time has disappeared.

We urge teachers to create the conditions of flow in their classrooms. Csikszentmihalyi (1990/2020) defines flow as the state of effortless action wherein the individual becomes so involved with the task or the activity that they lose track of time, nothing else seems to matter while they are doing the task, and the activity is justified for the sake of doing it. Flow theory is our blueprint to help teachers design their curriculum and practice for optimal classroom engagement (Brunzell, Norrish, et al., 2015). As flow is a mental state of focused attention and allows for deep task absorption, this occurs in a highly engaged classroom.

We have adapted Csikszentmihalyi's (1990/2020) findings of flow conditions as a checklist for teachers to facilitate student engagement when learning. What follows is an explanation of each step on our flow checklist (see Figure 1). Since most teachers educate groups of students together (as opposed to sustained one-to-one work), we offer the following strategies that can be planned for the group with the individual in mind.

Figure 1. *Adaptation of flow theory for classroom instruction*

Flow conditions:	*Not yet*	*Getting there*	*Definitely there*
Teacher ensures student's skill level matches the task at hand; task sits will within the student's zone of proximal development; the task is pitched high enough to challenge the student			
Teachers designs a task that has clear learning aims as goals; or the task allows student to set their own learning aims (goals) and meets them within the session; there are clear and fair success criteria that define the task			
Teacher gives student immediate, ongoing and meaningful feedback about their performance; feedback can also be self-given or from peers; feedback processes are inherent in the task			

Step One: Teacher diagnoses student skill level to design the task

The first step in developing student achievement under flow conditions is to design learning tasks within a student's zone of proximal development (ZPD). Vygotsky (1978, p. 89) defines the ZPD as "the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers". Engaged classrooms are ones wherein teachers are consistently designing learning opportunities for students with high success rates (Brophy & Good, 1986).

The opposite is sadly true: when the task is not within the student's ZPD, students give up because they cannot achieve success. Shernoff and colleagues (2003) conclude that when students found that their own skills met the task, their engagement increased. Working within a student's ZPD affords a teacher such opportunities to ensure that the task is pitched on the right level.

In our practice supporting schools, we observe more primary teachers regularly assessing their students' ZPD than middle school teachers. In primary school, teachers often spend more hours with fewer students and thus have frequent opportunities for summative assessments. Given less time per student, middle school teachers need to be more strategic with their planning to be sure to incorporate assessments prior to designing the learning task. Without an accurate assessment, teachers can become trapped in their own assumptions about what a young person can or cannot do. Particularly relevant for the students we support, teachers have incorrect expectations for students from underrepresented minority groups and/or lower socioeconomic status (Rubie-Davies, Hattie, & Hamilton, 2006). Such biased expectations lead to negative consequences for young people as they grow older (Walkey et al., 2013). Implementing ongoing diagnostics allow for teachers to eliminate the risk of negatively biased expectations because the results from the diagnostics set the student's task, not the teacher's assumptions.

For a practical example in English class, prior to launching a writing recount task, a teacher can first ask students to write a recount based on a recent excursion as a formative assessment. Then, comparing their recounts with curriculum standards, the teacher should determine what each student can already do and what they cannot do yet before designing the task. Equipped with the diagnostic results, the teacher can set the task. When tasks are designed to be open-ended and differentiated to the needs of each learner, the entire classroom of learners can succeed within their own levels to ensure flow conditions—and still remain as a classroom community working together to support one another. Such open-ended tasks allow for students to maximise their time on task (Brophy & Good, 1986) and allow development of surface and deep knowledge (Hattie, 2012).

Open-ended tasks allow for students at different abilities to be successful because these tasks are set within students' developmental continuums and allow for students to develop their stamina for learning while immersing themselves in deep thinking. To elaborate our practical example, the writing teacher, after analysing the data from the beginning of unit recount diagnostic, can then differentiate the learning task based on what students demonstrated they can do and what they need to learn next. This might mean that one student provides a two-paragraph recount about a topic within their schema (i.e., a recount of their previous weekend), whilst another student recounts an abstract concept (i.e., recounting a cultural belief or practice).

Step Two: Develop clear success criteria so that the task has well-defined learning aims

People are in flow where there are clear goals (Csikszentmihalyi; 1990/2020). When learning is clearly signposted for students, they will be more likely to engage with the challenge. Tasks that have learning aims as goals, accompanied with success criteria, help create the conditions for students to have focus for longer periods of time, have more motivation in their learning and take increased responsibility for their learning (Beesley et al., 2018). Learning aims should be taken from the standards; and success criteria show whether and how well students have met learning aims inherent in the standards. When teachers communicate clear success criteria (i.e., discussing and writing success criteria on the board every day) that show what the teacher is looking for in their students' work, students also develop the skill of managing themselves. This self-management is critical in enhancing stamina for learning and creating flow conditions (Witter, 2013).

Within an open-ended task given to the entire class, the task can be designed to vary from student to student, however the success criteria should be the same. For example, when a writing teacher is developing students' ability to write a recount, the daily success criteria should be aligned to the end-of-unit rubric detailing exactly what the recount should demonstrate to meet expectations (see Table 1 for an example).

Table 1. *Examples of learning aims and success criteria*

Today's Aim: **Write a captivating introductory sentence for your recount**	
Success Criteria 1:	The introductory sentence is interesting and memorable.
Success Criteria 2:	The introductory sentence's tone is appropriate to the audience.
Success Criteria 3:	The introductory sentence relates to the recount's main idea or purpose.
Success Criteria 4:	The introductory sentence does not feel out of place in the first paragraph.

The writing teacher can then explicitly teach success criteria for the aim, spending time comparing examples of criteria at its best and deconstructing how to improve examples below standard. Together, students then critically analyse the difference between the examples of each criteria prior to applying the learning to their own writing. The continuum of criteria has impact when students continuously refer back to it as they complete the task. We suggest that middle school teachers make daily routines of (1) publicly writing the learning aims and success criteria so students regularly check back during the task; (2) linking success criteria to 'good/better/exemplar' examples of what they can achieve; and (3) regularly prompting students to reflect back to the success criteria both individually and as a whole-class routine.

Step Three: Give students immediate feedback

Feedback to students focuses on helping them improve and maintains their engagement in the learning process. In our practice supporting vulnerable learners in middle schools, we find that teachers do not provide enough regular and ongoing feedback to ensure students are in flow. Feedback helps build the bridge between what a student can do now and what they are learning next (Hattie & Clarke, 2018). Teachers should use the success criteria as an anchor for what we are calling *fix-it feedback:* feedback that helps fill the gap between what is understood and what needs to be understood next.

We encourage teachers to specifically use the moniker *fix-it feedback* because it takes the heat out of formal assessment particularly for students who escalate when given what they perceive to be 'correction'. Feedback is most helpful when it alters the gap of knowledge (Sadler, 1989), and we aim to nurture the value that no work is 'perfect'. When giving feedback, consider student's willingness. Start with what the student did well, ensure that the feedback is aligned to the success criteria, and provide strategies to ensure the student feels they can apply your fix-it feedback with appropriate scaffolds.

We know that middle school teachers are often given the ambitious task of providing feedback to many students. However, we know that the students who struggle the most require regular and sometimes continuous feedback (in the short term) to maintain their engagement and settle into the flow of learning. Feedback does not have to come from the teacher alone. To optimise flow conditions, the daily rhythm of the class should regularly incorporate using and reflecting on the success criteria during independent practice.

If teachers use effective feedback based on clear success criteria, self-assessment and peer-assessment strategies can be an effective and efficient tool for boosting student engagement. Developing opportunities for self- and peer-assessment using the success criteria will support students' own self-monitoring of progress. We recommend the following three strategies to make fix-it feedback sustainable when teaching multiple middle school classes: (1) set up a routine to rotate specific groups of students' fix it feedback throughout the week; (2) develop routines for peer feedback; (3) incorporate more opportunities for self-assessment.

Practically, the writing teacher might focus on one criterion within the rubric when setting up feedback opportunities during the draft phase of the recount, such as effective introductory sentences (see Table 1). After drafting, students can then compare their work with an exemplar, self-assess, and then revise accordingly. At the lesson's conclusion, students can exchange their work with a peer for more fix-it feedback and revise again.

These feedback routines are not only sustainable for a teacher, who

can provide individual feedback to students who require immediate attention, but also affords more opportunities for students to connect with the success criteria with their peers. When teachers proactively set up the conditions for optimal flow through the curriculum development process of assessment, setting tasks within ZPDs, and providing ongoing feedback that is aligned to the task's success criteria, students will develop enhanced task focus and begin to set higher expectations for what they can accomplish each day.

The Next Step: Enhancing the Classroom Environment as an Engagement Strategy

To build on the curricular engagement strategies adapted from flow theory with vulnerable learners in mind, we next turn to strategies to create a healthy classroom environment for student engagement by designing their classroom as a trauma-informed *therapeutic milieu.* An imperative distinction to be made is that teachers are not therapists nor mental health clinicians and therefore, should never replace the important interpersonal work of our allied education professionals. However, Stokes and colleagues (2019) found when researching our practice that student engagement increased when teachers designed the environment of their classroom when employing trauma-informed therapeutic principles. Considering the classroom as a trauma-informed therapeutic milieu repositions the classroom as dual-purpose: (1) a place to instil the skills and strategies to become a life-long learner and (2) an environment which is itself an intervention to help someone meet their own needs in healthy ways.

We find Street's (2018) model for *contextual wellbeing* within schools quite useful to help in the articulation of a healthy classroom environment. We have used Street's model to organise our trauma-informed strategies so that teachers can identity and enact strategies to ensure their classroom is an environment of engagement for all students—with focus on their struggling students. The domains of contextual wellbeing include people, physical spaces, policy, practice and social norms.

Trauma-informed Engagement Practices for *People*

The people in the school are continuously in relationships—some that often help learning and unfortunately, some that can hinder learning. Trauma-informed practices focus on building relationships with students who have struggled to make and sustain relationships due to their own histories of disrupted attachments (Brunzell, Stokes, & Waters, 2016). Students who have experienced healthy relationships can often be swiftly co-regulated by a teacher or peer to have strategies to de-escalate themselves when experiencing stress when learning within the classroom.

For students who struggle in interpersonal relationships, attempts to be co-regulated by another can unfortunately have the opposite outcome. Students who interpret healthy relational interactions as threatening or dominating struggle to develop the social skills and collaborative mindset required for learning, and therefore teachers must be proactively ready to create relationally safe environments to support students when they feel like giving up, reject fix-it feedback, push the work away, and disengage from the classroom community.

For teachers to have relationships that are strong enough to invite students to activate a de-escalating self-regulation strategy, successfully complete diagnostic assessments, determine their own academic goals, and receive fix-it feedback, teachers have to have specific strategies to create and maintain a classroom culture of safety and respect for students with complex needs. We draw on the following concepts which can help teachers create and build upon relationships for learning:

Attachment. Attachment (Bowlby, 1971; Cornelius White, 2007) is a theory which helps us understand that healthy relationships are based upon co-regulatory principles. We regulate our own physical rhythms (i.e., heartrate, responses to stress, healthy coping) when we are in the presence of another regulated person (Kohler et al., 2002). For teachers new to this theory, it can be confronting if teachers feel they need to be the definitive voice of power and control within the classroom—and not understand it is inherent within their role to co-regulate others to maintain focus on healthy relationships and learning.

Through the lens of attachment theory, we can see when teachers raise exasperated voices (*"Sit down! I'm going to write your name on the board now!"*), they are creating a no-win situation for a student who has just been embarrassed in front of their peers. Teachers enacting dominator behaviours are not modelling healthy responses to stress nor healthy coping at times of disruption. We can model adulthood for our middle school students with attachment moves of our own (Klem & Connell, 2004). It starts by consciously not

embarrassing students in front of their friends, but rather, ensuring that any corrective feedback be given in a way that the student can truly hear and understand that you want the best for them.

Teachers enact attachment strategies to address resistant behaviour when they (1) take a deep breath before giving students fix-it feedback to ensure both parties are connecting—*not reacting*—to one another; (2) crouch down next to the student, side-by-side and shoulder-to-shoulder to avoid eye-contact or looking down at students; (3) give the fix-it feedback in a lowered tone of voice, so only the student can hear in order to preserve their self-concept in front of their peers; and (4) circle back to the student with enough time to allow them to shake off the moment and return to work (versus standing over them). We know that giving students fix-it feedback on their behaviour takes time and practice, particularly when teachers consider new ways to provide feedback that do not fall back into negative habits of dominator behaviours.

Unconditional positive regard. Within therapeutically supportive relationships, unconditional positive regard is a useful way to understand how to maintain focus on the health and wellbeing of the person—while simultaneously intervening to address their dysregulated or unhelpful behaviours (Rogers, 1961). If teachers unconsciously see their vulnerable students as problems that need to be fixed, it will be quite difficult to accurately assess the causes of negative behaviour and proactively create the environmental context for the student to achieve into their potential. A perspective of unconditional positive regard shifts teacher thinking from *"Here we go again…He's always disengaged right after the independent work begins…"* to *"There must be a pattern here, and I just don't see the causes yet. I need a second set of eyes to help me determine a better strategy to keep him engaged."*

Teachers can aim to create the environmental context for healthy relationships by seeing it as their role to consistently model attachment and unconditional positive regard. This is not an easy task and requires our reserves of patience for students with patterns of educational disruption. However, we know that students will not engage in learning or request fix-it feedback from their teachers unless they feel safe, supported, and believe their teacher is on their side to help them manage the everyday speedbumps that arise when learning.

Trauma-informed Engagement Practices for *Physical Spaces*

We consider the physical spaces containing the classroom environment as both the seen (i.e., the walls, furniture and lighting) and the experienced (i.e., classroom routines, transition strategies from one class to another, and responses to off-task behaviours) all of which occur within the physical space of the classroom. The spaces, and inherent routines within those spaces that we inhabit, can either increase engagement or create barriers—which can quickly become unhelpful excuses for why students cannot learn.

Calming classroom spaces. We know that students who struggle have not yet felt that the classroom belongs to them. Particularly for middle school, most classrooms do not 'belong' to just one class or one teacher. Middle school teachers are often required to put forth extra effort to share learning spaces and thus, it can be difficult to tailor learning spaces for cohort- or subject-specific student needs. We recommend that teachers who share spaces work together each term to address aspects such as the lighting (i.e., do you have harsh overhead fluorescent lighting that could be mitigated by utilising natural sunlight and a combination of floor lamps, desk lamps or other options?), furniture (i.e., can you bring in a variety of seating options such as small table groups, stools, beanbags, furniture that allows students to move in place—all of which students can choose what works for them?), and areas of the classroom to call their own (i.e., can you create corners of the classroom for students to elect to work by themselves and request this option because the corners are decorated with inviting plants, posters, or work station materials?; Witter, 2013).

Students need to *move.* The research is now clear: students need to move to stay engaged with the task (Mahar, et al., 2006). To increase cognitive functioning and sustained focus for learning, a student's body cannot remain static for the entire lesson sitting and listening to information. Consider that in primary school, students are more likely to be involved in regular physical movement activities through class singing, kinaesthetic learning, and multiple physical transitions between rug-time, deskwork and learning stations; in middle school students are often being trained for senior secondary classrooms where all too often, lectures and note taking are the norm. Middle school teachers have the opportunity to teach healthy routines and to teach

students that moving when learning increases engagement levels and competence (Hruska & Clancy, 2008).

We like calling movement breaks throughout the lesson brain breaks. *Brain breaks* are short lesson interruptions that give our brains the opportunity to pause in learning and give other parts of our body opportunity to move and be active. These can be formal (*"Everyone, we are now going to take 3 deep breaths together and then play silent ball for four minutes"*) or informal (*"If you want to pause your writing, and squeeze the fidget tool while you brainstorm the next sentence, go for it!"*). There are many resources that can be found by searching for brain breaks (see for example IPEGGS & BSEM, 2019). Brain breaks make it possible for students to increase their stamina for on-task learning one minute at a time. We urge teachers to teach a number of brain breaks throughout the year so students can eventually have an entire repertoire to choose from to self-regulate themselves; and eventually have an entire tool kit of self-regulatory strategies of their own by the time they reach their senior secondary years.

Trauma-informed Engagement Practices for *Policy* and *Social Norms*

While it is beyond the scope of this article to adequately address policy and social norms leading to healthy contexts for engagement, we want to introduce topics for future exploration that currently guide our own research and practice. When seeking to increase engagement with struggling students, we know that the policies and social norms must support what individual teachers are doing in their classroom to help students meet their own needs in healthy ways.

The research evaluating our work has shown that engagement increases with struggling students when there is a school-wide shift in social norms valuing trauma-informed practices (Stokes et al., 2019). These newly emerging social norms include proactive help seeking so vulnerable students can identity support before they rupture the learning environment (Was & Warneken, 2017); using 'ready to learn plans' as individualised, student-created plans for personal de-escalation and self-regulation (Brunzell, Norrish, et al., 2015); teaching towards growth mindset school culture and valuing learning from mistakes (Dweck, 2007); and instilling the social norm of fix-it feedback, wherein everyone is a lifelong learner that can be helped along the way through regular feedback (Witter, 2013).

Taking the widest view within our communities, we support families that struggle by working towards education equity including fair access to allied education supports, forging strong parent and carer ties to the school, and placing school at the centre of community as an emancipatory step towards self-determination. Our teachers must have continuous opportunities to learn new strategies to address and incorporate: cultural safety and culturally responsive pedagogies (see for example www.8ways.online and also Gay, 2002; Ladson-Billings, 1995); trauma-informed practice throughout their professional journeys (Howard, 2018); strategies to address the impacts of poverty within communities (Doidge et al., 2017); and ground their behavioural intervention upon restorative practices (McCluskey et al., 2008).

Conclusion

When engaging students, particularly students who struggle to engage due to complex factors such as experiencing adverse childhood experiences, intergenerational education inequity, systemic racism and system barriers to family supports, we all have a role to play across educational and allied education systems. It can start within the walls of each classroom by ensuring that every teacher understands the psychological state of flow and total emersion in the task. Then, by understanding that the classroom environment can itself be an intervention towards engagement, trauma-informed principles can increase engagement by providing the environmental context that holds the classroom community together.

We see the future directions of our work as a continued journey of integration between wellbeing-informed and trauma-informed practices, between the system of the classroom itself and the greater systems in which the classroom is embedded, and between the dual purposes of this work of healing and growth through learning. We urge teachers to find the access point that resonates with their own practice and then to share these stories broadly for us all to learn together.

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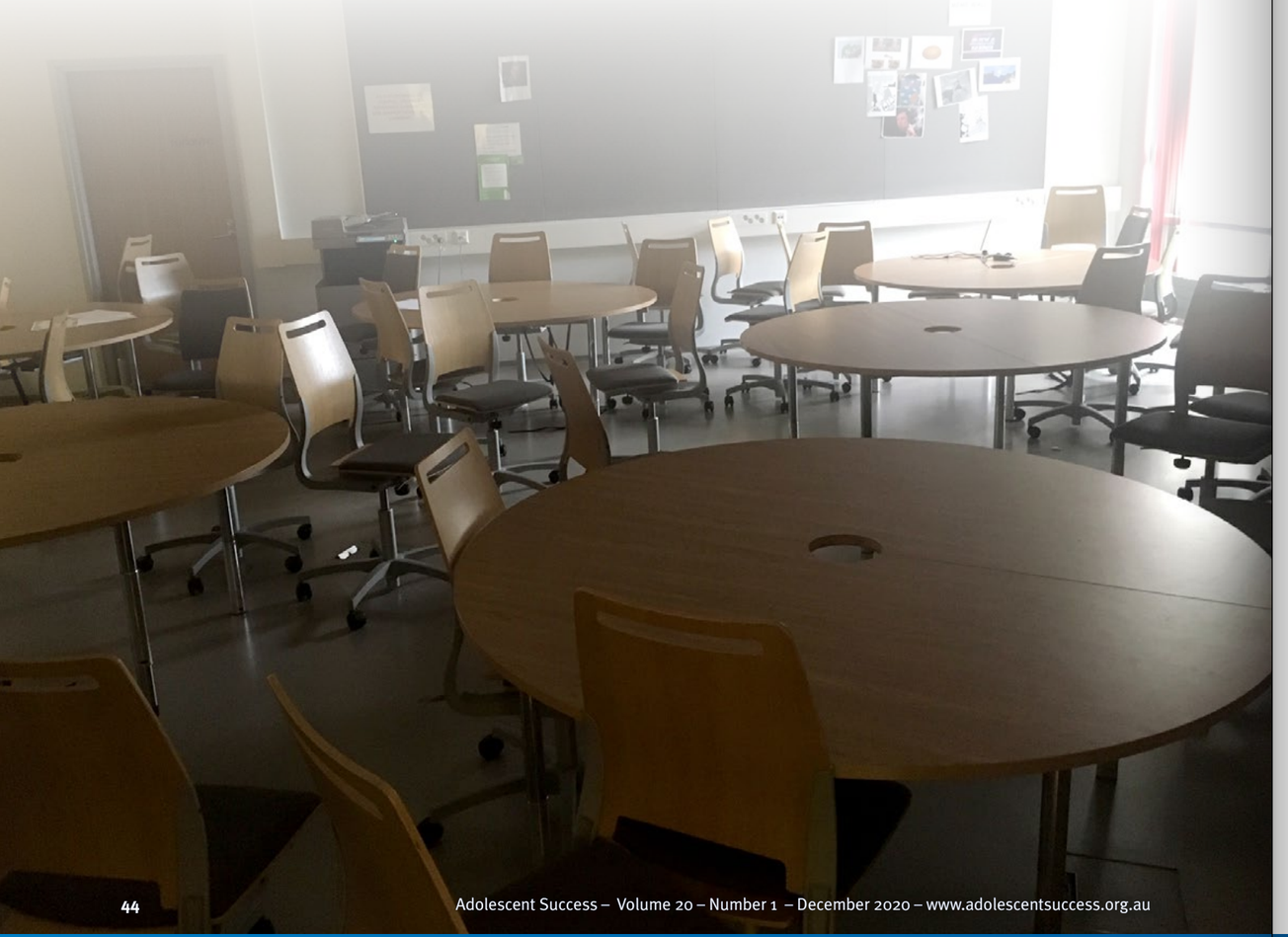

Remote Learning ...by design

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Early in Term 1, while students were attending their last big event, House Athletics, Debbie Dunwoody, principal of Camberwell Girls Grammar School was following her intuition and beginning the detailed process of preparing the community for learning beyond the physical spaces of the school. This enabled the school to be well prepared for the eventuality of remote learning and reimagining school.

As every school leadership team is aware, there are many facets to running a school and each had to be considered both individually and in connection with others in preparation for what could have been a long initial lockdown based on the experiences of other countries. Three clear messages were communicated with the staff on their final day of onsite school in Term 1:

- The school values and cares for its community
- Teachers have choices in how they plan and implement learning for their students
- Teachers have permission to share widely the tools and resources that will help educators beyond our school.

We have approached remote learning in the same way we approach the design and implementation of learning experiences and wellbeing more broadly — with a design thinking mindset. The five key design thinking stages reflect the purposeful nature of what we do within the context of our school. We have looked within our school to tap into our collective expertise and looked beyond to harness the wisdom and experiences of the wider community.

Camberwell Girls has been at the forefront of contributing to the wider education community, assisting schools with shorter timeframes for moving to remote learning with sample communications, daily and weekly structures, infographics highlighting key messages, and departments freely sharing lesson and unit plans. Clear, consistent communication has been a feature of our COVID-19 experience, with regular sharing of information and guidelines, ranging from remote learning principles, guidelines for videoconferencing and updates on government recommendations to examples of student learning and family engagement. Regular opportunities for feedback from staff, students and parents have been provided and most importantly, the ways in which the school has responded to this feedback have been shared with the community.

Our staff have been quick to rise to the challenge of finding solutions to issues, such as how to run online assessments while maintaining their integrity, keeping track of students at risk of disengagement, or enabling year levels and house groups to stay connected. We connected with our parents through Zoom learning conferences to provide feedback to parents about their child's learning and provided parent webinars to walk them through the new Junior School learning hub, set up in response to the remote learning needs of our younger students. We trained class representatives to organise and host Zoom meetings to keep parents connected. As a team we have become more skilled at considering different viewpoints and framing questions to gain maximum insight and ultimately empathy, important aspects of Stanford d.school's Design Thinking process (2017).

The differences between face-to-face and remote learning are significant enough that unique approaches are required for effective teaching online. Careful planning and sustained support enabled our teaching and learning programmes to continue during remote learning. For some programmes, this required considerable rethinking such as the Year 9 AI (Artificial Intelligence) for Good conference, which transformed itself into AI (in the sky) for Good, leveraging opportunities to engage with panellists via Zoom and using online collaboration and communication tools.

This need to be flexible also extended into our Career Story Year 10 VCE (Victorian Certificate of Education) Preparation Days which were intentionally designed to be a blend of onsite and offsite experiences over two days. From here, students were transitioned into an Online VCE Subject Information event, a regular in all schools but reimagined here to accommodate students and their families being remote. The collaborative efforts of subject departments within the Senior School, meant that everything that would typically be delivered in person, was absorbed into collaborative online spaces such as Padlet — a digital wall app, and Zoom. Dually, this enabled students and their families to engage with all that they needed in an asynchronous and synchronous capacity, according to their preferences.

Ongoing, the school's established Remote Learning Model has enabled hybrid offsite and onsite learning to continue with VCE students back on campus. With staff teaching across modes, the need to manage these workloads in a sustainable and flexible way has been paramount, so the initial design of this was done with anticipation of an eventual staggered return to school of different year levels.

We have tailored our Remote Learning Model to cater for our Junior School students. This has included differentiating the structure of remote learning to support their different developmental needs. For example, in order to continue to build foundational literacy and numeracy skills, we have provided regular small group videoconferencing sessions for both instruction, practice and consolidation of these key skills. The structure of the week has been carefully thought through to consider the cognitive load of different tasks and the intensity of remote learning, particularly for our younger students and their families who are key to much of their support.

Teachers and students have been supported to expand their use of familiar tools and to learn new tools and processes. This has included the use of Padlet and Flipgrid — a video discussion platform, for sharing of work, discussions and peer feedback. Yammer groups (Microsoft's social networking service) have been set up for year levels to stay connected and individual classes have used this communication tool for class discussions and sharing of work. Digital learning tools were carefully chosen to engage and excite, facilitate communication and discussion and provide students with greater opportunities for practice and feedback. Therefore, technology was used to enable and accelerate the learning of every student and to create engaging and meaningful activities that may not have been possible in a regular face-to-face class. Research has demonstrated the value of interaction through designed rather than incidental learning activities, especially when designed activities are informed by good pedagogy (Dalgarno, 2014)

What have we learnt from the various learning environments we have so far experienced in 2020? We have learnt not to make assumptions. Some students and teachers who we might have thought would have struggled with remote learning have thrived, using the experience as a springboard to mastery of new skills, increased engagement and new initiatives. Others have struggled, challenged by change, new routines, lack of control, challenges with staying connected as well as the technical glitches experienced by everyone. Overwhelmingly, the feedback has been to examine how, when and what we teach in the context of a very different world and how we might enable our students to codesign their learning to combine the very best of their teachers' skillset with elements of choice and student interest, mindset and tool kit.

There have been so many ways that students have been able to take charge of their learning experiences. Student leaders have been engaged with their peers through challenges such as the House Cross Country which was run using apps and pedometers. Groups of students have been hosting Zoom panels including a Diversity Week panel with a diverse group of indigenous Australians from across Australia, while simultaneously, several Year 9 students created visual narratives using skills learnt in their AI for Good conference. These experiences have enabled students to learn and use new skills which have broad applications. We need to continue to harness these opportunities and provide students with regular, real world experiences which move beyond the mark book or formal exam. 'When learning has relevance and purpose, children can see how it feeds into their lives outside of the school walls and how it empowers them to have an impact on the world around them.' (Claxton & Carlzon, 2019, p. 68).

As we moved to remote learning, high impact teaching strategies came to the fore (State of Victoria, Department of Education and Training, 2019). Lesson structures in physical spaces do not necessarily translate into online learning lessons, neither should they. Staff were provided with options for engaging with their students and examples of how they might structure their lessons (if synchronous) and leverage the use of digital tools. For those unfamiliar with videoconferencing, this provided an initial scaffold as they developed the confidence and skills to interact with their students via digital tools. It is the combination of good teaching i.e. the use of high impact teaching strategies, with carefully chosen digital learning tools that can aid in the development of transferable skills, skills that prepare all learners to be life-long creative connected and collaborative problem solvers and to be healthy, happy individuals who contribute to the common good in today's globally interdependent world (Fullan & Langworthy, 2013).

Feedback is one of the teaching strategies with the highest impact on student learning. AITSL's *Spotlight: Reframing feedback to improve teaching and learning* (2017) highlights the work of Wiliam (2010) and Hattie and Timperley (2007) in analysing the research, with numerous studies indicating positive gains for students including accelerated learning. Remote learning has presented new challenges for feedback, as immediate oral feedback is more problematic, particularly if given in a gallery of students, rather than the privacy of a one-to-one exchange. Our teachers have been creative, robust and rigorous in how they have gathered student responses and provided feedback. They have individually and collaboratively explored many of the tools which provide an insight into student understanding and mastery. Students have learnt self-regulation skills, a key determinant of future success (Duckworth & Gross, 2014). This has included having to organise materials and time, practise patience and develop an understanding of the boundaries between home time and school time.

We have established a weekly bulletin for all staff which has provided a continued focus on pedagogy, digital tools and purposeful design. It has also provided a forum for staff to provide an insight into their online classrooms, useful resources and tools. As a staff we have been able to delight at the humorous instructional videos for Year 2 as they explore procedural texts, share in Year 11 Psychology students' pain as they explore the psychological impact of orphanages, learn about Big Bang Theory through a student-created video, be amazed by the innovative ideas from Year 9 students as they consider how AI can be used to support people with disabilities, and understand the nuances of a Year 10 exploration of Shakespeare. We have had a glimpse of learning across year levels and discipline areas, in Junior School and Senior School as teachers have shared their remote learning spaces in some way. We have also seen the boundaries between classes blurred as remote learning has provided opportunities for teachers to participate in each other's virtual learning environments, for example, being a member of a Yammer group, making copies of Padlets, and providing student feedback to students from different classes.

We have been reminded about the importance of language, how the words we choose and the way we use them can have an impact on how a new concept is learned, whether or not a task is completed accurately, how a student responds to feedback or how a staff member interprets a message. As a learning community we continue to develop a shared vocabulary, one that has rapidly evolved during remote learning, incorporating newly needed words and phrases such as 'breakout rooms', 'Zoom fatigue', 'asynchronous' and 'synchronous'.

Every educational institution is likely to be asking their version of the questions:

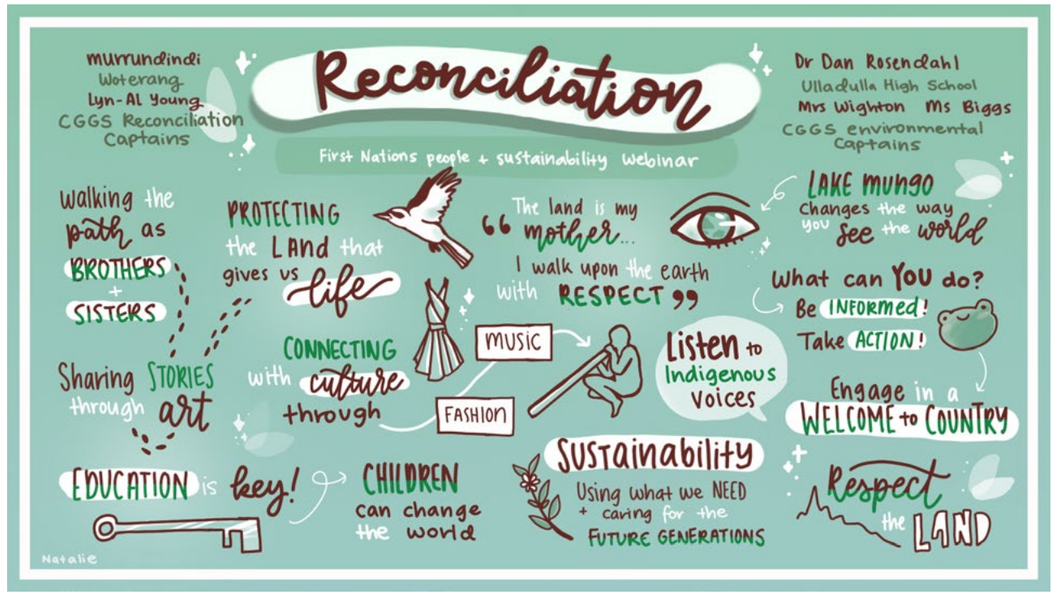
- How do we leverage the positive outcomes of remote learning?
- What conversations do we need to have?
- How might school be different?

The challenge moving forward is to capture the experiences and desires of our learning community and find ways to honour these. There will be a dichotomy of responses: choice/directed; known/unknown; flexibility/structure; safety/risk to name a few. Our challenge is to be purposeful in the changes we bring, ensuring we reach out widely, and acknowledge the different stages of confidence and competence of our community.

The key to the provision of ongoing, rich learning experiences and smooth transitions back to school has been the consistent, transparent communication from the school leaders as well as the regular opportunities for students, teachers and parents to provide feedback to the school. In our first transition back to school, we had a strong focus on wellbeing and strengthening relationships as well as celebrating the effort and work our teachers and students have been engaging with during remote learning. As a school, we will continue to listen to and respond to our community and adapt with purpose to the learning environment, particularly with the continued uncertainty about the location of our learning in the short-term.

So what is the enduring message for us? Our community has thrived because of the effort of every single member. Our collective problem solving, work ethic, collaboration and idea generation has enabled our school to respond to the learning environment with purpose. It has not been easy but we have a common vision and the capacity to adapt and learn quickly. We have maintained our sense of humanity as we strive to build a more just and sustainable world. As per Hans Rosling's (2018) vision for education, we have endeavoured to remain humble and stay curious, being realistic about the extent of our knowledge and being happy to say 'I don't know.' Being a curious community, we have been open to new information and actively sought it out. We have let our mistakes trigger curiosity rather than embarrassment and have openly modelled this for our students. We are supported by a large and strong community to take the best of our previous learning experiences and interweave them with the new learning that we have lived through due to COVID-19.

What could be? We reimagine an education which respects our heritage, values the diverse nature of our learners, is purposefully designed and responsive to the changing needs of our local, national and global community. This time, perhaps unlike any other, has allowed us to think and act locally and globally about things that matter and to work together to create our tomorrow. It will take the very best elements of remote learning and provide opportunities previous unimagined.



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World Peace Game Foundation

Simon Dray
Scotch Oakburn College

WORLD PEACE GAME FOUNDATION

SCOTCH OAKBURN COLLEGE
CREATING THE FUTURE

It's Monday morning at Scotch Oakburn College in Launceston, Tasmania, and Prime Minister Marshall of Ganadoo has just been advised that the Secret Empire is laying blame on Ganadoo for the leak in an offshore oil rig located off their Western coast. Prime Minister Wilson of Willington disputes the ownership of the oil rig, claiming that they have paperwork verified by the United Nations and the World Court that states this resource belongs to Willington. At the same time, a coup d'etat within the ranks of Destiny's cabinet has led to the appointment of a new Prime Minster who is questioning the ownership of the island, Orangeland, off their Eastern border that has historically been owned by Greenland. If the crisis is not averted by the end of game day 2, things could escalate. This is the inaugural World Peace Game being played by Year 7 students at Scotch Oakburn College.

According to the World Peace Game Foundation (2018), the game is a hands-on, geo-political simulation that gives students the opportunity to explore the connectedness of the global

community through economic, social, and environmental crises and the imminent threat of war. The aim of the game, they state, is to extricate each country from dangerous circumstances and achieve global prosperity with the least amount of military intervention. There are 23 interlocked, real-world crises that require students' attention to not only achieve world peace, but at the same time, increase each country's starting budget. Only then can the participants declare the Game won. Acting as "nation councils," students gain greater understanding of the critical impact of information, how it is used, and most importantly, how their decisions impact others within our global community.

The founder and creator, John Hunter, has been an educator for over 40 years. He is an award-winning teacher and educational consultant who has dedicated his life to helping children realise their full potential (World Peace Game Foundation, 2018). Using his rich and varied background, John has combined his teaching and artistic talents to develop unique methods of teaching students about humanity and the world. "The end result of the World Peace Game should be compassion", states Hunter himself.

As students delve deeper and become immersed in this interactive social experience fraught with philosophical issues and highly charged situations, secret empires, and saboteurs, the skills needed to deal with this information and incidents will be enhanced. Moreover, they will quickly discover that impulsive reactions not only fuel isolation but can leave them alone to deal with powerful enemies. Beliefs and values will

evolve or completely unravel as they begin by experiencing complete despair, the uncomfortable nature of not knowing the answers, and not having a teacher tell them what they need to do. They then move towards experiencing the positive impact and windows of opportunity that emerge through effective collaboration and refined communication.

In essence, as stated by the World Peace Game Foundation (2018), the participants will learn to work comfortably on the fringes of the unknown to create meaning out of the chaos they find themselves in and by thinking outside the box in terms of solutions. Is this not what we, as educators, talk about and emphasise when we attempt to prepare these young people for jobs and careers that currently do not exist, or when we debate and discuss the skills required beyond the 21st Century?

The students continue their final round of negotiations with the ousted Prime Minster being offered a position within the World Court who would value his knowledge and expertise, in exchange for $200 billion dollars. The Secret Empire has threatened Ganadoo with a Nuclear strike if they do not resolve the Oil leak that is threatening their territorial fishing waters, whilst the Minister of Defence of Greenland has repositioned their spy drones over the Secret Empire to gain further intelligence. What will happen next…?

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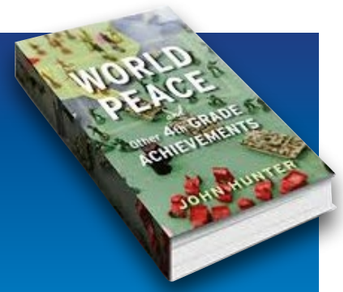
Please see the links below for further information about the World Peace Game and the World Peace Game Foundation or Home - World Peace Game Foundation. John Hunter's book, "World Peace and other 4th Grade achievements", is available at www.Booktopia.com.au or www.bookdepository.com

(1) World Peace Game - Behind the News - YouTube

(2) World Peace and other 4th-Grade Achievements Extended Trailer - YouTube



Story and Challenge: Reflections on *Rites of Passage* in Middle School

Christine Crump
Swan Christian College, WA

"We live in narrative; we live in story. Existence has a story shape to it".
Eugene Peterson

Introduction

Story is at the heart of what makes us human: the ability to tell, share, become absorbed in, to imagine and to create stories. Middle School's story is an adventure in learning. Every child is woven into the fabric of Swan's original story creating their stories individually and collectively. The following article shares our story in introducing a Rites of Passage program into Middle School.

Setting the context

There are several key national and international agendas that need to be considered in generating any well-being program for young people. In recent years the OECD published a position paper on the future of global education (OECD, 2018). It argues that whilst we are "facing unprecedented challenges – social, economic and environmental," those challenges also provide us "with myriad new opportunities for human advancement" (OECD, 2018, p.2). The report affirms that a key purpose of education is well-being – it challenges readers with a kind of social and cultural inclusivity stretching beyond contemporary understanding of the term: students "will need to value common prosperity, sustainability and well-being" (OECD, 2018, p.3); as well as financial reward, "they will also need to care about the well-being of their friends and families, their communities and the planet" (OECD, 2018, p.2). Like the Alice Springs (Mparntwe) Declaration (2019) it insists that education should equip students to be "active, responsible and engaged citizens" (OECD, 2018, p.4). Another of the report's core tenets is student and co-agency outworked in their metaphor of a learning compass. Another key report, Future of Education and Skills 2030 (OECD, 2018) outlines transformative competencies, values, learning behaviours, and changes to teaching and learning that should ensue to ensure well-being 2030.

Similarly, the Alice Springs (Mparntwe) Declaration (2019), maintains that, "education plays a vital role in promoting the intellectual, physical, social, emotional, moral, spiritual and aesthetic development and wellbeing of young Australians" (Alice Springs (Mparntwe) Declaration, 2019, p.3). Further, the National Principles for Child Safe Organisations (2018), advocates for a child rights approach to well-being, in a broad sense, but especially child safety. WA schools are measured against these standards for (re)registration; the principles must be explicitly integrated into a school's well-being program.

The demographics

Middle School at Swan Christian College spans years 7-9 a time of early adolescence. It is a time of rapid physiological growth and

change; a critical time for brain development. Brain plasticity is at a height (more than any other time since infancy), cognitively students are moving from concrete to abstract thinking and are acutely attuned to their reward centres which may encourage risk-taking behaviour. Coupled with changes in hormones and reproductive maturation, the aforementioned contribute to emotional variability, immense self-awareness and concerns about identity. Peers have significant social influence. Young people are yearning to belong and to be known, (King, 2017). Identity, affirmation and belonging are crucial to student wellbeing and learning outcomes (Darling-Hammond et al, 2020). The digital world is heightening such matters sometimes making early adolescence a time of travail.

Into these agenda spaces, we seek to ameliorate well-being programs for middle schoolers at our College. How might we do this in a way that is genuinely Christian; that is redemptive and transformative; that is true to God's word?

The Story and Challenge Program

Under the leadership of the Deputy Head of Middle School, Simon Bergin, the College co-constructed a scope and sequence for well-being 7-12 called, Living Well (2019). The scope and sequence is underpinned by a 'Philosophy of Personhood' which reiterates that humans are made in God's image person and captures the multiple domains of being human. The Living Well program operates through 20 x 55 minutes periods per year, a camp for Years 7 and 9 and with some scope to supplement this in Mentor Group time daily.

Years 8-12 remain with the same mentor and year coordinator throughout their time at the College, in order to prioritise relationship. Each of the year groups is framed around different themes: Awe and Wonder - Year 7, Growth - Year 8, Story and Challenge - Year 9. It is upon the latter where Simon has focused, where we use aspects of the Rites of Passage, and to which this article now turns.

Rites of Passage (n.d) is the work of Dr Arne Rubinstein, an experienced physician whose time in emergency impelled him to think differently about how we transition our young people into rich and meaningful adulthood – the active, engaged and responsible citizens to which the above educational agendas aspire. At the core of Rites of Passage (n.d) lies transformation: from child to healthy adult behaviour. Rubinstein, like others, is drawn to anthropological examples of indigenous and traditional communities around the world, where transition of young people safely into adulthood is intentional and community-driven. An example includes circumcision in Australian Aborigines and Massi cultures. Some traditional rites of passage are dramatic and even life threatening – a boy hunting a lion, or jumping head-first off a bamboo tower with a vine tied around his ankles in Vanuatu. Another transition event is the Mescalero Apache Girls Puberty Ceremony, "an annual event celebrating the initial menses of selected girls, as well as the perpetuation of the tribe" (Farrer,1987, p.240). Each girl has a mentor who prepares her for the ceremony. The ceremony spans four nights of dancing by the girls accompanied by tribal singers who recount tribal history with 64 different songs.

Story is essential to the Apache event. The ritual drama is deeply spiritual, 'a reunion with the primary life force the Creator God and his consort Mother Earth' (Farrer,1987, p.241). The long nights of dancing intertwined with other rituals by day, are tests of endurance required for motherhood, and much more. At the heart of each rite of passage is a challenge, a challenge which upon successful completion marks entry into adulthood. Rubinstein has adopted some of these features into his program: separation, transition and integration forming the core steps (Rubinstein, n.d). Sadly, today many teenagers generate their own destructive forms of challenge – schoolies perhaps being a prime example.

Dr Rubinstein has worked alongside the Deputy Head of Middle School, other members of our pastoral team and parents. Each time we are moved by his passion and personal integrity. Last year I had the privilege of attending Rubinstein's leadership training camp where he taught us in more detail, where, as participants we experienced each of steps, and which gave me a wonderful opportunity to think theologically.

Although they imbue all aspects of the program, story and challenge, sit most firmly within the transition phase. Narratology, framing process with story, telling stories, sharing stories and living story, aligns thoroughly with a Christian worldview. The Bible's metanarrative, the accounts in each testament, its message, the parables, its systematic theology, are all story driven. In Rites of Passage (n.d), story is used to generate empathy, share values, and to forge relationships. Swan Christian College's iteration seeks to emulate

this by embedding a 'talking stick' into activities, replacing expository teaching with narrative, using Rubinstein's stepped process, listening more to students, guest speakers inspiring students with accounts of life's adventures, team building games and character development activities. Story and Challenge is currently a gendered program seeking to speak directly into the maturation of young men and young women in explicit ways.

Yet it would be remiss if our program didn't include the redemptive story of Jesus. In the end, narratology in Rites of Passage (n.d) is a tool, one in which "stories allow for multiple interpretations, offering participants the freedom to choose what they take way from the story" (Rubinstein, n.d). For Christians, the Biblical story is true. For Christians, the Biblical story points to relationship with Jesus. Unlike Rubinstein, the Christian story also has an ending not yet fully realised. It is worth noting that while our program is based in scriptural concepts, we do not use the program as a tool to evangelise – rather point to, and affirm relationship.

Conclusion

It has been a blessing to work alongside staff as the Story and Challenge program has come to fruition. Our story is not complete. In some ways our story provides continuity with the past, and in some ways, it points forward. Further, we understand that there is more to story than simply hearing stories, responding to others' and living out our own. G K Chesterton (1908) explained it like this: "I had always felt life first as a story: and if there is a story there is a story-teller." As a Middle School team, we believe there is a bigger story, a storyteller who brings us hope, a future, a purpose. Life is not simply a series of emotions, images, characters, conversations, forms or life experiences. Our heart is made to live in a larger story. The storyteller is God and it is in him, and his son Jesus that all human stories culminate. Ultimately, it is this story, this storyteller that drives everything we do in Middle School at Swan Christian College.

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Appendix - From Role statement for the Director of Story and Challenge.

"The Director of Story and Challenge is primarily responsible for further developing and leading the Story and Challenge program for the Year 9 cohort, working directly alongside and with the Dean of Year 9 and Deputy Head of Middle School. The primary function is to develop and lead the Story and Challenge program for the Year 9 course 2019 and beyond.

1. Successful partnership and collaboration with key stakeholders;
2. Clear documentations of the program developed over time;
3. Practical outworking of the vision;
4. Underpinning rites of passage with a Christian worldview".

Future directions

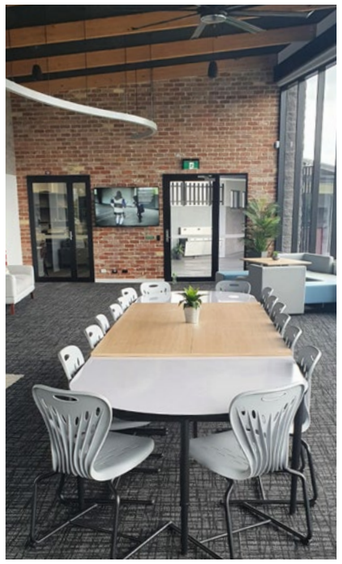
1. To embed the Story and Challenge concept through the Year 9 Mentor Group time;
2. To work with the HOLAs embedding the course within the Year 9 curriculum.

Being stuck in the 'Middle'

Kristy Matthew
Riverside College, Qld

Riverside is a Prep to Year 12 co-educational school that serves students in the Maryborough and Fraser Coast region. Riverside has approximately 850 Day School students and our College is split into 3 sub Colleges; Junior College: Prep-5, Middle College: Year 6-9 and Senior College: year 10-12.

We are a Christian College that strives to allow students choices in their learning pathways and environments and believe in holistic education to create the best student outcomes.



The inquiry approach

This year our College was lucky enough to engage with one of the ISQ Collaborative Inquiry Research Projects with 11 other schools in Queensland. Why did we want to undertake this process? The answer is because we acknowledge while every school and every class is different, it is professional collaboration among teachers, that has the most impact on student and school improvement.

The Research project in Schools Collaborative Inquiry program was underpinned by the Spiral of Inquiry developed by Timperley, Kaser and Halbert (2014). The project asked us to collaborate, consider data and meaningful evidence, consider our school climate and culture, involve learners, families and communities, develop collective agencies, create community practice, work towards improvement and deliver sustainable approaches.

Our collaborative inquiry

Our school is made up of four sub Colleges; three within Day School - Junior (Prep-5), Middle (Years 6-9), Senior (Years 10-12) and a Distance Education sector. Our Day School College campus has amazing facilities and an outstanding curriculum basis; however, there seemed to be three very unique ways of working within the three, Day School sub Colleges; all based around the educational and social/emotional needs of the various age groups. Therefore, our team landed on the idea that we wanted ***to create and implement a transparent transition process across the three sub Colleges.*** Whilst respecting the current research, we were keen to find strategies to enter and exit students in the middle phase of learning, that supported them as learners and supported the teaching pedagogies of all three sub Colleges.

Data collection phase of project

Our first step was to collect pre-data. The pre-data would help the team avoid the trap of assumptions, provide some targets that could be continually referred to and help us to track our impact.

The first set of data that was collected was 2019/2020 transition data. This data was a collection of surveys, interviews, and data sets including social Trust Mapping data. Together, the data provided a a collective understanding within the College community about the transition process that had just taken place for Year 6 students who had just arrived in Middle College, and the Year 10 students whohad just departed Middle College). Not only did we survey and interview the students, we asked for parental and teacher feedback as well. The data provided some interesting insights. Parents and teachers shared concerns such as teachers not knowing their students in as much detail as they might when spending more time with them in a traditional Junior classroom, that children would not be able to handle the extra responsibilities and that r children might fall behind in work and they would not know. Students, however, seemed to be thinking about friendship changes, change in teachers and the increase in academic expectations. The results were very interesting; for many years energy has been directed into ensuring that the school's concerns about transitions were addressed. However, while the concerns aligned to the other adults in their lives (parents/ carers), we clearly were not on the same page as the students, for they clearlyhad a completely different set of concerns.

Analysis of the 'old days'

The first thing we did was outline what we already had in place for transitions, and put them up against the feedback and pre-data sets we had collected. If the transition strategy was fruitful, we decided to keep it, if not, we put it aside. After working through all the pre-data sets we came to understand the weaknesses in our current transition strategies, and all the gaps that we needed to fill, if we were to create a seamless transition for students, parents and teachers.

Research and trends

Many research papers were poured over throughout this project, but this phase was enjoyed so much more than anticipated. It helped me to both completely affirm what we were doing, while at the same time, question everything we do.

The biggest trends found in the research are outlined as follows:

- That the age at which children are transitioning into adolescences has shifted to begin earlier: now from aged 8-10, traditionally aged 10-12.
- That the pedagogically model employed at the College (called CAP21) is the most beneficial way to engage adolescents in learning and will help guide their relationships and progression in the 21st Century Skills or Student Learner Traits.
- Longitudinal research from Murdoch University Children's Hospital (Melbourne) on Educational Transitions states the 'concerns' shown by our students directly correlated to the 'concerns' of the students and parental body that undertook a Hospital Research Project.
- On average 72.9% students in adolescence will have significant barriers to learning environment – social/emotional, homelife difficulties, peer relationship issues, etc.
- On average 72% of those students will use their peers as their most reliable source of support or wellbeing, NOT an adult or parent.
- That our understanding of the ways in which adolescents think, behave and experience their schooling within the Middle phases of learning will directly impact their potential for success, in not only Senior phases of learning but also lifelong learning.

My personal summary of this research was:

- Our College's collective concerns (students, parents and teachers) were not unique but could be broadly recognized by other schools.
- That, at any given time, if 72% of the students in your class are not in the 'optimal learning phase' mindset, they also will not be seeking advice from you to get past those barriers; rather they will be seeking out their peers for advice.
- That our students could possibly be experiencing adolescence earlier than our College was planning for with regards to our sub-Colleges.
- That we have a very well researched and successful pedagogical model in CAP21, and that it was one of the highest predictors of success in future learning.

Collaborative Think Tank

All this pre-data was presented, approximately 90 people, 'think tank' groups were established with the purpose of, focussing on one question.

Knowing all the pre-data and research, what are some strategies or priorities that we should focus on for 2021 transitions that will best serve our adolescent learners in and out of transitions?

We posed this question in three separate areas of College life; pastoral care, sense of belonging/ community and academic achievement. The think tank groups collaborated for the whole afternoon on suggestions and strategies for 2021 transitions. One of the keys to a successful project is whole staff collaboration. Collaboration is not only powerful for gathering collective ideas and allowing for open discussion, but also creating ownership. It was important to acknowledge that if staff were to participate in these initiatives, then their voice needed to be heard; the most successful projects can only take flight if there is ownership and buy-in by all parties.

Direction for 2021

While 2021 is still a while away, Transitions initiatives have commenced:

- Year 9 students (soon to leave Middle College) are undertaking a term long immersion subject called 'Welcome to Senior'. Heads of departments take turns to meet the Year 9 students, run through their subject outlines and run short, but engaging, activities with the students on a weekly basis. Students also work through some time management activities and study skills in preparation for undertaking Senior subjects.
- Year 5 students (soon to be in Middle College) are undertaking a term long immersion subject called 'Welcome to Middle'. Students spend a double period a week in the new Middle College precinct with the currently Year 6 teachers. Teachers run social/emotional activities with the students, to get to know them, and help them understand the type of learning environment they will be transitioning into.
- The Code and Conduct policy has been updated to clearly show students and parents the steps in the school discipline process; that we do acknowledge students need grace while navigating adolescent behaviours, but also where boundaries and support have been placed for student with high behavioural needs.
- Transition Day (a previous initiative) remains in place for the last week of school where all new students across Years 6 – 9 are invited in for the day, to participate in rotational activities, meet teachers and hopefully experience a small taste of the community they will enter into next year.
- A student survival guide is being published with thoughts and opinions of current students on transitions and emotions they experienced during transitions. A list of self-help and school related help options is listed in this publication, as well testimonials from past students.
- A parent handbook is being published on what they might encounter as a parent with an adolescent going through transitions, again with a list of self-help and school related help options, and parent testimonials.
- A Peer Skills pastoral care program (Life line program) with other students being buddied with younger grades to guide and mentor them through social emotional issues or problems, is being set up within the Health curriculum and Pastoral Care lessons for 2021.

Summary of the project

Of course, this project is not finalised, and will be on going until post-transition data and feedback is collected, but we are optimistic that with these current changes we will begin to make a smoother and more seamless transition for our students, teachers and parents. While our College has three very distinct sub-Colleges, within the Day School setting, all with different pedagogical approaches to student learning, they are all very valid for the different age groups involved. We stand by our pedagogies, making the transitions in and out of each sub-College a very important focus of our work. We look forward to the post transition analysis and revisiting our original project focus to see how far we have come in achieving our goal/s at the end of Term 1, 2021.

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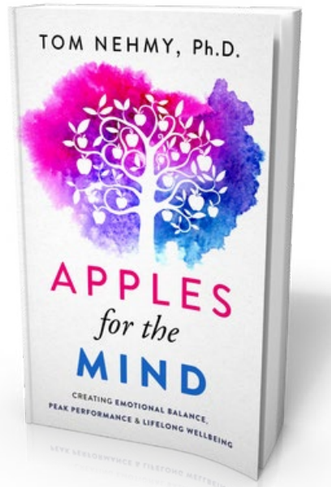
Book Reviews

Tom Nehmy Ph.D.

'Apples for the Mind. Creating Emotional Balance, Peak Performance and Lifelong Wellbeing'



Reviewed by Rachel McKee
Dean of Wellbeing – Middle School, Seymour College.

Do you want to know the anecdote for a fulfilling and rich life? 'Apples for the Mind' has the answers. Tom Nehmy Ph.D. provides the reader with the 20 secrets you need to enhance your wellbeing and find fulfilment in your life, and those around you.

'Finally, a psychologist reveals the most important things you need to know to prevent problems, enjoy optimal mental health, and reach life-changing peak performance.' The blurb invites you to 'truly transform your life'. Tom Nehmy, a clinical psychologist, has devised a plan to assist people to manage their own wellbeing. In any book store you will find a multitude of books promoting wellbeing initiatives, Tom brings the best of what he knows to the audience.

This easy to read and digest guide allows for your own reflection. A practical manual with meaningful and easy to understand *checking points*, each chapter explains one part of the secret to building a fulfilling life with anecdotes, personal experiences and the science behind each secret, without the 'psycho-babble' allowing a busy education professional to easily absorb the content. The reader is invited to *Do and Digest* each characteristic, cementing in practical terms the wellbeing initiative presented.

By giving of himself, Tom enhanced my understanding of what it takes to improve one's wellbeing. With practical interludes to try the activities as he describes them, you are taken on the journey of *life medicines*, the *Wellbeing wheel* and the *Helpful Thinking Process*. 'The ultimate psychological skill of all: making good decisions' (Nehmy, 2019, p. 37) places the power in the reader's hands, imploring them to take control and use the skills presented in the book to make good decisions in putting their lives on track to fulfil their potential.

Not limited to the adult audience, all strategies and research presented in the book form the 8 week Healthy Minds program which is taught to Year 8 students in many schools. A proactive program to safeguard adolescents against poor and deflating wellbeing. The transactional tools question perfectionism, depression and anxiety, poor decision making, and destructive stress, instead of focussing on preventative psychological skills to enable the reader to face challenges and reach their potential. This wellbeing program is not limited to the 8-week course it can be reiterated throughout the broader curriculum, confirming to students its messages and skills to make good decisions.

By absorbing the themes and partaking in the activities both teachers and students would benefit from reading this guide to enhance their wellbeing. Language and terms presented add to one's repertoire to be inserted into professional conversations, broadening its reach. The book allows you to dip in and out as needed and use it as a useful reference tool when speaking with students and parents.

Don't just be the *curious listener*, be the curious reader and devour your Apples for the Mind.

adolescent success

Dedicated exclusively to the education, development and growth of young adolescents.

Adolescent Success believes that successful education in the middle years requires an intentional approach to teaching and learning that is responsive and appropriate to the full range of needs, interests and achievements of young adolescents.

WHAT IS UNIQUE ABOUT THE MIDDLE YEARS?

YOUNG ADOLESCENTS ARE DEVELOPING

INTELLECTUALLY

Young adolescents seek intellectual challenge whilst still developing thinking capability.
Curriculum must be genuinely challenging, relevant and stimulating in order to engage them in their learning.

PHYSICALLY

Physical appearance is considered important and often drives a desire to engage in trends for acceptance.
Positive body-image programs and messages are vital.

EMOTIONALLY

Young adolescents experience heightened emotions as they grow through puberty into adulthood.
Regular access to counselling services are essential for young adolescents.

SOCIALLY

Peer approval is commonly valued and sought during adolescence and sometimes leads to acceptance-driven decisions.
An opportunity to be part of their social landscape is essential.

ETHICALLY

Ethical understandings are a significant part of the holistic development of young people as they relate to issues that impact their world.
Opportunities to be involved in service to the local and global community are important in the middle years.

EDUCATORS IN THE MIDDLE YEARS ARE

DEDICATED

Educators are advocates for this age group.

With a well-developed understanding of the unique needs of young adolescents and a commitment to continuously enhance their understanding.

They use this understanding to cater for learning experiences that challenge and grow young adolescents.

KNOWLEDGEABLE

Educators know and understand the idiosyncrasies of the young adolescent learner, effects of maturation, brain development, the power of technology and are interested in young adolescents.

They have gained specific skills in adolescent education from reputable training institutions through further research and professional learning.

EMPATHETIC

By showing an ability to understand the changing and often volatile feelings of young adolescents.

They are willing to walk alongside young adolescents in their learning and are able to look beyond the 'what' of behavior to the consider the 'why'.

PASSIONATE

Educators are passionate about teaching this age group.

They have energy, show enthusiasm, strong feelings and/or beliefs about and for these learners, and are skilled and excited about teaching and learning in the middle years.

RELATIONAL

The most important thing an educator can do is to develop a positive relationship with their young adolescent learner.

It is essential to be emotionally predictable and fair and not be drawn into the drama that may present itself during this phase.

ADOLESCENTS are developing physically, intellectually, emotionally socially and ethically

PLACES of learning are flexible, diverse, democratic, positive, safe and engaging.

PEDAGOGY is innovative, challenging, integrative contextual, informed relevant, pastoral, inclusive and responsible.

EDUCATORS are dedicated, knowledgable, empathetic, passionate and relational.

PLACES OF LEARNING ARE

FLEXIBLE

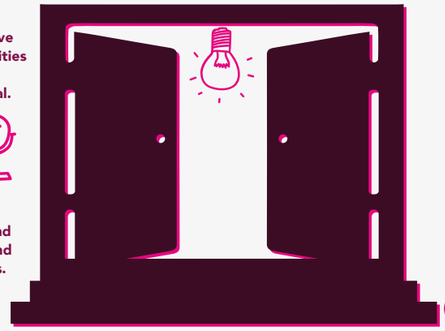
They allow individual and collaborative activity, personalisation with opportunities for play and movement. They are aesthetically appealing and functional.

DIVERSE

They offer variety and diversity of learning methodologies, through a wide range of programs, contexts and learning areas. They are accepting and inclusive of all cultural backgrounds.

DEMOCRATIC

They ensure learning occurs in inclusive environments, where young adolescents have a voice that is valued, and where collaboration and decision-making is integral to learning.



POSITIVE

They create learning communities that foster confidence, optimism and success for all.

SAFE

They provide an environment that builds and celebrates learning and diversity. They allow the unique characteristics of each individual to develop, fostering a sense of community.

ENGAGING

They are places where learners have opportunity to connect with their world through relevant experiences and activities that promote and nurture imagination and creativity.

THE PEDAGOGY IS

INFORMED

Pedagogical practices utilised are research and evidence based, and teams are specifically trained, ensuring that educators implement these practices.

INCLUSIVE

Pedagogical practices recognise the diversity of learners, acknowledging that they have a range of different personalities, aptitudes and attitudes, cultural, religious, prior experiences and current needs.

RELEVANT

Teaching and learning experiences are challenging, dynamic and exploratory by nature, and are negotiated, differentiated, integrated and/or interdisciplinary.

PASTORAL

Pedagogical practices foster in young adolescents empathy, compassion, gratitude, a sense of belonging and connectedness, recognising it is an education of the heart alongside an education of the mind.

GLOBAL

Pedagogical practices develop young adolescents as global learners and citizens, who can come to understand their place in the world. They are enthused and compelled to make connections, engage with and learn from others.

INNOVATIVE

Teaching and learning explores and incorporates new, advanced and transformative practices into programs by encouraging new initiatives, entrepreneurialism and creative thinking.

CHALLENGING

By having high expectations of young adolescents, the teaching and learning challenges their thinking and capacity to learn, enabling them to rise to the expectations and be excited about their learning.

INTEGRATIVE

Teaching subjects in a way that promotes the 21st Century skills is essential in the middle years. Educators are knowledgeable and skilled in multidisciplinary teaching, capable of making natural links between curriculum areas, engaging in learning experiences that connect multiple areas. Core teaching teams are ideal in the middle years.

RESPONSIBLE

Pedagogical practices create an understanding that learning empowers young adolescents to be community minded and thus be active citizens who contribute positively to society and the global community.

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