

Australian Journal of Middle Schooling





GROWING WONDER



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Editorial

Using the analogy of the doctor attempting to treat their patients, Goss and Hunter (2015, p.1) note that in a similar way, teachers need to continually identify what strategies their students need to help them improve in their learning. Doctors use various means to identify and understand the symptoms displayed by their patients. Similarly, teachers need to develop a repertoire of strategies to develop an understanding of their students' learning so that they can adjust their teaching approaches accordingly. Nowhere is this need more apparent than in a middle years' classroom. Developing an understanding of the unique characteristics of each student, not only as a learner but as a person, is the hallmark of successful teachers in the middle years. But how does a teacher know that the evidence upon which they are basing their decisions about teaching meets what might be colloquially known as "best practice?"

There is no doubt that we would be very concerned if a doctor was using techniques from 30 years ago to treat their patients today. Hence it should be no different for the contemporary teacher. Employing strategies that might have been regarded as best practice in the past may no longer be appropriate for the modern adolescent learner. Doctors use approaches that are grounded in extensive and rigorous research and so it should also be the case that teachers employ evidence-based approaches. Research by its very definition implies a systematic inquiry that provides either new knowledge or affirms existing knowledge. Adolescent Success has a strong commitment to research and the use of evidence-based approaches in the education of the adolescent. This approach was reaffirmed at the recent conference in August

(@adolescentsuccess)

Journal Sub-committee

Dr Katherine Main Angela White Susan Korrell Dr Tony Dowden

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of this year with the inception of the first Research Symposium for those engaged in research in the middle years. For those who participated it was a wonderful opportunity to engage with other researchers and to hear of the many exciting projects that are being conducted around Australia.

Adolescent Success is uniquely positioned as a conduit for the latest research from both within Australia and abroad. The Australian Journal for Middle Schooling, has, for many years, been a 'go to' for both teachers, administrators and researchers to learn about current research across a range of different areas that touch upon the adolescent learner. In this final edition of the journal for 2017 the range of different issues being addressed in each section of the journal reflects the many imperatives facing those working with young adults. In the refereed section, Hegazy and Barton provide a review of literature that investigates formative assessment and the role it plays in engaging adolescent learners. Sinclair, Hilton and Hilton share their research on a different approach to engage students in real world mathematical contexts. The other sections of the journal also add to the knowledge base of what works for the middle years learner. Dowden and Fogarty-Perry share their insights into a model of curriculum integration and Matthews describes a new approach to problem based learning. The changes to the learning environments for middle years students at Riverside Christian College are described. This school won the 2017 Adolescent Success Award for the most innovative use of space in a school setting.

As the year draws to a close it is important to reflect upon the many events that Adolescent Success has hosted throughout the year and the considerable learning

that has occurred by all participants. Sharing best practice continues to occur through fortnightly Twitter Chats and a number of 'TeachMeets' which provide excellent professional development and an opportunity to share. The 10th International Conference for Adolescent Success held at the Brisbane Convention Centre (24 - 25 August) was a highlight of the year and provided a wonderful forum for local and international participants to share their insights about working with adolescents. The conference also saw the inception of a Research Symposium organised by Dr Katherine Main and Dr Tony Dowden and facilitated by Professor Donna Pendergast. A summary of the symposium is included in this edition of the Australian Journal of Middle Schooling and, together with the other articles, serves as a timely reminder of the breadth of research being conducted in the area of the middle years across Australia.

There is no doubt that 2018 will continue to provide numerous opportunities to connect with Adolescent Success. As the focus on research strengthens and grows it is important for members of Adolescent Success to connect with each other and through the committee to develop new projects and to report on existing initiatives. There is definitely a sense of 'watch this space' with respect to research. On behalf of all of the Adolescent Success Committee and Editorial Board of the journal I wish everyone a joyous Christmas and relaxing holiday break. We all look forward to bigger and brighter 2018.

Dr Anne Coffey
Journal Editor
Adolescent Success

(Goss, P., & Hunter, J. (2015). *Targeted teaching: How better use of data can improve student learning*)

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President's Annual Report 2016-2017

Presented at AGM 26 August 2017

Debra Evans

The past twelve months for Adolescent Success has seen several initiatives and activities being undertaken that have led to new connections being developed, with existing partnerships reinforced and strengthened.

Executive Committees come and go, and with the support of the current Adolescent Success Committee, we have undertaken a number of important activities to ensure that we have a clear direction into the future. However, an Association cannot survive without members, and therefore, it is important that we are able to meet their needs. As such, this year has been one of consolidation and focus on events and activities that can bring our members together.

The development of our new Strategic Plan 2017-2020 occurred earlier this year to establish clear direction for the next three years. Our foci continue to be on:

1. **Adolescent Success** seeks to be **known as a leader**
2. **Adolescent Success** striving to develop a **dynamic product**
3. **Adolescent Success** having an ever-increasing **active membership** base.
4. **Adolescent Success** being **well-managed** by a dedicated committee
5. **Adolescent Success** creating long-term **financial sustainability**

Using these overarching areas, we identified specific goals to create our Operational Plan for the twelve months 2017-2018. This has allowed us to streamline our plans, ensuring that we are undertaking specific objectives in a clear and coordinated process.

The redevelopment of our website was one such plan. Our executive officer Angela White has undertaken a substantial amount work to update

our website this year, which has meant a considerable financial saving for the association. Following our Conference, there are plans for further redevelopment to occur in September 2017.

Another key operational goal this year is around research in the middle years. Our 2017 Conference has several streams, with a research symposium integral to strengthening and leading the way with this research. Katherine Main from Griffith University, who has been on our editorial committee for the referred section of our journal for many years has been seconded to our management committee for 12 months to work with us to strengthen this research component. The conference has attracted researchers from around the country, and is expected to be the catalyst for continued and valuable research in the middle years into the future.

The need to maintain our journal and to raise its profile is important for Adolescent Success. Whilst we showcase school programs and teachers work throughout the country - and this will continue to be an integral component of the journal - it is our aim also to increase the number of and value of refereed articles, hence [the] research that is occurring in middle years. This continues to be an important and necessary focus for educators around the world, and it is hoped that we can raise the profile of our journal by garnering more relevant and necessary research and evidence from a wider university base in Australia and overseas.

During this past six months, the management committee has spent time re-examining and redeveloping our Position Paper. This initial document has been launched at our Conference this year and will be available through our website soon. This important resource has been revamped to capture the essence

of this century and the needs of young adolescents and educators today. It will be a useful tool for use in schools throughout our country.

The Annual Awards

Our annual awards continue to be an important feature for our association. Last year's awards ceremony was held in October 2016 at the Brisbane Convention Centre.

We received several nominations in each category last year, and we congratulated and presented awards to the following schools and educators:

The Community Engagement Award to Norwest Christian College in NSW

Middle Years Transitions Program to Sarah Redfern High School in NSW

Innovative Use of Space to Nhulunbuy HS in NT

Educator of the Year to Des Hylton – St Paul's School

This year we have continued to offer these awards, with the inclusion of a STEM award to celebrate our Conference.

These award winners were congratulated and presented their prizes at our Conference cocktail event. The recipients were:

STEAM Award to Canterbury College

Educator of the Year to Rhiannan Gimpel – John Paul College

Middle Years Transitions Program to West Moreton College

Community Engagement to Methodist Ladies College - WA

Innovative use of Space to Riverside Christian College – Maryborough

We congratulate each of these schools and individuals for their dedication to the middle years.

Our executive officer attended the NZAIMS Conference at Whakatane in October 2016. We again offered our Adolescent Success Scholarship to attend this conference last year, with Simon Wagg from Trinity Christian College in ACT being the recipient for 2016. We continue to promote the NZAIMS conference and the connections we have with their association. Angela also attended one of their meetings this year, reinforcing our Memorandum of Understanding with them.

We continue our connection and collaboration with our Annual Partners: Furnware, Queensland Adventures and Latitude Travel Group. As an association, these partners are integral to our being a continuing entity, and we encourage our members to engage with these organisations to improve the opportunities that can be offered to themselves and their students. These partners provide valuable services and are an asset to our association.

In October 2016, one of management committee members, Andrew Landroth stepped down from his position. On behalf of the Association, I wish to thank Andrew for the time he offered to us in his position; it is greatly appreciated. His resignation led us to seek interest from the membership as his replacement. We received a high volume of nominations for this one position, and as such, it was decided to appoint two general members to our committee for the one year period. We welcomed Gabrielle Baker from St Peters School, Indooroopilly, and Howard Macpherson from Pembroke School in Adelaide to our management committee at this time.

Additionally, Sheridan Fisher from AIS Singapore nominated and has played a minor role without attending meetings. She has since been seconded to be our Regional Coordinator for SE Asia for the coming twelve months. We welcome her in this new role and look forward to strengthening our connections throughout the SE Asia region.

Jodie Davey from Townsville was a distant committee member and we thank her for her time in that role.

There have been a variety of Association events this year and I wish to make mention of these.

Teach meets were hosted in February and March of this year proving very successful and providing a platform for educators to collaborate and share practice. We hope to re-establish these in 2018.

The Adolescent Success Twitter chats continue to draw a variety of interested parties, with numbers maintaining throughout the year. The bank of relevant information, programs, resources and knowledge that is shared through this forum is invaluable. Our twitter followers have recently reached 2000, and I thank Adam Sommes our Community Connections member for maintaining our profile on Twitter. We will host Storifies and other resources on our website following its redevelopment.

Our Facebook page is a very successful platform, one that we encourage our members to share with their Facebook connections to broaden our reach. We will focus on increasing our presence on Instagram during the coming years.

eNewsletters have been maintained for most of 2017, and we are looking to assign its production to one of our committee members during the coming two-year tenure.

Of all events, the International Conference has been the key event for 2017, with conference profits allowing us to continue to employ our Executive Officer – Angela White, without whom, we would not be able to operate at such a high level.

With the aim of consolidating our financial position, Angela has been the conference organiser this year and, therefore, no events management company was employed. It has been an enormous undertaking, but the expertise and connections that Angela has, have meant that this conference has continued to draw a large audience of delegates. The input from the committee and other interested parties has meant that we have been able to coordinate a high-quality event, incorporating a Student Conference, Teacher and Leader Conference, as well as a Research Symposium in one event. Our annual partners have continued to support us in this venture, and the connections we now have with QUT and Griffith University, amongst others, will allow us to continue to offer relevant and inspiring events and conferences into the future.

Angela secured, for Adolescent Success, an Engaging Science Grant through the Department of Information and Advance Queensland of \$10000 for the Student Strand of our STEAM conference.

Under the guidance of our Executive Officer, the management committee has plans underway for the following events and activities in 2018:

- A series of Middle Years' workshops will be rolled out around Australia (and possibly NZ)
- A Finland Study Tour to be organised and managed by our annual partner - Latitude Group Travel
- With the secondment of a member in Singapore, probable event/s in Singapore to work with SE Asia educators
- Study tours in South Australia and NT for Leader Members in particular
- An event in Western Australia is in the pipeline in coordination with our Journal Editor Anne Coffey
- The NZAIMS Conference in NZ in 2018.

It is only with the dedication of our volunteers who sit on the management committee that we are able to offer the types of events we do; and it is through the passion and expertise of each of these educators that Adolescent Success can grow and provide services for middle years' educators.

Finally, I would like to formally acknowledge our outgoing committee members Matt Atkinson, our current Vice President, and Mary Campenalla, our current Treasurer, who have decided to step down. On behalf of the Association, I wish to thank them both for their commitment and dedication to the middle years. They have both had significant impact within the committee and their expertise and passion has been valued. I thank both personally for their professionalism and for their friendship throughout the past years. The Association wishes Matt and Mary all the very best as they continue to be outstanding educators of young adolescents.

Debra Evans
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Day 4 Curriculum and assessment in Finnish basic education. Afternoon visit to a school.

Day 5 Educational support: Inclusive education, guidance, counselling and student welfare services. Afternoon visit a school.

Day 6 Open and flexible learning environments. Afternoon visit a school.

Day 7 Leadership and management in Finnish schools. Afternoon visit a school.

Day 8 Depart Helsinki. Flight times to be advised.

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CONTENTS

Formative assessment in the middle years:

A review of literature and alignment with the Guiding Principles for Junior Secondary

Hind Hegazy and Georgina Barton

Abstract

With the continued national and international focus and demand for data-driven and evidence-based practice in schools, middle years teachers are looking for tools that will help pave the way for successful learning for their students. In Queensland, Australia this is particularly important due to a recent educational reform which saw Year 7 (aged 12-13 years) incorporated into high school. Evidence suggests students in this age group often disengage from learning, consequently increasing the importance of developing techniques that will provide middle years students with tailored and adequate educational support such as through formative assessment practices. This article provides a review of the literature on formative assessment as a pedagogical model that engages adolescent students with school and learning. As such, a number of formative assessment models are presented. These models provide teachers with signature practices and opportunities to gain relevant and timely information about students' learning progression, informing their teaching practices and lesson planning. The paper will then align effective formative assessment practices with the junior secondary *Guiding Principles*. Implications for future practice are offered which aim to support middle years teachers' important work in improving student learning outcomes.

Keywords: formative assessment, middle years, junior secondary, guiding principles.

Introduction

Assessment for improved learning has been a key priority and focus of policy makers and educational forums both internationally and nationally (Masters, 2014; Yee, 2016). For example, the Queensland Department of Education in Australia has increasingly emphasised the importance of data-driven instruction and has worked to ensure that teachers are adequately meeting the learning needs of all students through quality assessment practices (DET, 2016b). Such assessment practices are critical for students in the middle years given this unique development phase. In 2015, Queensland introduced a junior secondary reform with Year 7 moving from primary to secondary school (Pendergast, Main, Barton, Kanasa, Geelan, & Dowden, 2015). Ensuring the success and smooth transition of these students has become a priority for policy and practice. To address middle years' students' needs, it is vital to understand where every student is in their individual learning journey rather than just at the end (Humphrey & McNaught, 2015). One such way to ensure success through the learning journey for middle years students is the effective use of formative assessment.

Formative assessment is a process by which teachers gather evidence for the purpose of improving student learning (Yee, 2016). Evidence gathered by formative assessment provides both teachers and students with ongoing, real time information that guides and informs student learning as well as teaching instruction (Smith, 2011). It is a continuing cyclic process which informs teaching practice and supports students' active

engagement in learning through the identification of appropriate next steps and how to implement them; ensuring progression in learning for every student (Heritage, Kim, Vendliniski, & Herman, 2009). Formative assessment regulates teaching and learning, warranting learning with understanding, by providing feedback to both teacher and student (Hattie & Timperley, 2007).

Formative assessment is crucial in enabling teachers to identify where students are at the different stages of their learning (Wyatt-Smith, Adie, van der Kleij, & Cumming, 2017). Furthermore, formative assessment enables teachers to continually monitor and address the learning needs of students as soon as these needs arise. As such, we argue the implementation of effective formative assessment will enable and facilitate the success of the junior secondary reform.

Back in 2008, the Middle Years of Schooling Association (MYSA) developed a model that acknowledged the importance of people, practices and places in the success of young people's education (MYSA, 2008). Effective and quality teaching; future learning; community, wellbeing and belonging; and recognising the distinct needs of middle years learners were at the core of this model (MYSA, 2008). In Queensland, the renewed focus on the importance of the middle years phase of learning is reflected in the junior secondary reform; encompassing students from Years 7 to 9. The reform recognises these years as a distinct phase of schooling with particular features, challenges and opportunities associated with early adolescence (DET, 2016a). It is clear that the middle years of schooling represents

a crucial developmental phase in the teaching and learning of young adolescents (Pendergast, 2017).

Research identifies the ages of 10 to 15 years as a time when children develop and grow more rapidly than any other developmental stage, specifically cognitively (Barratt, 1998). Therefore, it is crucial to be cognisant of students' learning needs through formative assessment. It is important that teachers encourage student development of new skills and proficiencies, emphasising proof of understanding behind their work and learning from mistakes, through effective formative assessment practices (Wiliam, 2013).

The highly individual nature of each learner demands a student-centred approach to teaching and learning across the junior secondary years to ensure all students are productively engaged in learning. Formative assessment practices offer the foundational bases for a student-centred approach to teaching and learning in the junior secondary phase. It engages students in reviewing their performance and planning for future success, which contributes to a student's social, emotional and personal wellbeing (Garrison & Ehringhaus, 2014).

This paper therefore provides a comprehensive review of the literature on the topic of formative assessment and also how it applies in the middle years phase of schooling. It provides a number of models of formative assessment that can be effectively used in the classroom. The paper then argues the critical importance of effective formative assessment practices, particularly in the Queensland context by aligning the models

with the Junior Secondary Six Guiding Principles (DET, 2016c). Recommendations for teachers' practices are also suggested.

A comprehensive review of the literature on formative assessment

Formative assessment is an integral part of the teaching and learning process, it involves both teacher and student active involvement in the learning cycle (Heritage, 2010). The importance of formative assessment and its implication on teaching practices has been noted to be particularly crucial for middle years students (Garrison & Ehringhaus, 2014; Organisation for Economic Cooperation and Development [OECD], 2005). In fact, much research exists that internationally and nationally supports the importance of effective formative assessment practices (Duckor & Holmberg, 2017; Heritage, 2010; Wiliam, 2010).

In earlier research a lack of clarity about what formative assessment is and how to use it existed (Harlen, 2007). Later, Wylie and Lyon (2015) still acknowledged some confusion around what formative assessment actually was. This made it difficult for teachers to embrace formative assessment, and it created barriers for school leaders seeking to support effective implementation within their own school contexts (Wylie & Lyon, 2015). It is therefore crucial to support teachers and school leaders to develop a conceptual understanding of formative assessment in order to develop a schema for effective implementation of formative assessment.

Models of Formative Assessment

There are number of proposed formative assessment models revealed in the research literature. These include those developed by the OECD's Centre for Educational Research and Innovation (CERI) (OECD, 2005). One particular study by CERI examined exemplary practice in secondary schools in eight countries. It identified six key elements for effective formative assessment. These are:

1. Establishment of a classroom culture that promotes interaction and the use of assessment tools;
2. Establishment of learning goals, and tracking of individual students' achievement toward those goals;
3. Use of a variety of instructional strategies to meet diverse students' learning needs;
4. Use of different approaches to assess students understanding;
5. Feedback on students' performance and adaptation of instruction to meet identified needs; and
6. Active involvement of students in the learning process. (p. 6)

Wiliam (2010) proposed a conceptual framework for formative assessment, where he believed that formative assessment is concerned with the creation of, and capitalisation upon 'moments of contingency' in the regulation of learning (p. 2). He explained that formative assessment provides these moments of contingency in instruction-where teachers, students and/or peers collect evidence about students' achievement to make decisions about the next

step. Wiliam (2010) categorised moments of contingency into synchronous moments, where there is interaction of communication between the teacher and the student; and asynchronous moments, where evidence of students' performance is gathered and utilised to provide students with feedback and/or modify the learning instructions as displayed in Figure 1.

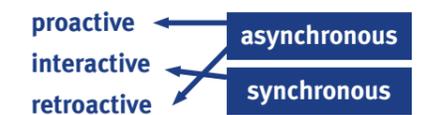


Figure 1: The kind of regulation within the synchronous and asynchronous moments (Wiliam, 2010)

Wiliam's (2010) 'moments of contingency' highlights the importance of teachers addressing and acting on the information collected by adjusting instruction and providing students with immediate feedback. It also points to the different types of assessment including long, medium and short cycles; emphasising the proactive role of the short cycle.

Similarly, and drawing on Ramaprasad (1983), three key processes in learning and teaching of establishing where the learners are in their learning, where they are going, and what needs to be done to get them there, Wiliam and Thompson (2008) suggested a framework to conceptualise formative assessment. They acknowledged the roles of the teacher, the learners and their peers. The framework consisted of five key practices:

1. clarifying and sharing learning intentions and criteria for success
2. engineering effective classroom discussions and other learning tasks that elicit evidence of student understanding
3. providing feedback that moves learners forward
4. activating students as instructional resources for one another and
5. activating students as the owner of their own learning. (p.57)

This framework is significant because it offers a comprehensive model that reflects the dynamic relationship between teachers and students. It highlights the important role of teachers to engineer effective practices, and emphasises how students are responsible for their own learning and how to put feedback into action. In doing so, this framework also identifies the pedagogical practices that allow this practice to occur. Figure 2 shows the roles involved and the types of strategies required.

	Where the learner is going	Where the learner is	How to get there
Teacher	Clarifying, sharing and understanding learning intentions	Engineering effective discussions, tasks, and activities that elicit evidence of learning	Providing feedback that moves learners forward
Peer		Activating students as learning resources for one another	
Learner		Activating students as owners of their own learning	

Figure 2: The elements of formative assessment model (Wiliam & Thompson, 2008)

In 2007, Heritage introduced a model of the formative assessment process, where she congregated the attributes of formative assessment (see Figure 3). According to Heritage et al. (2009) formative assessment is a process that comprises four main rudiments. These are:

1. Identifying gaps in students' learning;
2. Deciding where students are in their learning and what they need to learn;
3. Adjusting instructions to address individual students' leaning needs, and
4. Supporting them towards achieving their learning goals. (p. 2)

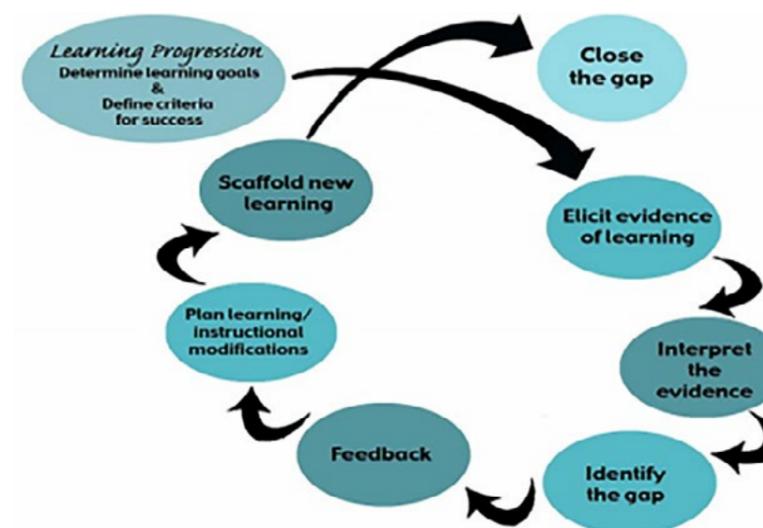


Figure 3: Heritage's Formative Assessment Model (2010)

Both models (Figures 2 and 3) include the process of feedback. Teachers' use of descriptive feedback helps students improve learning and closes the learning and instructional gap. It helps students to be involved in their own learning as they reflect on their learning (Hattie & Timperley, 2007). Formative assessment provides students with the opportunity to practise and be corrected during the learning process. Additionally, formative assessment breaks down a larger learning objective into smaller sub-learning objectives. This helps teachers to consistently monitor students' learning to ensure mastery of the set of skills needed to achieve the learning objective (Popham, 2008).

Similarly, Alvarez, Ananda, Walqui, Sato, and Rabinowitz (2014) proposed six guiding principles for effective formative assessment, they explained that effective formative assessment:

1. Promotes students' learning through continually monitoring students' progress;
2. Elicits evidence of learning through a variety of tasks depending on the instructional purpose
3. Changes the roles of teachers and students where the teacher are focused on creating a supportive learning environment in which the students are at the centre of teaching and learning;

4. Uses learning progression to anchor learning goals and monitor learning;
5. Results in meaningful feedback and adjustments to improve instruction for students; and
6. Enables students to become self-regulated and autonomous learners. (p. 12)

These guiding rudiments have the potential to offer educators clear guidelines that inform their understanding of formative assessment and therefore teaching practice.

Comparing models of formative assessment

As can be seen, the above models have a number of similarities. They outline how formative assessment puts emphasis on learning through the feedback loop process.

The key elements presented by the different frameworks explored here, specifically those proposed by Wiliam and Thompson (2008), address the needs of young adolescents, through enabling teachers to lay the foundations that cultivate lifelong, self-directed learning, and prepare students for the 21st century. The key practices proposed by Alvarez et al. (2014), the OECD (2005), and Wiliam and Thompson (2008) provide an interpretation of educational aims, such as 'personalisation of learning' and 'inclusion', reflecting the spirit of the junior secondary initiative. The frameworks offers pedagogies for engagement and provide a number of signifying practices that guide the effective use of formative assessment ensuring students' learning needs are met.

Table 1: Outline of key studies on formative assessment

Study	Centre for Educational Research and Innovation (CERI) (OECD, 2005)	Alvarez et al. (2014)	Wiliam (2010) and Black, Harrison, Lee, Marshall and Wiliam (2003)
Characteristics	<p>examined exemplary practice in secondary schools in eight countries has identified six key elements for effective formative assessment;</p> <p>a) establishment of a classroom culture that promotes interaction and the use of assessment tools</p> <p>b) establishment of learning goals, and tracking of individual students achievement toward those goals</p> <p>c) use of a variety of instructional strategies to meet diverse students' needs</p> <p>d) use of different approaches to assess students understanding</p> <p>e) feedback on students' performance and adaptation of instruction to meet identified needs</p>	<p>proposed six guiding principles for effective formative assessment. They explained that effective formative assessment;</p> <p>a) promotes students' learning through continually monitoring students' progress</p> <p>b) elicits evidence of learning through a variety of tasks depending on the instructional purpose</p> <p>c) changes the roles of teachers and students where the teachers are focused on creating a supportive learning environment in which the students are at the centre of teaching and learning</p> <p>d) uses learning progression to anchor learning goals and monitor learning</p> <p>e) results in meaningful feedback and adjustments to improve instruction for students</p> <p>f) enables students to become self-regulated and autonomous learners.</p>	<p>noted that early work on formative assessment was centred around five main evidence-based practices;</p> <p>a) sharing success criteria with learners</p> <p>b) classroom questioning</p> <p>c) comment only marking</p> <p>d) peer and self-assessment</p> <p>e) formative use of summative tests</p>

As it can be seen from these models on formative assessment practices a number of key signature pedagogies are also presented, as highlighted in Table 2.

Table 2: Overall signature pedagogies in formative assessment

Studies: Heritage, (2010); Wiliam & Thompson, (2008)
<ul style="list-style-type: none"> • Clarifying and understanding learning intentions and criteria for success • Planned evidence gathering • Adjustments to teaching and learning • Student involvement – peer and self- assessment • Engineering effective classroom discussions, questions and tasks that elicit evidence of learning • Providing feedback that moves learners forward • Activating students as instructional resources for each other, and • Activating students as owners of their own learning

These suggested signature pedagogies are clearly important for teachers in the middle years as they provide students and teachers opportunities for constructive feedback, for sharing criteria, and using both peer- and self-assessment. These practices place the student at the centre of the learning process where they are actively engaged through collaboration. Given Australia has a number of guiding principles (DET, 2016c) for effective Junior Secondary pedagogy and practice the paper will now recommend how formative assessment can be implemented in relation to each of the guiding principles and the middle years education in general.

Formative assessment a promising practice in the middle years in unleashing learning potential: Recommendations for the six guiding principles

Transition from primary to secondary school requires students to adjust to the more complex nature of the secondary context, while moving through the most crucial stage in their physiological and psychological development. Dinham and Rowe (2008) indicate that when the wellbeing and learning needs of students are not met, student engagement and performance can decline. As a consequence the Department of Education in Queensland developed the Junior Secondary initiative which is underpinned by six guiding principles (see Table 3). These principles provide the foundation on which schools and teachers can develop strategies, policies and processes that will engage students during these critical years of academic, social, emotional and physical development. The principles also provide an evidence-based approach to teaching and learning practices that meet the needs of students in early adolescence, and support schools to ensure a smoother transition between primary and secondary school (Pendergast et al., 2015).

Table 3: Junior Secondary Guiding Principles (DET, 2016c)

Guiding Principle	Explanation
Distinct identity	Junior Secondary students will be encouraged and supported to develop their own group identity within the wider high school. This can involve dedicated school areas and events.
Quality teaching	Teachers working with students in the Junior Secondary years will be given the skills they need through additional professional development, so they can support young teens through these crucial early high school years.
Student wellbeing	We will meet the social and emotional needs of Junior Secondary students with a strong focus on pastoral care. For example, schools could provide a home room to support students as they adjust to new routines and greater academic demands.
Parent and community involvement	We want parents to stay connected with their students' learning when they enter high school. Parent involvement in assemblies, special events, award ceremonies and leadership presentations will be welcomed.
Leadership	Schools will be encouraged to create leadership roles for students in Years 7, 8 and 9. Dedicated teachers experienced with teaching young adolescents will lead Junior Secondary supported by the principal and administration team.
Local decision-making	The needs of each school community will influence how Junior Secondary is implemented in each school.

This discussion takes a closer look at formative assessment as an evidence-based practice and how it aligns with the Junior Secondary Guiding Principles. Additionally, we aim to underline the implications of such an alignment on the practice of junior secondary teachers. Formative assessment provides teachers with excellent support in meeting the needs of young adolescents at this critical juncture in their schooling. It provides them with the strategies that will help develop students' skills to adopt their learning to meet the increasing academic expectations throughout secondary school (Barton & Woolley, 2017).

Quality teaching

The junior secondary agenda identifies the importance of quality teaching by highlighting how it suitably addresses the academic and social needs of young adolescents. Junior secondary teachers need to ensure their teaching is responsive to the learning needs of early adolescents and is targeted to meet the needs of individual learners. Such can be achieved through assessment that provides instructionally tractable information for contingent teaching and learning (Wyatt-Smith et al., 2017).

Formative assessment is an effective pedagogy that provides teachers and students useful information about an individual's learning that can be used to direct instruction and inform decisions aimed at improving student learning (Hattie, 2005; Heritage, 2010). Heritage (2010) identified learning progression as the first element in her framework that aids in eliciting evidence of learning to better understand where a student is in their learning, where they are

going and what needs to be done for a student to achieve said goal. As such, "formative assessment gathers and uses information about students' knowledge and performance to close the gap between students current learning state and the desired state by pedagogical actions" (Shavelson, 2006, p. 3).

Identifying where students are in their learning progression will allow teachers to identify any learning gaps and address these accordingly (Pendergast, 2006). The learning progression within Heritage's (2010) framework enables teachers to breakdown learning into set skills and define the pathways along which students are expected to progress. Subsequently, the model enables teachers to help students by modifying a learning approach that is most suited to each student and provides the teacher with the relevant information to provide constructive feedback. By using this strategy, teachers can inform their practice while students can inform their learning.

Student wellbeing

Student wellbeing can be defined as "a sustainable state of positive mood and attitude, resilience and satisfaction with self, relationships and experiences at school" (CESE, 2015, p. 2). The key features of formative assessment, as described in the literature, suggest that it takes into account the effects of external social-cognitive factors on the individual's cognitive response (Heritage, 2010) and it can be identified as a highly qualitative process that focuses on interaction, support, and development (Black & Wiliam, 1998a, 1998b).

Williams' (2013) model puts an emphasis on the importance of

students' involvement in their learning through collaboration, peer assessment and self-assessment. Collaboration allows for the activation of students as instructional resources for one another where they interact with peers to provide and receive feedback on their learning. Importantly, the process allows students to view their learning from different point of views and reach suitable solutions with peers, which develops positive feelings and attitude towards learning, and relationships. Within the different models, the learning goals and success criteria are identified as a key strategy that connects and guides students in their learning. Learning goals and success criteria increase student motivation by providing them with simple yet achievable learning goals against which they can self-evaluate their learning progress. As such, learning goals and success criteria develop students' wellbeing by building their sense of accomplishment and high level of satisfaction with learning experiences (Leighton, Seitz, Chu, & Gomez, 2016).

Notably, it is important for junior secondary teachers to nurture and support collaborative learning to develop students' sense of connectedness with their learning and with their peers. Supporting collaborative group, peer feedback and effective goal setting will provide opportunity for students to engage in a meaningful social interactions and cultivate a sense of connectedness to the learning, teacher and peers.

Distinct identity

Formative assessment in its core is responsive to students' learning needs and represents the self-regulated learning strategies

required for students to develop their identities as junior secondary learners (Järvelä, Järvenoja, Malmberg, & Hadwin, 2013). Self-identity is constructed in response to a number of contextual factors including; family, peers, and school (Rice & Dolgin, 2008). Students' positive experiences in these contexts facilitate the development of positive self-identity. Typical at this stage, students' self-concept and social identity is specifically and strongly influenced by school-related factors such as teachers, learning experiences, teaching strategies, peers relationships and the classroom environment (Gullotta, Adams, & Markstrom-Adams, 2000). As such, formative assessment addresses each student as an individual including their personalised way of learning supporting them in developing a positive sense of self as a junior secondary student.

Wiliam (2013) asserts that when students take an active role in monitoring and regulating their learning the achievement of students is increased which creates a strong sense of self and increase their motivation levels. Similarly, the importance of self-regulation allows students to learn more about themselves as learners and develop the strategies that best allow them to achieve their learning goals (Csikszentmihalyi, 2014). The process of effective formative assessment, if implemented correctly, provides the opportunity to construct a supportive classroom environment and a learning climate that reflects the collaborative partnership amongst teachers and students. Successful teaching practices that respond to the needs of young adolescents along with a strong and positive student-teacher relationship, will allow young adolescent learners to develop

positive self-concept and identity within a supportive environment where it is safe to take a risk and learn from mistakes (Giles, 2012).

Parent and community involvement

Constantino (2008) defines parent and community engagement as the interaction between schools, families and the wider community and the level to which they are involved in their Children's educational lives. There is a growing body of research to show the importance of engaging parents, families and community in learning (Avvisati, Besbas, & Guyon, 2010; Hill & Taylor, 2004; Hill & Tyson, 2009; Tang, 2015). When supported and guided with the right strategies parents can help bring about improved outcomes for their children (Mapp, 2004).

Formative assessment is the pedagogical tool by which schools and teachers can engage parents to play an active role in their children's learning. Involving parents in the formative assessment process is a useful way of engaging with parents on a more purposeful and meaningful level, and has many benefits for students (Moore, Garbacz & Gau, 2016). Sharing students information from formative assessment through regular and open communication with parents will help them understand the role they can play in helping their children achieve success. When teachers regularly share students' work samples and provide meaningful written feedback, parents will have a better understanding of how they can best support their children. Written feedback can provide parents with a comprehensive view on where their children are in their learning, where they are going, and what needs to

be done to get them there (Barton & Woolley, 2017).

Notably, when parents engage with their children's learning, it provides an opportunity for a dialogue between parents and children about the learning. Putting the emphasis on learning and building students' motivation for learning also improves cognitive and social attributes (Gonida & Urdan, 2007). Additionally, parents' engagement allows teachers to develop deeper understanding of individual students' cultural and community backgrounds to support them in building healthy identity and connect with students in a meaningful and effective ways (Cooper, Jackson, Nye, & Lindsay, 2001).

Leadership

The Queensland Department of Education (2016c) explains that leadership programs for junior secondary students should contain two key elements: it is service based, and provides students with the skills that will affect their lives beyond the immediate environment of school. Formative assessment practices supports these key elements as it allows both the teacher and the students to identify where they are in their learning progression and identify the skills needed to reach the learning goal as well as provide a trajectory of future learning opportunity (service based) (Heritage et al., 2009).

As Heritage (2010) and Wiliam and Thompson (2008) identified, the first step in the formative assessment process is goal setting. Students' involvement in establishing their learning goal enables them to become challenge seekers rather than

challenge avoiders, students become motivated by the process over performance (Meyer, Turner, & Spencer, 1997). Formative assessment has the potential to empower students as it motivates them to learn and have control over their learning (Brookhart, 2013). This enables students to think for themselves and to share their understandings, which liberates them to become the leading and driving force in their own learning.

Local decision making

It has been established throughout this review that formative assessment is highly effective in raising students' achievement. To ensure success of every student, teachers and schools need to implement strategies that will best support their students' learning and help them reach their full learning potential.

All schools ultimately aim to raise student achievement while recognising individual students' differences. If schools and teachers use formative assessment as a pedagogical framework for teaching and learning, it can lead to educational reform. The OECD (2005) indicated that formative assessment improves equity of student outcomes ultimately improving the achievement levels mostly of underachieving students. Schools and teachers using formative assessment promote a culture of evaluation and reflection of practice, they use evidence-based data to evaluate the impact of teaching strategies on students' learning. As such, evidence-based practice provides schools and teachers with the bases for developing pedagogical framework for improvement (Hattie, 2005).

At a local level schools that make a conscious decision to develop a strong evaluation culture, focus on identifying which strategies best address different students' learning needs (Giles, 2012). Schools adopting formative assessment as an educational reform strategy support their teachers to collect information on student understanding and adjust teaching to meet identified learning needs (Duckor & Holmberg, 2017). School leaders then use the information to identify areas of strength and weakness and to develop strategies for a whole school improvement. At the system level, the information collected through monitoring of school performance is used to direct investments in training and support for schools, teachers and to set broad priorities for education as illustrated in Figure 5.

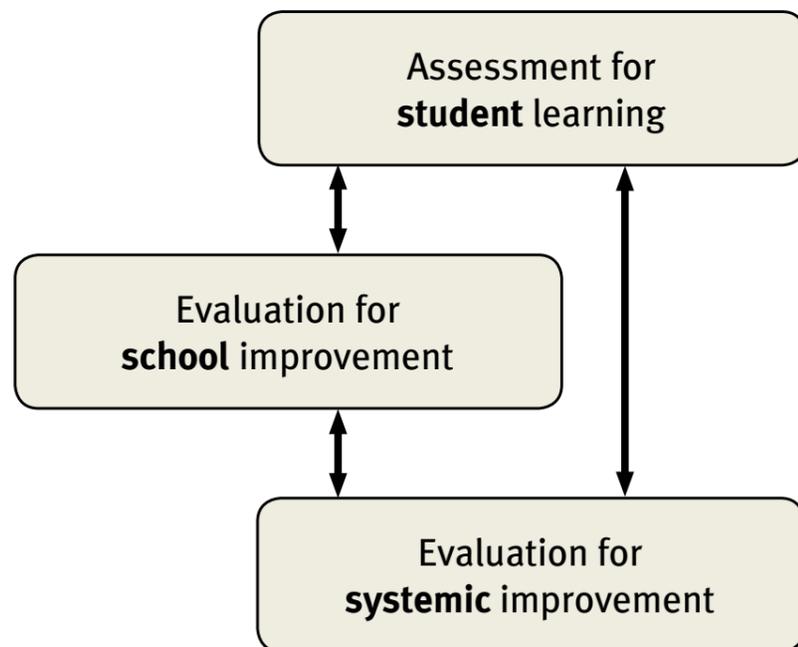


Figure 4: Coordinated Assessment and Evaluation (OECD, 2005)

It can be seen that an exploration of each of the guiding principles allows opportunities for appropriate and effective formative assessment methods to enable optimal learning for junior secondary students. Table 4 summarises how the guiding principles align with the critical elements of formative assessment as highlighted in the literature review.

Table 4: Formative assessment practices alignment to junior secondary six guiding principles

Guiding Principle	Explanation	Recommended formative assessment practices
Distinct identity	Formative assessment addresses each student as individual and their personalised way of learning supporting them in developing a positive sense of self as a junior secondary student	<ul style="list-style-type: none"> Students' involvement Self-assessment Learning goals
Quality teaching	The real essence of formative assessment is what the teachers learn about how students learn and how they use the information to decide on the most appropriate instructional strategy.	<ul style="list-style-type: none"> Learning progression Identifying gaps Eliciting evidence of learning
Student wellbeing	Formative assessment provides opportunities for collaboration and the activation of students as instructional resources for one another where they interact with peers to provide and receive feedback on their learning.	<ul style="list-style-type: none"> Meaningful feedback Student involvement (peer & self-assessment) Activate students as instructional resources for one another Collaborative group work
Parent and community involvement	Involving parents in the formative assessment process is a useful way of engaging parents on a more meaningful level. Sharing students information with parents will help them understand the role they can play in helping their children achieve success.	<ul style="list-style-type: none"> Meaningful written feedback Work samples Work Portfolio
Leadership	Formative assessments focuses on the process of teaching and learning and provides students with the skill of learning how to learn supporting them becoming long life learners and giving them leadership over their learning.	<ul style="list-style-type: none"> Learning Goals Success Criteria
Local decision-making	Schools and teachers using formative assessment promote a culture of evaluation and reflection of practice. The impact of teaching strategies is evaluated and evidence-based practice provides schools and teachers with the bases for developing pedagogical framework for improvement.	<ul style="list-style-type: none"> Systematic implementation of formative assessment model

Implications for future research

It is evident that formative assessment, as an instructional practice, can have a positive impact on students' learning outcomes, particularly in the middle years. Therefore, it is important to ensure that teachers not only gain conceptual understandings of formative assessment but also develop responsive pedagogies to

implement formative assessment every day in the classroom effectively.

Harlen (2007) explains that when teachers use formative assessment mechanically without a deep understanding of its meaning or purpose, it could have negative impact. As such, teachers need significant support in developing

meaningful formative assessment practices (Atkin, Coffey, Moorthy, Sato & Thibeault, 2005). This has implications for both policy writers and educators to determine their goal of improving students' performance. Future research agendas therefore should focus on providing teachers with professional learning on formative assessment.

In 2012, Wylie and Lyon identified the need for ongoing formative assessment research to address:

- The kind of instructional knowledge teachers need to engage in, interpret and act appropriately on evidence from formative assessment;
- The kind of feedback teachers need to improve the quality and frequency of formative assessment; and
- How teachers develop routines. (p. 2)

Dunn and Mulvenon (2009) indicated that more research is needed to indicate how formative assessment can assist specific age groups especially within the context of junior secondary students due to the 2015 Year 7 reform. Additionally, it is important for research to investigate how formative assessment can be used as a promising instructional practice

for middle years learners since there is limited research into how formative assessment can be used in the junior secondary context.

The Queensland State School Strategy 2016-2020 suggests a concrete direction for educators to employ quality evidence-based practices focused on success for every student. With this imperative, teachers need to be supported in understanding what evidence-based practices look like in the classroom. Only then can assessment fulfil its potential role as the most powerful force in systematic education reform.

Conclusion

In this article, we aimed to explore formative assessment as a promising pedagogical practice for supporting junior secondary students' learning via a comprehensive literature review based on a number of effective models. We have presented four assessment frameworks designed to support teachers in identifying key elements and signature pedagogical practices that will support effective implementation of formative assessment in the junior secondary years. We the aligned formative assessment strategies to the Junior Secondary Six Guiding Principles. This alignment, we hope, provides teachers the opportunity to adopt the signature practices of formative assessment and address the unique needs of students in this distinct phase of their learning journey.

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Staging a Numeracy Performance

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Abstract

Improving middle years students' engagement in mathematics and their numeracy skills has been an educational focus for many years. One approach is to utilise teachable moments in contexts beyond traditional mathematics classrooms that engage students in using mathematics in real world contexts, thereby developing their numeracy. This paper reports on student numeracy engagement through theatre staging workshops. Year 7 students were led by a professional stage manager to understand the role and the practicalities of stage management. While observing the workshops, it was realised that there were multiple opportunities to engage students in numeracy. Interview and observational data were collected to identify numeracy teaching opportunities and the nature of the mathematics involved. The workshops immersed students in a rich, real-world context that required them to apply mathematical knowledge and skills, especially in measurement, estimation and sequencing. The theatre context also gave the students opportunities to apply practical and logical reasoning skills that align with the Australian Curriculum general capability of numeracy. This paper provides teachers and schools engaging in contexts such as stage productions, an insight into how this creative focus presents a powerful real-life context that gives middle years students an imperative to use their mathematical knowledge and skills.

Introduction

For many years it has been recognised that there are issues around the literacy and numeracy of students in the middle years of schooling. The research literature abounds with studies and reports pointing to increased disengagement and disorientation of students in the early years of secondary schooling (e.g., Luke et al., 2003; Ministerial Council on Education, Employment, Training and Youth Affairs [MCEETYA], 2008; Main & Pendergast, 2017) and the accompanying drop in achievement in literacy and numeracy, as well as specific subjects such as mathematics (Doig, 2005; Lokan, Greenwood, & Cresswell, 2001; Luke et al., 2003). Gibbs and Poskitt (2010) conducted an extensive literature review and identified eight factors that influence engagement and achievement of students in the middle years namely, (a) relationships with teachers and other students, (b) relationship learning, (c) dispositions to be a learner, (d) motivation and interest in learning, (e) personal agency/cognitive autonomy, (f) self-efficacy, (g) goal orientation, and (h) academic self-regulated learning. Of particular interest in the context of the study described in this paper are motivation and interest in learning. According to Gibbs and Poskitt, these attributes are fostered by engaging students in learning activities that are enjoyable and by making learning meaningful to students.

In recent years, there has been increased recognition that the middle years in particular are a crucial period in which to develop students' numeracy prior to post-compulsory schooling and that numeracy is essential for success in

life beyond school (Dole, 2017). The promotion of numeracy is not solely the responsibility of mathematics teachers and indeed, in Australia, it is recognised as a general capability and the responsibility of teachers across all key learning areas (Australian Curriculum, Assessment and Reporting Authority [ACARA], 2017). According to ACARA (2017), teachers in all subjects are required to

identify the specific numeracy demands of their learning area/s; provide learning experiences and opportunities that support the application of students' general mathematical knowledge and skills; and should be aware of the correct use of mathematical terminology in their learning area/s and use this language in their teaching as appropriate (paragraph 2).

Identifying opportunities and using mathematical terminology can be a challenging requirement for teachers of subjects beyond mathematics and for teachers who are not trained in mathematics. However, it is vital that all teachers capitalise on those moments in their classrooms when mathematics is used and where students can use it in authentic ways and real-world contexts. The rationale for this approach is strongly supported by literature, which shows that numeracy is more than mathematical knowledge – it relies on the use of mathematics in context (Goos, 2007). Contextualising mathematics learning is important because when students use mathematics in context they are likely to have a stronger understanding than if they learn it in isolation (Zevenbergen & Zevenbergen, 2009). While context is an essential component of numeracy and an important aspect

of mathematical learning, we also know that students find it difficult to transfer their mathematical knowledge across contexts (Bransford, Brown, & Cocking, 2000). This understanding requires teachers to be able to recognise and capitalise on promoting the use of mathematical knowledge across as many contexts as possible. Often these teachable moments in numeracy can arise in diverse and unexpected contexts (Thornton & Hogan, 2005).

This paper presents a small case study that illustrates the multiple opportunities in a series of performing arts workshops that capitalised on teachable moments to promote numeracy in an authentic context. This case study developed during the course of a much larger project when it was realised that the activities in these workshops were engaging the participating students in using mathematical knowledge and skills to solve authentic problems. The paper aims to prompt teachers of all curriculum areas to reflect on the potential teachable moments within their own subject areas.

What is Numeracy?

Numeracy is variously described in the literature and the early definitions were criticised for their limited focus on mathematical knowledge and number use (Dole, 2017). A succinct definition of numeracy was provided by Willis and Hogan (2002): “numeracy is intelligent, practical mathematical action in context” (p.7). A more detailed definition was presented by the Australian Association of Mathematics Teachers (1997). This definition acknowledged the importance of using mathematics knowledge and skills in real world applications and the importance

of having a positive disposition to do so. In response to the diverse and numerous definitions proposed over the latter half of the 20th Century, Goos (2007) offered a more detailed description of the key elements that contribute to 21st Century numeracy. According to Goos, there are five key elements that together constitute what is meant to be numerate. These are mathematical knowledge (the mathematical skills and concepts that are usually articulated in the mathematics curriculum); tools (digital and physical mathematical tools as well as mathematical representations); dispositions (positive attitudes to mathematics, confidence, willingness to take risks, flexibility, and perseverance); a critical orientation (preparedness and ability to question, scrutinise, and challenge the use of numerical data); and contexts (real world and authentic situations as well as those related to multiple curricula). The centrality of contexts in this model and other definitions highlights the context-dependent nature of numeracy and the fact that it occurs when mathematics is used in authentic situations rather than in contrived situations such as those often encountered by school students. By exposing students to opportunities to use and apply what they know in authentic ways or by providing students with an imperative to apply their mathematical knowledge and skills, different contexts can move students from mathematical thinking to numeracy applications. Moreover, once a student can see reasons, through practical applications, for what they are learning in the mathematics classroom, their knowledge becomes more embedded in the real world.

The teaching of numeracy is the

responsibility of all teachers, which requires teachers of all subjects to take the concepts and skills that their students learn in mathematics classrooms and assist students to apply them in new contexts. In practice, however, this requirement can be challenging for non-mathematics teachers. In describing the Australian Curriculum, Goos, Dole, and Geiger (2012) argued that it “lacks a theoretically informed model for characterising numeracy, and as a result, teachers have little guidance in recognising the numeracy demands of subjects other than mathematics and in embedding numeracy learning opportunities across the whole curriculum” (pp. 314-315).

The Importance of Numeracy Engagement in the Middle Years of Schooling

Students are likely to develop attitudes to mathematics while they are still in primary school and these attitudes (whether positive or negative) may influence their engagement in mathematics (Dowker, Bennett, & Smith, 2012; Eccles, Wigfield, Harold, & Blumenfeld, 1993). Research has shown that when students have positive attitudes to mathematics they are likely to have higher levels of engagement and are more willing to persist when challenged. Further, these factors also influence achievement in mathematics (Adelson & McCoach, 2011; Barkatsas, Kasimatis, & Gialamas, 2009; Commonwealth of Australia, 2008; Goos et al., 2012; Pintrich & Zusho, 2002; Usher & Pajares, 2006).

Many students in the middle years of schooling exhibit low levels of engagement in mathematics and this has been of concern in

Australia for many years (Attard, 2011).

International results have provided significant evidence that addressing this concern is an imperative. For example, the 2011 Trends in International Mathematics and Science Study (TIMSS) showed that only 16 percent of Australian students in Year 8 had an interest in mathematics (Mullis, Martin, Foy, & Arora, 2012) and that Year 8 students were underperforming in mathematics with 37 percent failing to achieve at a proficient standard (Australian Council of Educational Research [ACER], 2012).

Low levels of engagement have been attributed to students not enjoying mathematics or seeing no personal relevance in mathematics. Interestingly, while the TIMSS 2011 findings revealed a concerning level of disinterest in mathematics, they also showed that 86 percent of students see at least some value in learning mathematics. Other research has found that even successful mathematics students dislike the subject because they do not see it as relevant to their own lives. That is, they do not identify with it (Boaler, William, & Zevenbergen, 2000).

Doig (2005) argued that making mathematics more relevant to students' interests is an important approach for addressing students' disengagement from mathematics. One approach to helping students see more relevance and to allow them to apply their mathematics knowledge and skills for a real purpose involves taking mathematics learning beyond the mathematics classroom. Indeed, Steen (2001) insisted that numeracy must be learned in multiple school subjects and not only in mathematics if it is to be of

use to students. According to Dole (2017), experiencing success in applying mathematics in contexts beyond the mathematics classroom, such as in other subject areas, can also assist students who experience mathematics anxiety. Experiencing this success can have a positive influence on one of the most important aspects of numeracy in the middle school: having a positive disposition to using mathematics.

Background to the broader study and impetus for the case study

The theatre staging workshops that are the focus of this paper were part of a larger programme known as Sky High, which aimed to engage students in meaningful curriculum-based learning in a range of contexts beyond school. This program was a philanthropically funded program and was conducted through the University of Technology Sydney (see acknowledgements). The program involved lower secondary school students from a number of Western Sydney schools. The students who were chosen were selected by their schools on the basis that they came from backgrounds of disadvantage and were at risk of not achieving their educational potential. Many of the students were disengaged or have negative attitudes to school. The program ran for two years and aimed to promote school engagement, develop confidence, enhance a sense of options for futures as well as building social and life skills. The educational activities emphasised real world experiences and contexts. To facilitate these goals, 12 full-day activities were offered to students in the first year of the program and a further 12 in the second year. Several of the workshops included follow-up activities in the schools.

The Sky High program has been an ongoing research project since 2012, however, more recently, the research focus has been on ways to engage students and to enhance skills, including literacy and numeracy. The authors of this paper are involved with the project as researchers, and the third author also acts as events facilitator and in addition to her role with Sky High, she is a professional stage manager at the Sydney Opera House (SOH).

In the case of the theatre staging workshops, more than 60 students from six different schools were taken to the SOH with the stage manager for a behind-the-scenes tour. The students experienced a 'bump in' of a show, witnessing the set-up of lighting rigs, sound systems, and stage furniture, while cross-referencing their progress with a provided floor plan. This experience was the catalyst for subsequent practical theatre staging workshops within each of the six schools. The focus of the workshops was to role-play the responsibilities of the stage manager and technicians and to focus attention on staging placement, sequencing, and timing while effectively communicating with each other to deliver a dramatic scenario.

While conducting an earlier theatre staging workshop, the authors of this paper realised that beyond achieving the initial stated goals, this context provided a very rich opportunity for the application of students' mathematical knowledge: It was a powerful numeracy teaching and learning opportunity. As mentioned previously, these workshops and the focus on numeracy were not planned as a separate study. The idea for this case study and the data that are presented in this paper arose incidentally when the third author

accompanied the students to a SOH event. Interestingly, when attention was drawn to this, the stage manager, whose background is in theatre and stage management, not mathematics education, was surprised at the amount of numeracy that was involved, stating that her intention had not been to focus on mathematics in the workshops. As a result of these observations, it was decided that at subsequent events, data would be collected to allow the researchers to identify numeracy teaching opportunities that might commonly be presented to students engaging in a performing arts context of this kind.

This article describes the different mathematical concepts and skills that were evident in the theatre staging workshops at both the SOH and the follow-up at one of the schools, and provides examples of how students engaged in using them. The purpose of this paper is to illustrate to teachers the multiple ways that a seemingly non-mathematical context offered rich and varied opportunities to engage students in the meaningful use of mathematics.

Method

Workshop Participants and Setting

Approximately 60 Year 7 students from six different Western Sydney schools participated in the behind-the-scenes tour of the Sydney Opera House (SOH) with a resident stage manager. Subsequent practical theatre staging workshops were conducted with groups of students in each of the six participant schools. The data presented here were collected during the SOH workshop and at a subsequent workshop involving 12

students in one of the participating schools. This article focuses on the ways in which the stage manager engaged the students to use various mathematical skills and concepts during the workshops.

Study Design

A case study was designed to focus specifically on the numeracy elements of theatre staging workshops as a means of identifying opportunities for engaging students to use mathematical skills and knowledge in authentic ways. Since this small-scale study grew out of a broader study not focused on numeracy development, the decision to use a case study approach was based on the opportunity to observe this stage manager with the group of students with whom she was working at the time. The case study focuses on the activities and the opportunities to use mathematics rather than on the stage manager herself. According to Merriam (1998), a case study is a particularly useful design if the focus of interest is process. Further, it is a useful approach when dealing with a unique situation for which it is important to describe an implementation or program. Yin (2003) argued that case study design is suited to situations in which the phenomenon cannot be separated from its context or when the single case represents a context not previously accessible. This view was reiterated by Flyvbjerg (2006) who argued that the case study is especially suited to producing context-dependent knowledge.

In the case of this study, the context was the theatre staging workshops. The research question addressed in the study was: What are the mathematical skills and concepts utilised by students when they engage in theatre staging

workshops and how do these align with the organising elements of the Australian Numeracy Learning Continuum (ACARA, 2015b)? The broad aim of the study was to illustrate to teachers the ways in which every day, seemingly non-mathematical contexts can in fact be rich and valuable for engaging students in numeracy.

Data Collection

The third author, who in addition to her role as professional stage manager at the SOH is also a theatre educator and education researcher, acted as facilitator of the workshops. The first and second authors collected data during the workshops and conducted interviews with the stage manager to clarify and expand on notes made during the workshops. At the theatre staging workshops, observations were made and field notes and photographs were used to record the instances in which students were required to draw on mathematical knowledge or skills in order to participate in the workshop activities. The workshop planning documents and other artefacts used in the workshops were also collected. The facilitator of the theatre staging workshops was later interviewed by the other authors (both mathematics education researchers) to elaborate on the specific numeracy abilities required of students when participating in the workshops.

This elaboration also allowed for validation of the observations made and to ensure the accuracy of the descriptions of the context and activities involved.

Data Analysis

All field notes, interview transcripts, and artefacts were analysed to identify instances in which mathematical ideas and skills were used. Each of these instances was mapped these against the Australian Numeracy Learning Continuum (ACARA, 2015b) to identify the organising elements to which they related (i.e., Estimating and Calculating with Whole Numbers; Recognising and Using Patterns and Relationships; Using Spatial Reasoning; Interpreting Statistical Information; Using Measurement; and Using Fractions, Decimals, Percentages, Ratios and Rates). After identification of the relevant organising elements, the instances were also aligned with the descriptors of the key ideas within each of the organising elements. The first and second authors conducted this analysis independently in the first instance. The team members then compared their analyses to ensure alignment of their interpretations.



Results

When mapped against the six organising elements from the Numeracy Learning Continuum, the activities aligned with three, namely, Estimating and Calculating with Whole Numbers, Using Measurement, and Using Spatial Thinking. The activities and the organising elements and key ideas to which they align are summarised in Table 1.

Table 1. Summary of Results: Theatre staging activities and curriculum links

Numeracy Continuum Organising Element and Key Ideas	Activities
<p><i>Estimating and calculating with whole numbers: Students</i></p> <ul style="list-style-type: none"> estimate and calculate with whole numbers to solve everyday problems in authentic contexts use efficient mental, written and digital strategies 	<ul style="list-style-type: none"> Estimation of seating numbers: counting rows, multiplying by numbers of chairs Checking answers by calculating using written strategies and calculators
<p><i>Using spatial reasoning: Students</i></p> <ul style="list-style-type: none"> use symmetry, shapes and angles to solve problems in authentic contexts interpret maps and diagrams use scale and directional language 	<ul style="list-style-type: none"> Using symmetry to mark out stage Using angles to make decisions about lighting, position of performers Interpreting scale diagrams to position performers, actors, props, etc. on stage Understanding directional language (e.g., upstage, centre stage) to follow stage directions
<p><i>Using measurement: Students</i></p> <ul style="list-style-type: none"> estimate, measure, compare and calculate when solving problems in authentic contexts (length area, time) identify and sequence events, operate with clocks and use timetables 	<ul style="list-style-type: none"> Estimating dimensions of stage and location of centre stage, position of actors, orchestra, etc. using benchmarking and checking with tape measures Sequencing events for a performance using cueing involving timing of multiple processes performed simultaneously

All of the activities required students to draw on a range of mathematical knowledge and skills, which were combined in diverse scenarios to allow students to solve real problems for the smooth running and coordination of the stage management tasks in which they were engaged. In the following section, these key ideas are elaborated with further descriptions of the activities. The purpose of this is to support teachers to recognise numeracy opportunities within their own contexts.

Measurement of Distance and Area

Following the staging workshop at the SOH, the students needed to take their knowledge and translate it into a school setting, which meant that they had to downscale the stage and audience areas. Theatre staging requires a combination of exact measurements and estimations. For example, the students used a tape measure to accurately position centre stage but often estimated approximate locations by pacing out. Photos of this activity at the SOH are shown in Figure 1. An example of the discussion from a school-based workshop follows. In this scenario, three students have volunteered to mark out the stage.



Figure 1. Using benchmarking and pacing out to create mark up of stage (bottom), marked-up stage showing centre stage and wings (top).

Defining spaces on the stage or for the audience or orchestra also required the students to use a combination of measuring skills. For some, tools such as a tape measure were used; for others, informal measurement units or estimating by benchmarking were used; or sometimes a combination of all of these was used, for example, the area for the audience was measured in terms of chairs (informal use of units) by making one row of chairs, measuring it and multiplying it to determine how many chairs

would fit in the available space. In the school-based workshop, the students were working in the school theatre, which is a much smaller space than the SOH theatre they had previously experienced. The discussion centred on the number of chairs in the school theatre compared to the SOH and why the seats in a large theatre are raked:

Stage Manager: How many seats are in this theatre? How could we find out without counting all of them?

After some discussion, a student answered, ‘there are 13 rows and

Stage Manager: Find the centre stage – how do you know you’re in the centre?

Student 1: We could count the audience chairs – there would be half on each side.

Stage Manager: That’s a good idea. What if I don’t have a tape measure – what else could we do?

Student 2: Estimate? We could count our steps. (The student paced out 10 steps across the marked-out stage).

Student 3: So, there would be five steps to centre stage.

The students finally used a tape measure to determine the accuracy of their estimations and marked centre stage.



there are 9 chairs on this side and the same on the other side.’

Stage manager: Good, so how many is that altogether?

A student using a calculator answered, ‘13 times 18 is 234.’

Stage manager: What if we have 10 times that many seats, how many would that be?

Student: 2340

Stage manager: So, would it be easy to see from the back? Why? What could we do?

The students agreed that it would not be easy to see the stage and the conversation turned to the use of tiered or raked seating so that the audience could see the stage. This conversation was also used to describe the origins of terms such as upstage and downstage from early theatres in which the stage rather than the floor was raked. This discussion led to a series of activities that utilised spatial reasoning.

Using Scaling and Spatial Reasoning

An extension of the estimation of locations using stage measurements requires stage managers to mark out positions of performers, props, or musicians using a scale drawing (a mathematical representational tool). In a school performance space, such as a classroom or outdoor area, there is often no stage as such. The space must be seen as a whole and then plans must be drawn to represent the relative sizes and locations of the performance area, music area (if needed) and audience area. These must be considered in relationship to each other with a clear understanding of the size of the cast and the number of people expected to attend. These areas must be kept in practical proportions to facilitate the performance. An actual floor plan of a show was used to set up the space. Students used measurements of spaces to draw plans to scale. These scale drawings were then used by students and teachers to plan various stage movements of the actors and props. Figure 2 shows an activity conducted with the students, which involves the translation of a two-dimensional scale drawing of a floor plan to a marked-up stage to position musicians on stage.

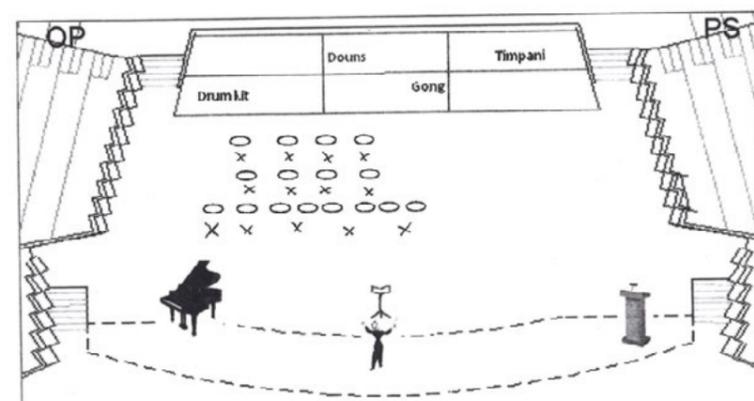


Figure 2. Defining positions using a floor plan (left), floor plan (right).

Measurement of Time

One of the keys to successful stage production is timing. There are many elements that need to be drawn together in the correct sequence with timing elements, from running sheets (simple order of events) to cueing, and timing of sound effects and lighting. Precise timing allows the coordination of the director, conductor, cast and crew. The stage manager directs the timing using a complex arrangement of timers, monitors and intercom systems as shown in Figure 3.



Figure 3. Stage manager explaining the cueing process and procedures involved.

The students were given the opportunity to develop these schedules for the production. This activity began with a discussion of a familiar situation that has a sequence of events (topics included birthday parties, going to the movies and the school's morning routine). These discussions were used to develop the language used in the theatre to communicate to those responsible for particular cues (e.g., 'Cue 1 lighting stand by'; 'Lighting standing by'; Cue 1 lighting go'). The students were then asked as a group to create a timed sequence of cues for a medal award ceremony. This required the students to role play those responsible for sound, lighting, announcements, medal presentation and recipients. This activity provided a powerful experience of the need for precision and coordination of timing in a complex situation.

Measurement of Angle

The understanding of angle is a major aspect of any stage performance. Cast and crew need to be very aware of angles in many circumstances. For example, performers need to be aware of how they orient themselves to the audience and each other; lighting crew must understand the positioning of the lights and the cast. In fact, lighting crew need to co-ordinate many important mathematical concepts simultaneously, including the constantly changing distance and angle from the cast members or adjusting the aperture of spot lights to cover different positions and areas, as well as the timing of each of their actions. Workshop activities that exposed students to these elements of mathematics are shown in Figures 4 and 5.

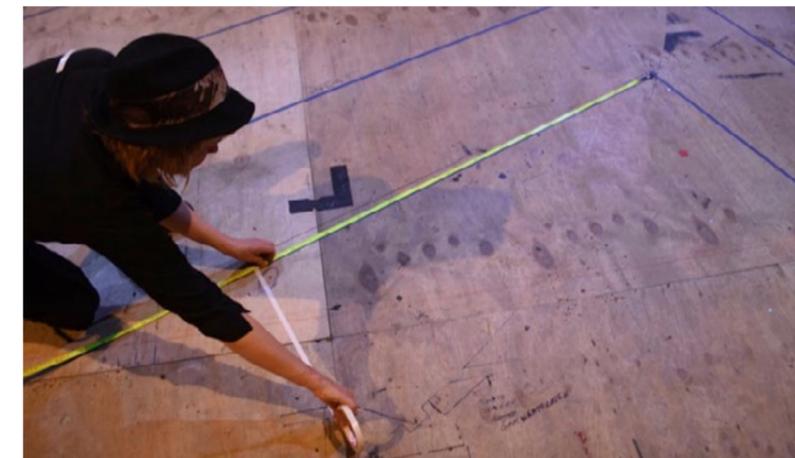


Figure 4. Measuring distances and angles on stage.



Figure 5. Estimating angles for stage lighting.

Discussion

This study explored the nature of the mathematical skills and concepts utilised by students when they engage in theatre staging workshops. It also focused on identifying the alignment between the mathematics used and the organising elements of the Australian Numeracy Learning Continuum (ACARA, 2015b). The findings of the study show that performing arts activities such as learning about stage management can indeed engage students in mathematical reasoning and that such activities provide teachers with opportunities to expose their

students to the use of mathematics in rich and real-world contexts. In particular, the workshops engaged students in the key numeracy elements of measurement, spatial thinking, and estimation and calculation. While only three of the six organising elements of numeracy were identified in the staging workshop activities, this finding aligns closely with the Arts Curriculum document (ACARA, 2013) which identified the use of number to calculate and estimate; use of spatial reasoning to solve problems involving space and 2D shapes; using scale to describe positions; and using measurement to explore length, angles, and time

as the key elements of numeracy to be developed through the Arts.

While identifying the mathematical elements in what may appear to be non-mathematical learning tasks can be a challenge for teachers, it is important that all teachers are aware of the potential within their subject areas and that they capitalise on them when possible. This need not be an onerous task. This study has shown that often the mathematics reveal themselves, and while the use of mathematics may seem incidental, it is nevertheless important. Often, non-mathematics teachers need not change the content of their lessons but rather, when the students are using mathematics the teacher should make this explicit to the students. Foregrounding the mathematical thinking in this way helps students to make connections between their mathematics knowledge and its use in the new context. This approach makes a significant contribution to students' learning as it is well known that students don't find it easy to transfer knowledge from one subject to another (Bransford et al., 2000).

In terms of the Goos (2007) model of numeracy, four key elements of the model were evident in the workshops. The students were required to use mathematical knowledge (such as mathematical concepts and estimating and measuring skills) to solve problems in a new context. They utilised a range of mathematical tools (including calculators, measuring tools, and diagrams) in authentic situations and perhaps most importantly, they did so enthusiastically, thereby demonstrating positive dispositions. While it is clear that new mathematics learning must

be the realm of the mathematics classroom, this article has highlighted an example of an authentic context that allows teachers to support and reinforce students' numeracy and provided an example of an approach that fulfils the call of researchers such as Doig (2005) and Steen (2001) to engage in numeracy across subject areas. Having an explicit focus on students using mathematics in activities such as the stage management workshops is also an effective means of helping students see the relevance of mathematics in everyday real-world situations and promotes interest and motivation because mathematics is used in a meaningful way for a real purpose. This approach aligns with the work of Gibbs and Poskitt (2010) and addresses the imperative to move away from contrived situations.

This was a small-scale case study and, as such, the findings are limited due to the small sample size and the unique context in which the study was conducted. It is however, this uniqueness that allowed us to focus on a specific example of a performing arts activity that offered multiple opportunities for students to engage in authentic uses of mathematics in a context that did not overtly appear to be mathematical in nature. We hope that through this study we have been able to shed some light on the importance of being cognisant of mathematical opportunities to promote numeracy in all our subject areas to support our students' development of this very important life skill.

Conclusion

Being numerate is an advantage for people's work life and opportunities, their role as active and engaged citizens, and for their success in their personal and social lives (Goos, 2007). As all teachers are responsible for the teaching of numeracy, engaging students in authentic activities can provide a rich encounter in numeracy to the benefit of students. As numeracy is a general capability articulated in the Australian Curriculum and is the responsibility of all teachers, it is important for teachers to recognise the teachable numeracy moments in varied contexts. If appropriate numeracy teaching opportunities can be recognised by teachers in the diverse activities in which they engage throughout the year, then powerful numeracy learning opportunities can be enjoyed by students. Keeping some middle years students engaged in school can be difficult. Providing them with exciting real-life opportunities in which their learning has relevance to them can help in the process of motivating their continued engagement. However, once engaged, there are often rich opportunities to extend their learning beyond the initial focus of the activity.

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Building citizenship in the middle years:

Leading the implementation of student-centred curriculum integration in an Aotearoa/New Zealand school.

Tony Dowden

Barbara Fogarty-Perry

Abstract

The study discusses the implementation of Beane's model of student-centred curriculum integration via the professional narrative of a primary school principal who implemented the model in Aotearoa New Zealand. The findings show that implementing student-centred curriculum integration in contexts that are meaningful and relevant to students has the capacity to significantly enhance the value and impact of students' learning. In the process, the democratic design of Beane's model allows issues of diversity, inclusion and social justice to be successfully tackled by empowering students to 'make a difference' in their communities.

Introduction

Most of the literature on curriculum integration (CI) indicates that it is a curriculum design that is best suited to the middle years of schooling. In the 1990s, Progressive educationalist James A. Beane identified the middle schooling context as natural fit for CI and went on to champion his model of student-centred CI as the ideal curriculum for the middle years of schooling in the USA (Beane, 1993, 1997). It is now clear that student-centred CI is well suited to meeting students' learning needs in the middle years (Beane, 2013; Dowden, 2014; National Middle School Association [NMSA], 2010; Pendergast, Nicholls, & Honan, 2012; Springer, 2013; Wallace, Sheffield,

Rennie, & Venville, 2007). In addition, the Position Paper of the Middle Years of Schooling Association (MYSA) in Australia, now known as Adolescent Success, states that middle years' students need "integrated and disciplinary curricula" that are "challenging, integrated, negotiated and exploratory" (MYSA, 2008, n.p.).

In Aotearoa/New Zealand (NZ), the national curriculum carries a commitment to democracy, egalitarianism and equity, which reflects the bicultural values of Maori and Pakeha (NZ European) people in NZ society (Ministry of Education, 2007). The NZ curriculum encourages teachers to develop local curricula and consider ways that the subject

matter of the official curriculum can be contextualised within the life experiences of their students. The NZ curriculum also encourages a degree of student-centred CI. It states:

The values, competencies, knowledge, and skills that students will need for addressing real-life situations are rarely confined to one part of the curriculum. Wherever possible, schools should aim to design their curriculum so that learning crosses apparent boundaries. Ministry of Education (2007, p. 38)

Some educators have argued that student-centred CI aligned with engaging pedagogies and authentic

assessment that investigate 'real life' issues is ideally suited to the middle years of schooling in NZ (Dowden, 2007, 2010, 2012; Dowden, Bishop, & Nolan, 2009; Dowden & Nolan, 2006). In particular, several teachers in NZ have been attracted to Beane's model (e.g., Brough, 2012; Fogarty-Perry, 2016; Fraser, Aitkin, & Whyte, 2013).

Why integrate the curriculum?

The typical school curriculum that many middle years' students experience is like asking them to do a jigsaw puzzle without seeing the picture and only giving them some of the pieces (Beane, 1991). In contrast, CI gives students an opportunity to view the 'big picture'. In his review of over a hundred studies of CI, Vars found that "almost without exception, students in any type of interdisciplinary program do as well as, and often better than, students in a conventional [single subject] program" (2000, p. 87). Inquiry into a topic, problem or issue often means that crossing disciplinary boundaries is logical and necessary.

A roadmap for curriculum integration

The concept of CI and the terminology attached to it has a reputation for being difficult to understand (Springer, 2013). The literature includes a range of terms for CI including 'multidisciplinary curriculum', 'interdisciplinary curriculum', 'transdisciplinary curriculum', 'fused curricula', 'cross-disciplinary curriculum', 'integrative curriculum', along with 'integrated curriculum' and 'curriculum integration' (Dowden, 2007). Given the difficulties of untangling and defining these terms, it is simpler to return

to first principles. CI implies a holistic approach to designing the classroom curriculum where subject matter, cross-curricular links, pedagogy and assessment are constructively aligned. With this in mind, Dowden defined CI as:

A collective term for curricula where meaningful learning activities are designed by crossing discipline boundaries and/or utilising multiple disciplinary perspectives with the purpose of helping students to create and enhance knowledge and understanding. (2014, p. 18)

Conceptually, CI can be separated into two distinct approaches originating a century ago (Dowden, 2007; Gehrke, 1998). The first approach is the subject-centred or thematic model that involves correlating subjects according to a common theme (Hopkins, 1937). In the USA, this approach is constructed by teacher teams, usually representing the main subject areas of English, science, mathematics and social studies, who each fit their subject into an organising theme such as 'Medieval Europe' but without particular reference to students' interests or concerns and, in some instances, in ways that are contrived (Beane, 1997). As Dewey explained a century ago, sound curriculum design should be logical and not involve artificial means of correlation such as "weav[ing] a little arithmetic into the history lesson and the like" (1900, p. 91). A variation of this first approach is to designate certain subjects as naturally fitting together, for example STEM (science, technology, education, and mathematics). Although teachers have managed to implement innovative approaches to STEM

projects by using student-centred pedagogies (Rennie, Venville, & Wallace, 2012), the logic attached to limiting an integrated unit to just the four STEM subjects is questionable – especially in the primary school context, which compared to the secondary school context is relatively free of subject-area constraints – because it adds an artificial and unnecessary hurdle to curriculum design. In addition, a significant risk to successful implementation of this first approach in the middle years is that young adolescent students are not given ownership of the curriculum and may be unwilling to buy into it (Dowden, 2014).

The second approach to CI design is a student-centred model that involves collaboration by students and teachers during the process of curriculum construction and implementation (Beane, 1997). The student-centred model has the potential to catalyse remarkable outcomes including deeper learning and enhanced academic outcomes as well as developing advanced learning skills, especially social skills associated with working in a team (Springer, 2013). In addition, the student-centred approach closely aligns with students' developmental and learning needs in the middle years (Caskey & Anfara, 2014). Indeed, the NMSA found that young adolescent students in the USA who participate in student-centred CI programs, "exhibit high levels of commitment, energy and performance [and assume] greater responsibility for their learning and their actions" (2002, n.p.). This article focuses on this second, student-centred approach to CI, in particular Beane's model.

Beane’s student-centred model of curriculum integration

Beane’s model of student-centred CI (1997) utilises half-forgotten ideas about integration that were explored by Progressive educators

approximately a century ago (Dewey, 1900, 1916; Hopkins, 1937). The student is at the heart of student-centred curricula, which means that the student – rather than the teacher – is assumed to have responsibility for the process of integration. Accordingly, the most radical and eye-catching

aspect of Beane’s model is that the teacher and students collaboratively construct and implement the classroom curriculum together. Beane’s model incorporates the key components of personal integration, social integration and the integration of subject matter according to a theme (see Table 1).

Personal integration	Each student continuously constructs and refines their understandings of knowledge and develops key learning skills in ways that are personally meaningful to them, especially with reference to existing knowledge and familiar contexts.
Social integration	Students develop key learning skills for operating effectively in social contexts including working collaboratively, solving real-life problems and building self-discipline.
Integration of subject matter	Integrated units are organised collaboratively, by the teacher and the students, according to a theme and relevant subject matter that is identified as being necessary to address the theme.

Table 1: Components of integration within student-centred curriculum integration

Personal and social integration are processes that students actively carry out. As such, personal and social integration are central to Beane’s model and not only address the development of personal knowledge and skills but also teach students how to learn together and, ultimately, prepare students for active citizenship in a democracy. Themes can be anything the teacher and student collaboratively agree upon, such as a complex problem, a social issue or a particular topic. The subject matter for each theme is generally, but not exclusively, drawn from the formal subject areas in the official curriculum. Accordingly, Beane defined his model of student-centred CI as:

Themes for units are generated from students’ personal questions or concerns. Working in collaboration with teachers, students are asked two questions: ‘What questions or concerns do you have about yourself?’ and ‘What questions do you have about your world?’ As these questions are addressed, a theme is chosen and the subject matter needed to investigate the theme is identified and refined as the unit progresses. Accordingly, the teacher and students work collaboratively to plan and implement the integrated unit.

Beane’s underpinned his model with the interrelated principles of democracy, dignity and diversity (1993, pp. 64-67). Democracy refers to a commitment to inclusion, thus it implies that the curriculum should be the logical outcome of including everyone’s input (Beane, 1997). Dignity refers to a commitment to each person so that individual difference becomes honoured and celebrated. Diversity refers to recognising ethnic and cultural values, including youth

cultures, so that each person is included. Together, these three principles ensure that the classroom curriculum and, by extension, learning experiences and assessment are relevant and meaningful for every student (Beane, 1997).

Up-take of Beane’s model of curriculum integration

Beane’s model has never gained widespread acceptance in mainstream education. Although the model is ideal for coupling with rich pedagogies and actively engaging young adolescents by challenging them to develop higher order thinking skills and investigate real-life issues connected to local and global contexts (NMSA, 2010), it is not suited to more conservative learning environments where the implicit expectation is that the teacher alone will plan and implement each lesson and where academic progress is measured by narrow criteria, which typically include a standardised agenda and high stakes testing. Indeed, a review of educational history of CI and allied curriculum designs in the

A curriculum design theory that is concerned with enhancing the possibilities for personal and social integration through the organization of curriculum around significant problems and issues, collaboratively identified by educators and young people, without regard for subject-area lines. (1997, p. 19)

USA from 1950-2000 showed that student-centred curriculum designs always struggle for acceptance whenever the political climate takes a conservative turn (Vars, 2000). Nonetheless, student-centred CI continues to flourish and demonstrate advanced learning outcomes in small and scattered but dedicated learning communities in the USA (Springer, 2013). For instance, two well-known examples of student-centred CI programs in the USA that utilise Beane’s model, and have been implemented in middle schools for at least three decades, are located in Wisconsin (Brodhagen, 2007) and in Vermont (Kuntz, 2005).

NZ has been described as having an educational context that is generally more favourable than the USA for student-centred curriculum design (Springer, 2013), yet the history of education in NZ indicates that it has been within certain more progressive periods, such as the 1920-1940s, when most examples of student-centred CI have been implemented (Dowden, 2011). Accordingly, the evidence indicates that a benign political climate that is supportive of innovation and experimentation may be a necessary prerequisite to implementing and sustaining student-centred CI. The remainder of this article focuses on a narrative that discusses the personal experience of implementing Beane’s model of CI: Barbara’s narrative as a primary school principal in NZ.

The study

The professional narrative in this study was generated when the first author, Tony, asked the second author, Barbara, to share her story of her lived experience when implementing Beane’s model of

CI with respect to the needs of young adolescents. The data from this story was then collaboratively “restored” into a narrative by both authors in their respective roles as co-researchers (Creswell, 2014, p. 13).

Barbara was the Foundation Principal of a new primary school (Years 1-8) in an alpine resort town in NZ. She identified Beane’s model of CI as an ideal approach for developing and implementing a new curriculum in her school because it aligned with her educational philosophy and was an ideal means of including every child and young person in the learning and teaching process. In an earlier publication she explained that, at the fundamental level, she believed:

A commitment to social justice in schools leads us to a model of inclusive practice where everyone needs to be involved in the social processes and a change in power structures needs to occur. (Fogarty-Perry, 2016, p. 5)

The following narrative specifically focuses on the learning experiences of young adolescents in Years 5-8 but from, time to time, it adopts a whole-school perspective because this the natural vantage point of a school principal.

The right disposition for CI

Barbara realised that, in her role as a foundation principal who planned to implement Beane’s model throughout a new primary school, she needed to ensure the school employed teachers with the right disposition for implementing Beane’s model. In addition, she understood the need to clearly explain the curriculum design to

parents and the school’s board. Barbara explained:

The school began with three teachers and I was fortunate enough to have a new graduate who knew about Beane’s work with me as a teacher in the school. As it was a brand new idea, CI needed to be explained carefully to the Establishment Board (who were very excited about it), the parents and the students. The other classroom teacher, who had used inquiry learning for many years, found that Beane’s model was a logical next step for her.

Implementing Beane’s model of CI

Barbara and her colleagues soon realised that Beane’s model of CI is ideal for meeting the requirement in the NZ Curriculum for “the principal and staff [in each school] ... to develop and implement a [local] curriculum” (Ministry of Education, 2007, p. 44). Barbara explained:

The classroom curriculum was collaboratively planned by the teacher and students. Subject matter from the local context formed the initial basis for students’ studies as the natural environment was very beautiful and conducive to exploration via CI. Later, as the ‘Special Character’ aspect (associated with being a Catholic school) of our schooling emerged, in terms of God as Creator and the community as custodians of Nature, students began to think beyond themselves and started to query the impact of community actions, the health of the environment, and climate change; and what they could do to address issues in these spheres.

Barbara and her colleagues implemented Beane's design for generating topics for CI but with a small modification. She explained:

The areas studied were generated from students' personal and social concerns, by asking the following questions:

- *What questions/concerns did they have about the world or about themselves?*
- *What did they wonder about?*
- *What kept them awake at night?*

These questions were grounded in the concept of democracy, with all students having one vote on what they should study and with all voices being heard.

Supportive learning environments

Barbara believed that implementing Beane's model in her school led to a positive learning and teaching environment because negative behaviour exhibited by students was rare. As an experienced teacher in the NZ context, she found it especially notable that there were no serious behavioural problems in the first four years of the school's existence. She explained:

A remarkable outcome of implementing Beane's model of CI was that during my stint as Principal, minimal time was spent working on behavioural issues. In four years, the school grew from 26 pupils to almost 90 students and there were zero suspensions, stand downs or expulsions. The sense of involvement and control students derived from being part of the process of collaborative curriculum design led to high levels of student

interest and engagement. Students had considerable freedom and choice in terms of how they worked, which made learning interactive and fun. They also had great flexibility in what they studied, how they studied, how they presented their work and how their work was assessed. The teachers ensured students' voices were always heard. Over time, students gained increased power and control over their own learning and poor behaviour became increasingly rare.

Social justice

Barbara found that the democratic nature of Beane's model meant that teaching students about social justice, equity and inclusion – where students learn best by having experiences that are anchored in contexts beyond their self-interest – was straightforward:

Students began to develop the values attached to social justice, inclusion and equity. Respecting others was part of the school ethos, which was based on the notion of treating others as you want to be treated and the fact that we are a family. There was a strong focus on inclusion in the school and involving everyone, no matter who they are. This inclusive ethos meant the school began to attract students with special needs from other communities. Beane's model of CI, which is underpinned by the principles of democracy, dignity and diversity, was ideal for what we hoped to achieve.

She explained that student-initiated projects, particularly fund-raising and social action, were prevalent:

Years 5-6 students set about cleaning up the shores of the

nearby lake, while Years 7-8 students wrote to the [local government] Council about installing traffic lights at a busy intersection in the town.

Barbara explained how the curriculum helped develop and enhance students' personal values, especially in relation to accepting and getting to know others from different backgrounds:

In this way the values of social justice and equal rights began to develop. We had thirty different nationalities in the school, so we took steps to ensure each individual felt included. We had welcome signs at the door in all of their languages and we had days where national costumes were shared and foods from different nations were sampled. This all helped to celebrate diversity within our school community.

Congruent pedagogies

On occasion, Barbara and her colleagues engaged in pedagogies that did not neatly dovetail with Beane's curriculum design, yet they were fully congruent with a student-centred approach to learning and teaching and Beane's foundational principles of democracy, dignity and diversity. Indeed, catering for diversity in the middle years' classroom is particularly important because these are the years that shape young adolescent students' self-concept, personal beliefs and values (Caskey & Anfara, 2014). Beane (2013) also explained students should be specifically taught to value others and celebrate difference in the classroom.

Barbara recounted an especially effective activity that taught a Year

7 class an important lesson about valuing others who are different to them. She explained:

A female student with a severe physical disability joined a Year 7 class during the year. She had a teacher aide assigned to her for all her lessons. The teacher overheard some students mentioning that the new girl 'must be dumb' if she needs a teacher aide. The teacher pondered on how to teach the class to be more inclusive and came up with the idea of using a gift as a prop for learning. She wrapped up 25 new pens and 25 posters, with a gift box template on each poster, and put them inside a large shoe box before covering it with fancy wrapping paper and a gold ribbon. The girl with the disability was sent on an errand. The teacher told the rest of the class that each person is like a gift, wrapped up slightly differently to the next person, but with essentially the same needs inside. The teacher explained that everyone needs acceptance, friendship and to be included. She went on to explain that, even though the new girl is wrapped up on the outside in a way that is very different to her classmates, her needs on the inside are the same. The teacher explained that the new girl has the same ability level as most of the other students but needs a teacher aide to assist with her to complete tasks and, with a supportive community at school that includes her classmates, she will succeed. She then opened the box and gave each student a new pen and a poster and asked each person to describe themselves and their strengths within the outline of the gift drawn on each poster. After the class had completed their posters, they were displayed on the classroom wall to remind everyone that in order

Citizenship

The component of social integration in Beane's model helps students to develop the skills of citizenship. Barbara explained:

Our students soon showed evidence of citizenship and entrepreneurship. One savvy student offered to pay others to vote for her question, which she really wanted answered! Social action became an integral part of each unit and taught students that they have the power to be agents of change. Students increased their level of self-discipline as they learned to include others, especially peers with special needs.

Community support

Student-centred CI is not a mainstream curriculum design, thus it is essential to gain the support of stakeholders in the school community. Accordingly, Snapp (2006) explained that educational leadership provided by the school principal plays a critical role in the success or otherwise of student-centred CI. In her role as principal, Barbara developed a range of strategies to help stakeholders understand Beane's model of CI and convince them that a student-centred philosophy to learning and teaching has significant benefits for young people. She explained:

As community stakeholders started to understand CI and could see benefits in the lives of students, they bought into the process. Weekly newsletters explained what the students were studying. Each

to be successful at school, everyone needs the gift of each other in the form of friendship, acceptance and support.

term an invitation to attend an open evening was extended to parents, grandparents and friends, where students took groups for a tour around the school and explained what they were learning about. Student work was displayed on interior walls, so that visitors could immediately see the impact of CI. Fortnightly assemblies, run by various classes, provided an opportunity to showcase CI units. The media were regularly invited to school events. Teacher reports and feedback to parents helped them to understand the process of CI and realise the significant benefits to their children.

Mapping learning outcomes

In the case of most traditional units of work, the scope, sequence and learning outcomes are established during the planning stages, prior to commencing the unit, but this is not possible in the case of Beane's model of CI. An alternative is to 'back-map' learning outcomes from the integrated unit against required curriculum standards or skill sets (Brodhagen, 2007). Barbara described a similar process:

As a safeguard to ensure the national curriculum was being covered, staff developed an approach to curriculum coverage where we tracked the year's topics that had been studied and the curriculum areas these fitted into. We then used this information to develop three matrices that demonstrated curriculum coverage at junior, middle and senior levels in the school. In time this became a very useful resource.

Conclusion

Barbara concluded that Beane’s student-centred model of CI was especially suited to young adolescents. She reflected:

I believe using Beane’s model of CI to launch the curriculum in our new school was very successful. Young adolescent students described their learning as ‘the best education ever’. They said that they had ‘learned so much’

and that there was ‘fun in their learning’. The students’ behaviour was generally excellent because they were highly motivated and very engaged in their learning.

Indeed, surveying of student voice in the NZ context has shown that young adolescents want to learn about real life (Smith, Crooks, Gilmore, & White, 2009), that they need teachers who respect and understand them, and that they want social learning environments

that are engaging, challenging and fun (Poskitt, 2011).

This study advances the claim that Beane’s model of student-centred CI can help young adolescent students to achieve excellent results in both the academic and social domains. As shown in Table 2, young adolescents have specific developmental needs and characteristics (Caskey & Anfara, 2014) that are especially well catered for by Beane’s model of CI.

Developmental need or characteristic	Beane’s model of CI
Increased locus of control, increased cognitive capacity, enhanced ability and desire to communicate with others,	Negotiation, debate, compromise, deep investigation, collaboration with teacher/others, digital learning communities
Growth in creativity, desire for self-expression, flexible, exploration, embrace novel and innovative contexts	Personal integration, exploration of personal and social implications of themes, create culminating activities, multimedia presentation
Move beyond egocentricity, develop personal values and beliefs, desire to make an impact and be recognised for it	Social integration, enhance relationships, engage with social issues and ‘make a difference’ in the local community

Table 2: Young adolescent development in relation to Beane’s model of CI

Learning in a classroom where the teacher and students collaboratively create, plan and implement Beane’s model of CI helps young adolescents to develop key social skills needed for democratic citizenship, such as the ability to negotiate, to debate and compromise, and to accept others’ points of view. Students also learn to collaboratively create and deliver presentations or culminating activities at the end of a unit, such as a performance or curated exhibition. Implementing Beane’s model also provides an outlet for the expression of less apparent developmental characteristics such as students’ developing values and beliefs. As is already known from service learning (Theriot, 2009), young adolescents significantly benefit when they are able to move beyond their childhood egocentricity and serve their community. Barbara

and her colleagues found that CI was an effective means for students to actively engage in ‘hands-on’ activities that taught them the principles of social justice and tapped into their desire to make a difference to the lives of others in both local and global contexts.

Beane’s model of CI is a counter to mainstream education in the middle years of schooling which, too often, delivers a decontextualised and subject-centred kind of schooling that does not adequately respond to young adolescents’ developmental needs and is disconnected from local communities. This article demonstrates that, as long as appropriate scaffolding is provided and the community is supportive, young adolescents are fully capable of collaboratively creating, planning and implementing student-centred CI with their teacher. Beane’s model

caters for CI units that are exciting, rigorous and meaningful to young adolescent students and, in the process, helps them to develop important social skills for actively engaging in democratic citizenship and ‘making a difference’ by building and strengthening their local communities.

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Corporate Based Learning: ‘Turning ‘traditional’ on its head’

Kristy Matthew, Tim Hadfield & Larry McKeown

Riverside Christian College, based in Maryborough Queensland, is comprised of 750 students. The school recognises the importance of a separate Middle Years catering for the diverse needs of early adolescents. The school currently has 280 students enrolled in the Middle Years programs from Years 6 to 9. In this article we describe a new approach known as Corporate Based Learning that has been introduced into the middle years’ program.

Corporate Based Learning – aka CBL

The Year 8 team was very concerned about the gaps in student knowledge and academic performance. To this end a new approach called ‘Corporate Based Learning’ (CBL) was introduced. With its genesis in traditional Problem-based learning (PBL) method, CBL is also a method of learning and teaching which allows students to focus on how and what they will learn. The benefits of the CBL approach lie in the fact that it builds upon the successful foundations of PBL but highlights and teaches 21st Century learning skills. CBL focuses on explicit teaching of

these skills rather than merely assuming that these skills will be acquired during a PBL based unit. In the modified version of the CBL structure implemented at Riverside Christian College, students are given corporate-based roles within their teams. These corporate roles (Chief Executive Officer, Secretary, Research & Design Manager and Human Resources Manager) modelled from the business world, provide students with unique responsibilities for the team as well as the creation of the end product. Students rotate through these roles so that they are exposed to all the different responsibilities throughout the four terms within the year. This is considered a strength of the program for all students have the opportunity to take on and learn about each of the corporate roles that they assume.

The inspiration

After attending an inspiring Professional Development session on PBL at a highly respected all-boys College located in a high socio-economic area in Sydney, all three teachers decided that while PBL was an outstanding structure there were a number of issues in implementing a similar

program at Riverside Christian College. For example, as opposed to the boys college where there was significant parental investment in their son’s education, the teachers agreed that the PBL structure described would not necessarily fit easily given the current needs at our school. Riverside Christian College is located in an area that has 25% youth unemployment, and is the second lowest socio-economic area in Queensland. Local issues impacted the capacity to implement the PBL program described at the professional development session. These local issues included the fact that our school is located in a region that is number one for mental health issues and there is very little parental input in children’s education. Furthermore the school experiences frequent absenteeism and has a high proportion of students with learning difficulties. Modification of the PBL program was required in order to see the program successfully implemented in our context. It was against this backdrop that Corporate Based Learning was born in an effort to address these issues and provide quality learning opportunities for all students regardless of the present predictors of their future

achievements. The College was looking for a point of difference in what educational programs could be provided for the adolescents in the local area. The criteria for the program was that it needed to be student driven, offer choice, flexibility and creativity. In short, the program needed to reflect all of the signifying pedagogical practices of adolescent education. So our Corporate Based Learning program emerged.

21st Century Skills just make good sense

Before describing the CBL program it is important to consider the ‘drivers’ that encouraged the teachers to consider a new educational approach. In the future our students will compete on a global stage, and they need new skills to prepare them for further study and jobs – many of which have not yet been created. They need skills that we call the 4Cs: creativity, communication, collaboration and critical thinking. The rate of change in technology and in society is so rapid that to prepare young people to live, work and be successful in the 21st century, they will need the ability to think both creatively and critically, problem-solve and work collaboratively. Technology and access to technology has changed the world and education as we know it. Students nowadays have all the information at their fingertips through access to the internet. There is no need to memorise information when it is so easily accessible. Knowing the exact date that the Spanish invaded the Aztecs will not help you get you a job in the real world but, being able to source the information from a credible website, summarise it and interpret the meaning of the

inferences, will be a skill your child is going to use. CBL focuses on delivering Australian Curriculum outcomes while teaching these skills, currently called ‘General Learning Capabilities’. Future predictors in Education have said that by 2030, these skills are going to be the number one focus in education, Australia wide.

The CBL process

So what does CBL entail? Students, taking on the different corporate roles, work in groups of four to meet individual benchmarks (small summative assessment tasks), that help create the final group product at the end of the term. An example of this would be the ‘Medieval Unit’ which combines English and Humanities outcomes. This unit was completed over one term. Student groups were asked to create a fairy tale play that had a historically accurate conclusion. Small benchmarks to keep students on track were a story board, script analysis, script writing, medieval language (English outcomes), medieval inquiry questions and research techniques (History outcomes). The end product was performing their plays for members of the local Medieval Society at the end of term Medieval Feast! Each student received individual marks for their individual benchmark, as well as a group grade for the end product. This allowed for differentiation of grades on reports and a better understanding of individuals and their level of understanding with regards to the curriculum outcomes. A highly structured reflection and review process allows team disagreements to play out in a safe environment, as well as assists teachers in the differentiation of grades, for both academic outcomes and 21st century

learning skills, collaboration, communication, creativity and community. Corporate roles are explicitly taught prior to the task being presented and then, along the way, seminars are been allocated for individual roles that students can attend to help with the acquisition of both knowledge and understanding of a topic and 21st century learning skills. Students are expected to emerge from this process armed with better skills in communication, collaboration, creativity and critical thinking. They are also expected to exhibit a readiness for Senior College and/or the workforce. Participating in the CBL task also allows the students to have covered all the Australian Curriculum outcomes for Year 8.

The impact of technology

As a team, all of the teachers involved strongly believe in the CBL process. In traditional teaching the focus for students is often reduced to memorising timelines and dates, key people and important battles, and so on. In the CBL classroom, students need to use team skills to not only find the relevant information, but to also critically analyse it, decide on its credibility, summarise it, interpret it into their own words and find meaning from the events of the past. These higher-order thinking skills, such as analysis, evaluation and creation, are very hard to learn in isolation and take time to develop. However, they are extremely valuable skills as they can be transferred across all subject areas. Other teachers, such as those teaching in elective subjects within the College have noted a marked improvement in the capacity of Year 8 student to work in team, resolve conflict, work collaboratively and contribute in a constructive manner in a cooperative situation.

Change is hard for everyone

Is this type of education scary for some teachers? Yes, it most certainly is. When first presented with the idea, we found it most uncomfortable and did not like the thought of changing our whole teaching philosophy. However we had to objectively look at the facts: we could have continued with the traditional ‘memorise and regurgitate’ type teaching that produces good results and perhaps looks ‘pretty’ in theory. The alternative was to honestly assess the current impact of technology and the learning processes of our students. This reflection led to the conclusion that we need to teach skills that will allow students to not only find information and become independent learners, but to also critically analyse the information, to find meaning within it, discuss their opinion with others, and to listen to and respect the opinions of others. Students need to have a healthy debate with others regarding different approaches that exist to contemporary issues and learn and apply meaningful 21st century learning skills along the way. When faced with the two alternatives, as a staff, to take the second course of action was an easy choice to make. However it has not been an easy challenge. However, as a staff (and school) we are invested in the ‘whole’ child and their future direction. With this in mind it really did not take long for us to realise that we had to change to fit the future direction of education.

The conclusion

This year has been a difficult road, with many changes, for Year 8 students, teachers and parents as we implement the CBL approach. There have been many hurdles to overcome in regards to fine tuning planning documents, receiving honest and open feedback, student groups and behaviours, expectations, assessments and the overall upheaval of the teaching and learning philosophies of the three teachers involved. At times, it has been very stressful and we have all needed to support each other at one point of another. However, if we were to do it all over again, we all agreed we would definitely choose this path. We understand that to stay relevant and prepare our students for what comes next in their futures, there is no better way than CBL. We truly believe that we are doing something very meaningful for our students’ futures.

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2017 Adolescent Success Award Winner: Most Innovative Use of Space in a School Setting

Robyn McCarthy

Our Context

Riverside Christian College is a Prep to Year 12 co-educational school that serves students in the Maryborough and Fraser Coast region of Queensland. Riverside has a total enrolment of around 750 students from Prep to Year 12, and is divided into 3 sub-colleges:

- Junior College – Prep to Year 5
- Middle College – Year 6 to Year 9
- Senior College – Year 10 to Year 12

Due to rapid growth in student enrolments over the last few years, the College has been unable to maintain discreet precincts for each of the sub-schools. However despite the Middle College being spread between the Junior and Senior College classrooms, some year levels are grouped together and occupy buildings within close proximity of each other.

Statement of Purpose

At the end of 2016, Riverside Christian College undertook the challenge of converting three traditional classrooms into one open-plan, cooperative learning space for our 75 Year 8 students. The intention of the space was that it needed to be conducive to collaborative teaching, a cooperative, project-based learning approach and the promotion of 21st century skills.

The large indoor space that has resulted has enabled the establishment of a variety of flexible learning spaces, depending on the needs of the students at any one time. With a diversity of furniture options, the Year 8 learning space can be configured for specific purposes – whole Year

level instruction, three Homeroom class groupings, active cooperative learning structures, seminar groupings, boardroom meetings, small group collaboration, partner activities, individual work, performance areas, and relaxed floor space. These spaces can facilitate three learning modes: teacher-centred, student-centred and informal, with an effective and seamless transition between them.

The idea of flexibility centres on student choice, flexible student grouping and cooperative learning – signifying practices of middle years’ pedagogy. The significance of this space is not so much in the selection of furniture, but the provision and creation of spaces or zones appropriate to student needs.



Explanation of Spaces

The following is a list of the opportunities that have resulted from the new open-plan spaces:

- Within the space, a glassed-in 'boardroom' (otherwise known as the 'fish tank') serves the purpose of providing a noise-reduced, transparent learning space where important group meetings can be held, students with lower tolerance to noise or distractions can work, or students requiring focused learning assistance can be 'withdrawn' yet remain part of the class.
- Tiered stage platforms which serve as a performance or presentation space, as well as a seating option for large group gatherings/whole group teaching.
- Horseshoe comprising tiered seating for seminars (small groups up to 16), small group presentations where there is an option to sit on stools or soft ottomans within a focused area, where all students have good line of sight.
- Booths for small group collaboration and cooperative learning (groups of 4)
- Soft furnishings (splats, ottomans, byte couches, footstools, floor cushions) that provide comfortable, relaxed seating for individual, pair or small group work.
- Circular tables (indoor and outdoor) facilitating small group collaboration and cooperative learning.
- Conference tables for teacher/student/small group conferences and mini-lessons.
- Carrels that allow for individual work thereby reducing distraction and providing a 'safe' option for students suffering anxiety or auditory overload.
- Stand-up tables/benches for individuals or groups that provide a break from sitting.
- Writable surfaces on the back of booths, on the stand-up tables, desks, boards on wheels for group collaboration or small group teaching.
- A 'Presentation' space which has a formal lectern for individual speakers.
- Group desks that are able to be arranged in a variety of different shapes such as square, circular, L-shape and rectangular

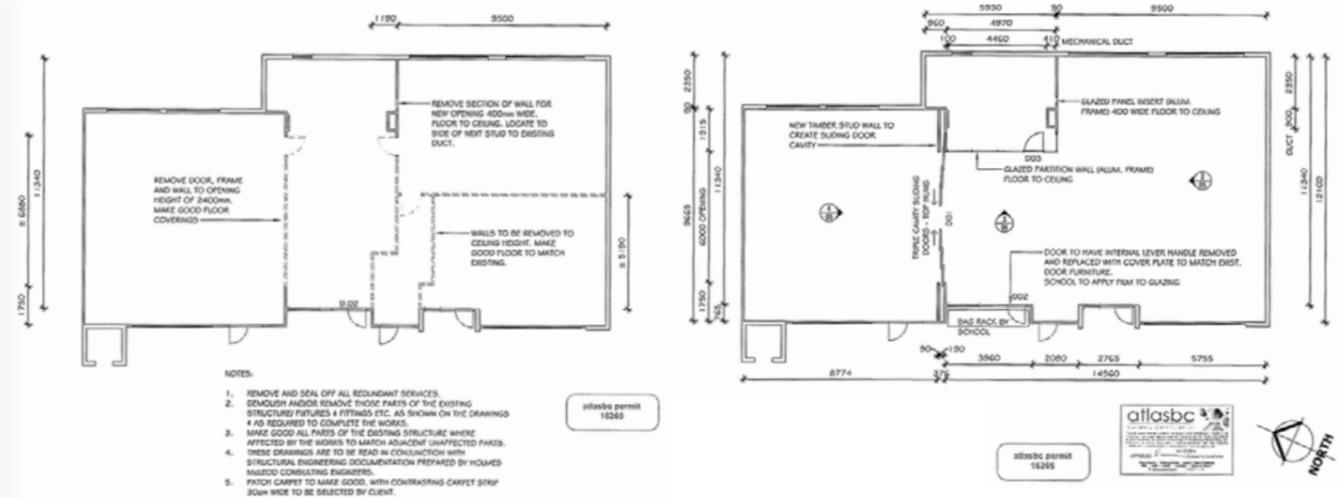
configurations for structured group work (can be used in variety of seating combinations).

- Screened areas to reduce distraction and to be used as a brainstorming or display surface, or to define spaces for groups or classes.
- A reading corner that provides a quiet, relaxed space for withdrawal and comfort (informal).
- Lotus foldable doors that provide a white board/pin-board surface which can divide the large space completely or partially as a teaching/grouping option.
- Bodyfurn stools/chairs to allow for student body movement (without rocking).
- Outdoor group furniture, coffee tables, stand-up bench, informal grouping areas for quieter outside student seating option or alternate small group teaching space.

Whilst a lot of the specialised furniture was purchased for specific purposes, all of these areas could be achieved by using current, standardised furniture, second-hand furniture and a bit of imagination. At Riverside College we used a combination of new specialist furniture, old and current school furniture, a repurposed school-built stage, and op-shop furniture. Thus savings can be made with some creative thinking. The Year 8 learning space was further enhanced by the inclusion of designated areas within the classroom such



Changes to the Floor Plan



as the Campfire, Watering Hole, Cave and Sandpit (as suggested by futurist and educational consultant, David Thornburg) to encourage student engagement. The design and use of different furniture within each of these spaces have pedagogical, physiological and psychological benefits.

Pedagogical Benefits

Teachers using these spaces report a range of benefits in terms of their pedagogy. There is a greater focus on group work as it is far easier for the furniture to be easily moved to accommodate different group configurations. This flexibility has meant that teachers can employ a variety of different strategies ranging from direct instruction to the whole class instruction; mini lessons, master class or conferences; small group, pair or individual work. Other advantages include:

- Provision for brainstorming and collaboration with writable surfaces for recording responses.
- Furniture options for all sizes of students (since adolescents grow at different rates).

- Inclusion of 'quiet' areas for concentrated learning support, student withdrawal or specific teaching (differentiated learners).
- One small learning community and a safe classroom environment through a shared space for one year-level with small team of teachers.
- Cooperative learning and collaborative teaching are easily accommodated in the new learning spaces.

Physiological Benefits (arrangement of the body)

Similarly there are benefits for the students such as:

- Ergonomically designed furniture that allows for correct height for age, 'moveable' chairs and stools.
- Provision of choice of furniture type, size and comfort for growing bodies, movement, body position – standing, sitting, lying, lounging.
- A large space (inside classroom and outside on verandah) for greater student movement.

Psychological benefits

Finally, more flexible learning spaces provide for the differing needs of the adolescent learner. Benefits include:

- Student choice to work inside, outside, soft furnishings, standard desks, standing, sitting, lying.
- Provision of 'quiet' spaces for students with ASD, auditory overload, learning difficulties, anxiety.
- Aesthetically pleasing, structured yet flexible.
- Sense of 'ownership' with students not being allocated to a particular desk but rather having the choice of where to sit in the classroom. Students can also 'arrange' the furniture within the learning space.

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Adolescent Success Conference: Research Round Table – Report

*Dr Katherine Main,
Griffith University, co-convenor, AARE Middle Years Special Interest Group*

In collaboration with the Australian Association for Research in Education Middle Years Special Interest Group (AARE MY SIG), an inaugural research symposium was held at the 10th International Conference for Adolescent Success held at the Brisbane Convention Centre, 24-26 August, 2017. The aim of the symposium was to provide an opportunity for researchers to share the results of their research as well as to gain feedback on proposed research projects, to network, and to highlight the synergies across the group's areas of expertise. The research symposium marked a significant milestone for those who research or are interested in current research around young adolescent learners and the middle years of schooling. The day provided a unique opportunity for researchers to meet and discuss their work and look for potential collaborations in small groups or as a collective.

The structure of the day included a Keynote address by Professor Donna Pendergast, Dean of the School of Education and Professional Studies at Griffith University, entitled: Making great middle years teachers.

Professor Pendergast's presentation considered the question - what makes great middle years teachers? She highlighted global education megatrends as a context for reflecting on the importance of teaching quality in schools as well as the changing nature of students using generational theory as a broad brushstroke lens to characterise the young people in classrooms today. Linking the trends with the changing needs and demands of students and learning, the presentation unpacked the four intentional practices necessary to create great middle years teachers. The importance of great teachers was highlighted throughout, and a connection was made between great teachers, quality teaching and student achievement. Student voice was a critical part of her presentation with a summary emphasising students' opinions of what makes great teachers. Professor Pendergast's open presentation set the tone for the day with a lot of thought provoking questions and animated discussion amongst participants.

The second section of the day included the round table style presentations. The room was

set with three tables that hosted three presenters for 30 minutes each. The presentations ran simultaneously whereby a presenter was seated at one of three tables and was given 20 minutes to present their research paper as well as being given an additional 10 minutes for those in attendance to ask questions. At the end of the time there was a five-minute change-over and the next group of three began their presentations. There were 11 presenters in total, with two groups sharing their 30-minute time-slot. Throughout the sessions, other delegates attending the general conference were welcome to sit in and listen and contribute to the research sessions. Throughout the day a number of conference delegates took the opportunity to join in the research agenda. Each presenter was also asked to provide a one-page summary of the work they were presenting. Researchers who were presenting on completed projects or planned projects have generously given permission for their research summaries or abstracts to be published as part of this report. Those who presented included: Dr Gabrielle Baker, Queensland University of Technology, Dr Anne

Coffey, University of Notre Dame, WA, Dr Tony Dowden, University of Southern Queensland, Mr Jason Hassard, Griffith University, Ms Dana Leidl, Centre of Research Excellence in Mental Health and Substance Use, NSW, Dr Katherine Main, Griffith University, Professor Donna Pendergast, Griffith University, Dr Michelle Ronksley-Pavia, Griffith University, Dr Rebecca Seward-Linger, University of Southern Queensland, Dr Kelly Sharp, Scotch College, Adelaide, and Dr Katharine Swain, Flinders University, SA. Contact details for each of the researchers are provided in their individual summaries.

The third session of the day was a Town Hall Meeting that involved all of the research delegates. The Town Hall Meeting was facilitated by Professor Donna Pendergast. The meeting opened with delegates invited to "voice" (by writing on a sticky-note) the most important take-home messages from the day. The collation of these thoughts distilled down into three main areas, being (a) Bridging the research-practice nexus through collaboration, (b) student voice, and (3) student-centred pedagogy/ responsive pedagogy. With a focus on these topics, a group discussion was held and guided by the following questions:

- What do we know?
- How do we know?
- What can we do individually and collectively about what we know? and
- Where to from here?

The following is a summary of the points made during the Town Hall Meeting:

1. What do we know?

- a. There are research/ school partnerships that support the research-practice nexus;
- b. We know teachers are passionate and want to share – they have their fingers on the pulse;
- c. Teachers often lack the confidence and skill to be researchers – they know what they know; they know some of what they don't know but there are also things that they don't know that they don't know;
- d. There is a repository of research aimed at school improvement (e.g., work of Fullan / Hargreaves);
- e. Teachers are key factor in implementing change in schools as they are both the subjects and agents of change;
- f. Student voice needs to be considered and teachers can make a difference by ensuring change is relevant and connected to the needs of students;
- g. The scalability of reforms, working through systems and gauging impact. There is a need to build the collective strength through research and school collaborations as too much is happening that is random, ad hoc and piecemeal;
- h. Look for good practice from macro to micro systems (OECD, National Systems, Research systems, School systems (national, state and local), enacted in classrooms) – how do we link the levels and ensure the flow of information?
- i. Need to avoid single champions of change – need systemic reform – large scale – with

distributed leadership to ensure sustainability;

- j. Avoid USA's boom to bust experience of middle schooling practices through the use of evidence-based practices, evaluation and ongoing professional development;
- k. Need to teach teachers to be researchers of their own practices to develop an continuous improvement cycle;
- l. Sustainable – ensure that data literacy and researching practices are valued and embedded as a key feature of initial teacher education capstone courses;
- m. Need sustainability of reform and good practices which can only be mediated by government education policies. We need to change the position of teachers to ensure they have agency and are empowered to implement change

2. How do we know?

- a. Research literature provides some evidence / we have experience / anecdotal evidence.

3. What can we do individually and collectively about what we know?

- a. It is about building teacher efficacy through effective professional development and effective initial teacher education programs that adequately prepare teachers to teach in the middle years;
- b. Mentoring – empowering and supporting teachers; and
- c. Building a professional learning community of researchers around middle years education.

4. Where to from here?

- a. Consider your individual position / responsibilities. Where do you see yourself as part of the solution to the puzzle?
- b. What role do you want to play?
- c. How can you be supported?
- d. How can you support others?
- e. What do you need to be successful in your research moving ahead?
- f. How can you be part of the scalability of middle years research across Australia?

A follow up email was sent to all delegates with the summary of the Town Hall Meeting with the hope that individually and then collectively that the group can begin to plan and action the questions in Section 4. It is envisaged that this was the first of regular opportunities for middle years researchers to be able to meet and share their research and look at ways of collaboration to support those who teach and ultimately improve the educational experience and educational outcomes for middle years students. Planning is currently underway to run a similar day at the New Zealand NZ Association of Intermediate

and Middle Schooling (NZAIMS) Conference in Auckland, New Zealand, 16-18 May, 2018.

As convenor (Dr Tony Dowden) and co-convenor (Dr Katherine Main), we would like to sincerely thank AARE for their generous sponsorship, Adolescent Success for their support of the middle years research agenda and including it in their Conference Program and for Professor Donna Pendergast for giving up her time and delivering both the Keynote address and for facilitating the Town Hall Meeting.

Dr Katherine Main

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Madonna King 'Being 14: Helping fierce teens become awesome women'

Reviewed by Janetta Hargreaves

Madonna King expanded on the themes of her book, *Being 14*, at the recent 10th International Conference for Adolescent Success. Her presentation was very well received by the many teachers and other professionals in attendance. One sensed that the many murmurs of agreement from those in the audience also reflected their experience as anxious and frustrated parents of teenage girls.

In essence, King's book is a primer into the major issues facing young women today directed at just such caring and concerned parents. King, herself the mother of two children not yet out of girlhood, was alerted to the fact that 'there was something about the age of 14 that warranted attention' through interactions with friends, acquaintances and older students, all of whom nominated this time as one of the most difficult years for teenage girls, and their parents, to navigate.

Seeking to investigate further, King interviewed 192 14 year old girls across the country, from city and country areas, from public, private, co-educational and same sex schools, and consulted experts such as school principals, guidance officers, youth health nurses, psychiatrists, police and academics. These people all highlight what dedicated middle years educators are well aware of- that 14 is at the centre of a period of dramatic physical, psychological and cognitive changes, that these changes impact differently on girls and boys, that pressure from social media and 'expectation inflation' from schools and parents often compound the

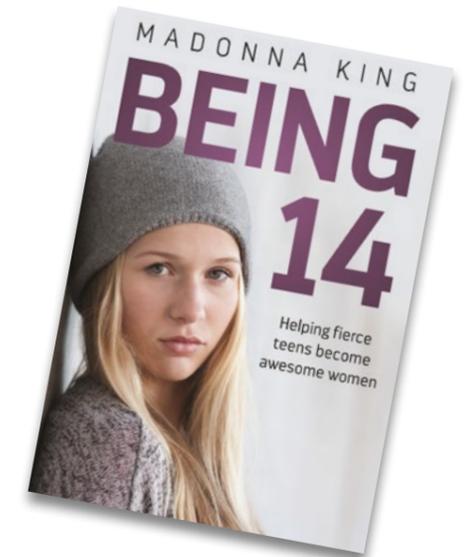
difficulties of this time for girls.

Each chapter in the book is dedicated to analysing and seeking counsel from experts on these themes. King explores teenage girls' pervasive (and invasive) attachment to social media; the importance of belonging and the influence of their peers; relationships with boys increasingly warped by a culture of raunchy pornography and mixed messages; rebellion from and attachment to parents; the rise in anxiety disorders and the epidemic of sleep deprivation.

King skilfully elucidates these contemporary issues, and references evidence-based, common sense professional advice for parents on ways to address these issues with their daughters.

A caveat, however, and one that King herself briefly acknowledges, concerns the lack of discussion in this book around the particular complexities faced by 14 year old girls in low socio-economic circumstances, in remote and/or indigenous communities, from homes where parents' own personal, economic and social challenges leave them unable to address the issues their daughters are facing.

King's discussion of the pressure on girls to succeed that they may feel from parents who are working to provide an elite private education, or of the exhaustion and over-commitment of girls who rush from rowing to school to ballet to debating is one side of a coin. On the other, are the many girls in our schools who are afforded



little support from their parents for their educational ambitions, whose isolated schools are under-resourced and lacking in subject offerings, and whose exhaustion at the end of the school day is a result of their additional home responsibilities. This limitation aside, King's commitment to engaging the voices of a wide range of 14 year old girls is to be applauded. And it is certainly the case that many of the themes investigated in this book- the tribalism, bullying and harassment often associated with 14 year old girls' peer groupings, the troubling influence of social media on girls' unrealistic expectations of their physical selves and of boys' norms of sexualised behaviour, of distracted, over-stimulated and exhausted students in our classrooms- are common across all social strata and in all schools.

In my role as Head of Middle School, I would have seen an investment in several copies of *Being 14* as money well spent. It would be worth referencing to concerned parents and would be recommended reading to pastoral care teachers, year level coordinators, coaches, and support personnel. *Being 14* serves as a timely reminder that those often troubled and troubling girls need our attention and our wisdom to become the accomplished, confident women they deserve to be.



Industry Experts Interviews

At the 2017 Adolescent Success conference in Brisbane we invited industry experts Mark Freeman from Gray Puksand and Keith Rowell from Downer to a panel to discuss their areas of work and the impact they see that education has on industry. In the interviews below we have summarised the panel discussion:



Mark Freeman

What area do you work in?

I work in the field of Architecture, in particular the areas of learning environment briefing, research, planning and design, for schools, universities and other educational institutions.

What skills, attributes and dispositions do you think are invaluable in our field today and looking into the future?

Ultimately there are many synergies in the skills required of potential employees in our industry and those of contemporary learning – I am particularly referring to the 6 c's of education - communication, critical thinking, collaboration, culture, creativity and connectivity. These skills are highly coveted in the modern workplace, where employees seek active, creative, engaged and articulate candidates who can work across multiple modes, settings and locations, whilst evidencing the ability to effectively communicate with colleagues and contribute to a shared cultural vision for the organisation. Ultimately we need people who are creative, adaptable, resilient, entrepreneurial, with sound leadership skills, who are inspiring, respectful and also passionate about Architecture.

What effect do you see the changes in technology having on education?

I truly believe that you should not design schools around technologies which continue to evolve and disrupt – schools have always needed to respond to changes in enrolment, curriculum, student culture, community expectations, curriculum and programmatic themes, and more recently the ability for students to partake in learning through project based curriculums, inquiry based learning, design thinking and technology enhanced learning. This ultimately suggests that schools need to be planned around constant change and evolution rather than a particular technological orientation. I see more learning environments tailored around interdisciplinary learning studios, where real world project-based scenarios co-exist alongside celebration of creative endeavours and active, student led participation – technology will merely serve these, in whatever form it takes. I see more immersive experiences offered to students and more ability for students to realise through technology that their investigations and learnings have a place amongst their peers, outside the school gates. Broadcasting, sharing and connecting with other students, industry and community.

If you could advise schools on what they should look like in the future what would you say?

I would encourage schools to continue their efforts to engage with community, industry and academia – local and global. The future is an even more connected world – students need to be more connected and networked than ever before, and schools are perfectly placed to develop students' social and entrepreneurial abilities.

Schools are true centres of community and I do not believe we have unlocked their true potential as fully integrated, complementary learning facilities – providing a broad range of community facilities and infrastructure – this extends the role beyond mere education and moves schools towards being true centres of the communities in which they are located.

If you could advise schools on curriculum what would you suggest should stay/go?

I would advocate for a high level thematic view of school curriculum, one which supports multiple pedagogical models, but essentially balances creativity, technology and development of self as a citizen of the world – a citizen of family, of community – both local and global. This should include social, ethical and environmental considerations – technology will continue to evolve, and schools must ensure our students do not lose their ability to understand their place in an ever changing world.

Any other comments

In the race towards a technologically enhanced future we need to ensure our students are well equipped to balance and evaluate how/what technology can enrich their future and what technology might be detrimental to our place in the world. Not all technology may prove to ultimately enhance the world – we need our students to also hold technology accountable for the disruption it may cause if left “unchecked”.

Mark Freeman

Partner
Gray Puksand Architects
mfreeman@graypuksand.com.au



Keith Rowell

What area do you work in?

I work in the area of next generation technologies, specifically as it applies to transport systems.

What skills, attributes and dispositions do you think are invaluable in our field today and looking into the future?

It's a difficult question and getting more difficult with time. Predicting the future is becoming an increasingly more difficult prospect thanks to the pace of change in technology. Thinking 10 or 20 years ahead is so much more difficult now than it was 10 or 20 years ago. And back then it was hard. Actually it's even harder than we think it is.

What effect do you see the changes in technology having on education?

The pace of technological change is exponential. The very pace itself increases.

When I was at school, back in the eighties, we chose math/science, soft sciences (economics) and some arts subjects (geography and history and art) or some combination thereof. There wasn't much choice and that was essentially a function of the industrial revolution where the goal was to create

young adults able to fit into a fairly well defined working world. When they were thinking of the future and what we should do differently, the advice we got was to learn Japanese. A noble pursuit in itself, but it was based on the predicate that Australia would do lots of commerce with Japan. We do, but we also do much a lot with China and other parts of Asia and Europe and the USA. The point is, back then it was difficult to be so prescriptive about what we should teach kids to prepare them for their future. Because when being so prescriptive, one had to know a certain level of detail about that future. Now it's so difficult, we really can't imagine what technological advances are coming in the next 20 years. What the world will look like in 2040 is anyone's guess. So the problems is now much harder. Or is it? In a way, this makes the problem easier. What we need to do is to take a step back and let go of being prescriptive about what to teach kids. Let's focus on what kids are good at, especially in the context of some of the things we know about the future.

If you could advise schools on what they should look like in the future what would you say?

In the future, AI, machine learning and robotics will play a big part in our day-to-day and economic lives. They already do. And remember the exponential pace.

We won't beat the machines at their game, so let's focus on our human qualities. As humans, we are wonderful general purpose learning machines. We're good at adapting to new situations, learning, having a gut feeling about something. We have emotions, relationships, empathy. These are the important things about being a human. This should be our focus.

If you could advise schools on curriculum what would you suggest should stay/go?

Let's teach kids problem solving, creativity, critical thinking, emotional intelligence, how to be adapt and deal with new paradigms. How to learn. With those kinds of skills and abilities, our kids will be able to handle whatever future awaits them. Indeed they will help create it.

Keith Rowell

Product Development Manager
Next Generation Technologies
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Information for Contributors

Adolescent Success welcomes submissions for journal inclusion that reflect the aims of the Association and address issues relevant to the middle years of schooling. Possible topics include: the developmental needs and interests of young adolescents; family and community partnerships; varied approaches to teaching and learning integrated curriculum; authentic assessment; school leadership and organisational structures in the middle years; information and communication technologies and resources in the middle years; research findings and future developments in the middle years.

Contributions may take the form of:

- academic and research papers that make an original contribution of an empirical or theoretical nature
- literature reviews
- papers of a practical or applied nature
- reports
- viewpoints
- book reviews

Contributions

- The journal has two levels of acceptance of papers for publication: refereed and non refereed. Refereed papers will have two referees selected from relevant fields of study by the editor. Papers must clearly indicate if they wish to be considered for refereed status. Refereed articles will be included in a specific section of the journal.
- Contributions shall be submitted electronically via email to the MYSA email address, or on CD, as a Microsoft Word document. Articles must be double-spaced, without the use of styles, 12 point font Times New Roman. The submitted article and CD become the property of MYSA.
- All contributors need to complete an Author's agreement form to be submitted with the article.
- Papers should be between 700 and 5000 words in length.
- Each article should have a

separate title page that contains the title, the names of all authors, their contact addresses, email addresses, and telephone and facsimile numbers. The names of the authors should not appear on the rest of the paper.

- An abstract of no more than 200 words must accompany each refereed article.
- All references should be placed at the end of text using APA (6th edition). For example:

Journal article

Rumble, P., & Aspland, T. (2010). The four tributes model of the middle school teacher. *Australian Journal of Middle Schooling*, 10(1), 4–15.

Book

Bandura, A. (1986). *Social foundations of thought and action*. New Jersey: Prentice Hall.

Chapter in edited book

Ajsen, I. (1985). From intentions to actions: a theory of planned behaviour. In J. Kuhl & J. Beckman (Eds), *Action control. From cognition to behaviour* (pp. 11–40). Berlin: Springer-Verlag.

- Footnotes are not to be used.
- Figures and diagrams should be professionally prepared and submitted in a form suitable for reproduction, indicating preferred placement.
- Photographs should be submitted separately (not included within the text). All student photographs, art work,

poetry etc must be accompanied by copyright release forms, which are available on the website or from the editor.

- If the material has been published elsewhere, details must be included on the author's agreement form.
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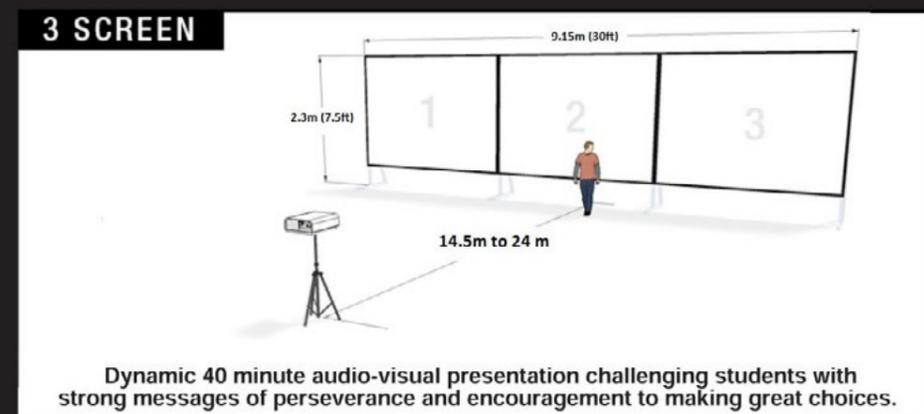
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