



“Being Together” in Learning: A School Leadership Case Study Evoking the Relational Essence of Learning Design at the Australian Science and Mathematics School

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Abstract

In this report on an interview-based school case study undertaken with seven school leaders using component theory analysis and the hermeneutic method, we reveal the relational essence of learning design at the Australian Science and Mathematics School. The phenomenon of learning togetherness presents, forged by deliberately practised notions of contributive leadership within open learning spaces and ongoing attention to new interdisciplinary curriculum forms. This case study highlights the phenomenological nature of a school that has been deliberately purposed for deep collaborative learning forms, respecting student and teacher ideas in the process, and marginalising habitual industrial school design forms that constrain effective student and teacher learning. The study has relevance for school leaders and teachers wishing to pursue new school design forms within enabling learning cultures that attend more closely to the learning needs of young people poised to enter the Third and Fourth Industrial Revolutions.

Background

Many secondary schools in Australia have remained wedded to the industrial design logic of 20th century mass education that siloes curriculum areas to a single isolated subject teacher per walled classroom (Whitty & Power, 2003). In this historically entrenched “Fordist” model of schooling, the teacher is often entrusted to deliver subject-specific curriculum content to classes of 25 students or more, with the school day consisting of a rolling entourage of year-levelled students moving from subject to subject and teacher to teacher. The design of these privatised and inflexible schooling forms inhibits collaborative and collective forms of schooling practices. By their very inflexible and isolated nature, they do not enhance the relational essence of “being” in teaching and learning together in schools. We argue that, as a consequence, valuable learning opportunities are missed for both staff and students that could be made possible

if relational understandings of how we best learn together (Giles, 2011) were to be put into practice.

By “relational” we mean three aspirational relational modalities of schooling. Firstly, there is the relationality that comes with more personalised learning practices that call upon leaders and teachers to be actively engaged in ongoing reflective attention to student learning life-worlds, including students’ learning interests and how carefully crafted school structures, “contributive” leadership practices, and an enabling school culture can work together to foster deeper pedagogies of engagement. In other words, schooling modalities that constrain learning engagement are addressed, and relational modalities that foster learning are enhanced. By contributive leadership, a phenomenon regularly described by the interviewees at the Australian Science and Mathematics School, we mean a cultural willingness of all staff to support learning innovation where and when it is needed for student

learning. It is not directed from “above”, but rather is inculcated into what it means to be a teacher in this place. Careful attunement to the relationality of learning modalities can nurture identity formation, and provide more opportunities for learning, along with developing the essential capabilities needed for learning and work futures including, but not limited to, the development of ethical behaviour, lifelong learning, creativity, problem solving, and entrepreneurship (Giles, Smythe, & Spence, 2012).

Secondly, we mean the relationality of the learning disciplines (the subjects) and how they naturally speak to one another when an overarching inquiry question is posed necessitating sophisticated teacher and student thinking and planning about how the disciplines, when forged together, can more authentically represent how we all experience and make sense of our world. Thirdly, we mean relationality that can be enabled by the physicality of open learning spaces equipped with “cutting edge” ICT, which together provide students and teachers with networked learning opportunities in and out of school and promote more face to face “unplanned” or “just in time” learning discussions during school hours. Open space in an ICT-rich learning environment represents the relational attunement of a school’s architectural design (Kraft & Adey, 2008) to the lifeworlds (Roche, 1987) of young people and how, in the digital age, they best learn together. In other words, closer physicality promoted by doing away with classroom walls allows teachers and students all to be “seen”, “heard” and “connected” in their learning. We argue that, with all three forms of relationality in schools advanced, “being” in learning together organically grows. In other words, a learning community that continually attends to these fundamental modalities of relational learning design is indicative of a school that has carefully thought through, planned and put into practice, within ongoing cycles of action and reflection, more opportunities for student and staff learning throughout the school day.

Relational learning design of this nature amplifies the relational learning benefits of all “being together” as a community of learners (teachers, students, leaders and school support staff) in school. It understands how an interconnected and vibrant learning community looks, feels and practises when students and teachers are enconced in deep learning (Bills, Giles, & Rogers, 2016). It is deeply humanistic in orientation and dwells in collegial professional trust and support within a culture of openness to research and inquiry, where collaborative learning conversations are naturally fostered (Huffman & Hipp, 2001). This relational formation of learning community acknowledges the dynamic nature of life in schools. This approach stands in sharp contrast to that experienced by teachers working within industrial forms of schooling design who are often faced with 200 or more students in a day. Siloing of teachers, students and the learning disciplines behind walled classrooms and

compartmentalised subject areas constrains the development of deep learning connections and educational relationships between students and their teachers. In our view, this dominant form of schooling design inhibits learning opportunities that can be made more available if relational schooling modalities are foregrounded. It means never taking the relational nature of our “being in the world” (Dreyfus, 1991) for granted.

The depersonalisation of teacher-student relationships that often comes with mass schooling (Hargreaves, 2006) can be experienced by teachers during first term report nights. These can present as awkward and embarrassing encounters for a teacher who struggles to remember the name or even the face of an individual student about whom parents have come to talk. As former teachers and educational leaders, we ourselves have experienced these “special” moments in our previous career forays in conventional secondary schools. We have noted how mass schooling with its dominant factory line structures constrains the development of deep educational relationships with both students and co-workers. That is why we consider this case study important to present. We view it as an enticement for educational stakeholders (policy-makers, leaders, teachers and educationalists) to better understand how attention to relational attunement in schooling design can promote togetherness for learning advancement. It must nevertheless be emphasised that this research is contextual, making the intricacies of the school design approach opened for analysis in this case study not readily transferable to other contexts, given that different contexts will call upon uniquely nuanced ways of doing schooling. A school’s historical storyline becomes paramount in this consideration. However, we do believe that the principles of the relational school design articulated in this study can be applied across all schools as a powerful way of engendering greater learning togetherness for pedagogical impact.

The “Grammars” of Schooling

The dominant secondary schooling design logics of mass education have long been critiqued by “progressive” educational leaders and academics. Some of the scholarship refers to the modalities of schooling as dominant “grammars”. By “grammar” is meant the institutionalised and historically embedded structures that determine how secondary schools organise for learning. These structures pertain to “standardised organizational practices in dividing time and space, classifying students according to age, allocating them into classrooms and splintering knowledge into subjects” (Tyack & Tobin, 1994, p. 454). For many students, these historical grammars have not been conducive to learning engagement in school. This is not a new claim. Almost a quarter of a century ago, Tyack and Tobin (1994) lamented the historical continuity of the grammar of instruction in American secondary schools which had frustrated generations of reformers who sought to change these standardised organisational

formats into more engaging and personalised learning environments that would work for considerably more students. However, the progressive personalised learning schooling project in America during the last thirty years has been somewhat intermittent – it having stalled, regrouped and stalled again across various historical epochs, influenced by changing educational political agendas and funding. Some growth has nevertheless been evident in the personalised “small schools by design” movement, most notably in US Charter Schools like Big Picture (Levine, Sizer, Peters, Littky, & Washor, 2002) and High Tech High schools (Neumann, 2008), which have continued to present across the American educational landscape and are emerging in various forms in Australia, principally based on Deweyan inspired school design principles such as “one child at a time”, “authentic learning” and “interdisciplinary curricular practices”. Meanwhile, the ideologically progressive Coalition for Essential Schools (CES), created by the reformist academic and teacher Ted Sizer in the 1980s, had philosophically embraced and practically supported Deweyan personalised learning approaches in “small schools by design” over a 30 year period, but ceased operations in 2017. The CES project pursued

Deweyan ideas of teaching and learning (block scheduling, integrated subjects, co-operative learning, portfolios, and senior projects) dictated that CES schools would be much smaller than [the average] comprehensive high schools CES schools advanced the small high school movement (including schools-within-a-school) receiving a large grant from the Bill and Melinda Gates Foundation in 2003. (Cuban, 2018, p. 2)

In the United Kingdom, the progressive educational organisation Learning Frontiers inculcated aspects of the progressive American schooling agenda into their operational mission in the early 2000s. Led by Valerie Hannon, the Learning Frontiers modus operandi centred on propagating innovative and engaging ICT-rich learning environments in schools designed to take 21st century learning technologies into the heart of student learning in order to make the educational experience of young people in schools both more meaningful and futures-oriented (Hannon, 2012). This organisation too, like the now defunct CES, advocated for schools to embrace a radical shift from the traditional “grammars” of schooling to more open learning environments that fostered collaborative multi-disciplinary inquiry-based learning conducive to generating the capabilities needed by young people in order to be adequately equipped for the digital and robotic world of work and employment opportunities.

Learning Frontiers was keenly aware that schooling design was not keeping pace with how young people best learn, changing work environments, job futures and employment conditions. It highlighted the need for

schools to respectfully encourage entrepreneurship alongside critical and creative problem solving capabilities in order to enable young graduates to be more employable in a vastly changing global workforce where permanent work is becoming a thing of the past. The movement has had considerable traction in the UK, most notably in reinvigorating and redesigning the learning environments of schools serving disadvantaged communities, and has had some involvement in Australia within the Australian Curriculum, Assessment and Reporting Authority (ACARA)¹, and in the Australian Science and Mathematics School (ASMS). The ASMS stands out as a radical version of a school that has freed itself from the traditional schooling “grammars” in order to better equip its students with the adaptable capabilities needed for their futures within a deliberately designed open, collaborative, ICT-rich learning environment embracing multi-disciplinary inquiry-based learning approaches.

Concerns about the learning constraints imposed by the dominant “grammars” of mass schooling have recently been taken up in the government commissioned review into Australian schooling titled *Through Growth to Achievement – Report of the Review to Achieve Australian Educational Excellence* (March, 2018). Since the review committee was chaired by David Gonski, the report will be referred to as “Gonski 2.0”² from here onward. Gonski 2.0 provided a series of significant and far-reaching educational claims and recommendations for Australian schooling approaches into the future. One of the more significant, albeit not new, claims pertinent to this case study, pointed to the industrial model of mass schooling as redundant, requiring a reformulation of personalised design approaches to improving student learning and preparation for the challenges of a dynamic global economy.

Australia needs to review and change its model for school education. Like many countries, Australia still has an industrial model of school education that reflects a 20th century aspiration to deliver mass education to all children. This model is focused on trying to ensure that millions of students attain specified learning outcomes

¹ ACARA is an independent statutory authority instituted to improve the learning of all young Australians through world-class school curriculum, assessment and reporting.

² Gonski 1.0 (2011) and Gonski 2.0 (2018) were Australian government commissioned reports. Gonski 1.0 argued for needs-based funding for all schools on the basis that federal government distributions of funding to the independent and public schooling sectors were found to be inequitable in terms of support for student learning needs, with the government schooling sector identified as doing most of the “heavy lifting”. The Gonski 2.0 report was a discussion paper arguing for more personalised learning approaches in schools in order to improve learning engagement and learning outcomes in all Australian schools.

for their grade and age before moving them in lock-step to the next year of schooling. (Department of Education and Training, 2018, p. ix)

Inevitably, we wonder why it has taken so long for an Australian government report on the future of schooling to make this claim. It is the first of its kind in the Australian context in a government commissioned review. And yet there has been ample evidence for many years of poor school learning engagement, particularly in low SES school communities, declining or plateauing NAPLAN³ and PISA⁴ results, and an ongoing exodus of students out of predominantly disadvantaged mainstream conventional schooling forms into the “safety net” of the more personalised schooling “alternatives” (Te Riele, 2014). The ASMS, however, cannot in any way be considered a “safety net” alternative, which in and of itself makes this case study quite unique, as what follows will show.

Context and Methodology

The context for this case study was a specialist Science, Technology, Engineering and Mathematics (STEM) public secondary school located in the southern suburbs of Adelaide, South Australia and called the Australian Science and Mathematics School (ASMS). Established in 2003, the ASMS seized upon a national mandate to propagate engaging learning approaches in science, technology, engineering and mathematics. It was also chartered to engender supportive professional development partnerships with secondary schools seeking to advance a STEM agenda across the educational landscape. The study focussed on the deliberate purposing of the school’s learning design development. The research participants were limited to seven volunteer “leaders”, including the principal of the school, who collectively had responsibility for integrated curriculum development, student welfare, daily operations and professional formation. The study aimed to explore, identify, understand and articulate the dominant ideologies of the ASMS as expressed by the interviewed leaders. The analyses of

³ NAPLAN is an acronym for the National Assessment Programme for Literacy and Numeracy, introduced in Australia in 2008 as a national annual testing regime for all students in years 3, 5, 7 and 9. Chris Bonnor (2019) and others argue that NAPLAN is more an indicator of those schools privileged by high social capital enrolment concentrations and those schools disadvantaged by concentrations of low social capital enrolments. Their work indicates that NAPLAN school results are therefore a reflection of socio-economic advantage or lack thereof rather than an indicator of teacher or leader effectiveness.

⁴ PISA is the Programme for International Student Assessment. It is a worldwide study by the Organisation for Economic Cooperation and Development (OECD) in both member and non-member nations to evaluate educational systems by measuring 15-year-old school pupils’ scholastic performance on mathematics, science and reading.

the findings have been drawn and structured by using the component theory framework developed by Barton and Meighan (1978). This analysis has been formulated from our interviews with the seven participant leaders. The case study school has been identified by its actual name following approval of this by those interviewed.

The interviewed leaders were all highly experienced in their various fields of work at the school. They were identified for interview through an invitational process. Three of the interviewees were employed at the school during its developmental period fifteen years before. How leaders conceive of and talk about their leadership, and the stories they narrate of conformity, challenge or difference is an important part of understanding ideological school leading as discursive practice (Thomson, Hall, & Jones, 2013). The ASMS is a non-zoned public secondary school that caters for students who have expressed interest in pursuing science, mathematics or engineering in their future careers. It is categorised by the Department for Education (DfE) as a category 6 school (meaning low levels of disadvantage) and offers schooling to a culturally diverse range of students from years 10 to 12, drawn predominantly from across the Adelaide metropolitan area. Student enrolment numbers over a five year period have remained consistently at school capacity (400 students), and includes slightly more boys than girls. Throughout its history, the school has achieved outstanding results and has been internationally recognised as innovative in its approach to schooling, as borne out in the following excerpt taken from the OECD Innovative Learning Environments Report:

Learning activities are inter-disciplinary, personalised, authentic and inquiry-based, linking science and mathematics to other areas of study including cutting-edge technologies like robotics and nanotechnology, as well as to real world issues. (OECD, 2013, p. 201)

Data Gathering

Semi-structured interviews provide the opportunity to gather data from participants through both open and closed questions. The intention was to gain more in-depth understanding of the educational ideologies of the leaders within the school. The semi-structured nature of the interviews allowed for dialogue around observations made by the participant and researchers, the exploration of patterns within the participant’s responses, as well as the opportunity to “member check” the transcripts. Each leader participant was individually interviewed, for a period of 45–60 minutes, using a digital recorder, on questions that relate to the component theories as articulated by Meighan and Siraj-Blatchford (2003).

The component theory approach was first developed by the sociologists Barton and Meighan (1978) and has since been used to articulate ideologies within multi-cultural

contexts (May, 1992), Christian education (Giles, 1995), curriculum development (Brown, 1988) and the de-schooling movement (Meighan & Siraj-Blatchford, 2003). In the component theory approach, the ideology of education is seen to be made up of various component theories. For the purposes of this study, “an ideology of education may be defined as the set of ideas and beliefs held by a group of people about the formal arrangements for education, specifically schooling” (Meighan & Siraj-Blatchford, 2003, p. 191). Significant components for educational institutions considered hermeneutically from the interviews undertaken in this research are:

- Aims, goals and outcomes of the enterprise;
- Organisation of the learning situations;
- Learning and the role of the learner;
- Teaching and the role of the teacher;
- Resources appropriate to learning knowledge, content and structure of the curriculum; and
- Location of learning.

(Adapted from Brown, 1988; Meighan and Siraj-Blatchford, 2003).

Questions were asked relating to each of the above areas, so that an analytical framework could be developed as a useful tool for critical engagement and dialogue on aspects associated with school beliefs and practice. The component theories approach provides a direct link between one’s philosophy, with its implicit assumptions, and the explicit principles and practices associated with that philosophy (Giles, 1995; Knight, 1989). Ideologies considered as shared understandings and framed via component theories can assist in the fleshing out of a unique expression of education found in the school. Our guiding question was: “What is the ideological nature of schooling at the ASMS as seen from the perspective of a leader?” and the associated sub-questions were as follows:

- How do these leaders work within the school community on their STEM agenda?
- Is there a common ideology existing across the leadership of the school?
- How do the leaders in this school frame their educational purposes towards learning?
- Is it possible to construct an ideology and essence of schooling within this school?
- How has the ASMS learning design impacted teacher and student relationships?

Data Analysis

Two analytical approaches were used in this case study inquiry. The first was a thematic analysis of the interview data, and the second involved engaging with a hermeneutic analysis where the meanings and understandings within the interview transcripts were sought.

The purpose of the thematic analysis was to identify emergent themes within the leaders’ narratives. The thematic analysis used hermeneutic processes employed in earlier research by Bills, Giles, and Rogers (2016) and Giles (2011). Where thematic analysis tends to focus on the words used, the benefit of coupling such analysis to a hermeneutic consideration is the opportunity to consider the data in terms of the meanings expressed. The data across the individual interviews was coded and hermeneutically analysed for emergent and powerful themes that serve the purpose of describing an alternative ideology of schooling. Palmer (1998) has described this as a fleshing out process of “authoring” or “scripting” our way and dynamically managing the paradoxes we find in our lives.

Ethical approval

Ethical approval for this research was gained from the College of Education, Social Work and Psychology Ethics Committee of Flinders University and the Department for Education and Child Development in South Australia. Assurances were given to the participants in relation to the confidentiality and anonymity of the data and within the representations of the data. Following the release of a draft version of this paper to the participants, they were keen for the school to be named but requested that their names be withheld even though they understood that it was nevertheless probable that they would be identifiable.

The Research Findings

Three broad ideological themes dominated across the interview transcripts, namely (1) the central importance of building, sustaining and improving an inquiry-based interdisciplinary curriculum, (2) the learning benefits of the school’s open and ICT-rich physical learning environment, and (3) the notion of “contributive” leadership, as described by the leaders, which indicated the innovative willingness of the whole staff body (teachers, leaders and support staff) to continuously improve the “project” of teaching and learning. These three unique structural, cultural and pedagogical schooling modalities collectively “pull” the school community (students, teachers and leaders) into daily dialogic educational encounters with one another. Within this learning design, teachers and students cannot work in isolation. For one, the physical design of the building makes this almost impossible. Learning is always “seen” and teaching is always “heard”. This “visibility” and “hearing” of teaching and learning is not a distraction. Rather, it is viewed by the leaders as an enabler of learning. As the principal reiterated time and again across two interviews:

They have to move away from what I call the 20th Century School design features. It’s not just about curriculum. It’s about the way

you put students and teachers together. The evidence is there's no such thing as a Year 9 student. They've got to move away from one teacher, one classroom, one discipline, because that's going to hold us back – teachers teaching separately hasn't got enough diversity in it to develop the capabilities the kids actually need. Disciplinary learning should be banned. (Principal, December 2016)

The ASMS physical environment consists of open learning spaces deliberately designed to foster regular teacher and student interaction. Learning design “openness” has helped to make the ASMS project of schooling highly collaborative. It is not the only reason for this, but it does present as an enabling condition for “learning togetherness”.

The barrier between all staff and students isn't there. It's more that we're one. Kids are quite happy to go up and talk to teachers – most of them But in other schools you talk to a teacher when you need to, whereas here they'll chat to them. And again, that's part of the design of the building – that teachers are easily available – and so they feel comfortable to walk up to them. The other thing is that kids don't want to go home. They're comfortable here. ... facilities, access to everything, but I think it's more that it's a nice place to be – the general environment and feel of the building – it's just a nice place to be. (Leader 6, December 2016)

This relational “pulling together” has offered the school community greater coherence of purpose, deeper understandings and appreciation of each other's teaching and learning strengths, and has fostered a school learning culture that embraces a willingness to innovate, ask difficult questions and inquire as the normalised “way things are done”. In other words, the essential “grammars” of learning design at the ASMS have enabled the growth of a dynamic learning culture attuned to both the learning needs of the students and the professional teaching and learning needs of the staff.

... there seemed to be much more communication than at ... schools where the Science Department is the Science Department and the PE is the PE Department ... and they rarely mix, apart from in the staffroom, and that's more from a social aspect. Whereas here everybody seemed to intermingle with everyone. (Leader 3, December 2016)

All in all, the ASMS learning design has prioritised relational necessity as its essence in order for all of the school's community members to work closely together.

This implies not only knowing students and staff well, but engendering ongoing collaborative planning and sharing of “learning together”, with learning from mistakes without fear of reprisal or embarrassment part of the school's (teachers, students and support staff) modus operandi. In so doing, a both personalised and attentive form of schooling practice has emerged. We now turn to a more comprehensive overview of the research findings pertaining to the three aforementioned “grammars” which collectively inhabit the school's learning design, namely (1) interdisciplinary learning, (2) open learning environment, and (3) “contributive” leadership.

The “Learning Togetherness” of the ASMS Interdisciplinary Curriculum

For the leadership at the ASMS, ongoing collective teacher inquiry into pedagogy and subject discipline knowledge has led to the emergence of interdisciplinary teacher teams who work together in creating an interdisciplinary curriculum. This approach began during the school's formative years and there has been historical continuity of on-going practice since that time. It is representative of how the teachers grapple with the big ideas of life in the world and beyond together. As the principal noted, “They [referring to former ASMS school leaders] put that in place right at the beginning”. The interdisciplinary curriculum was described consistently across the interviews, albeit in interchangeable terms such as integrated and cross-curricular, but the essential meaning was a coming together of the disciplines which pulled the whole school together in teaching and learning, manifesting in how team teaching was collaboratively undertaken. The rationale for this approach has evolved from the initial influence of the research-based inquiry undertaken by the school community from the beginning.

The curriculum has always been interdisciplinary. And we've stuck to that. It's actually about exploring theory – exploring the evidence – having a look at what's going on in the world and making those connections to the curriculum that's being designed. (Leader 2, December 2016)

And so, from the start, there was an overarching and agreed “big picture” understanding that learning outside of schools is never compartmentalised into disciplines but rather always connected. Therefore, it should also be connected in school curriculum design and pedagogy.

The world and knowledge itself is all connected and it's all over the place. So my explanation for students is that we try to replicate what life is like within the curriculum. It's confusing and it's messy and it's

sometimes contradictory; and sometimes it's unclear if you are right; and you can be right; and the exact opposite where you can also be right – and that's what we try and capture ... I guess we're trying to get kids to play in that complexity and the ambiguity between ideas. (Leader 1, December 2016)

Another reason provided for pursuing curriculum interconnectedness, which presented as a common theme across the interviews, was the need for students to be aware of how the subject disciplines “speak to” one another when “big idea” learning questions are pursued. For example, part of the principal's educational argument for planning and offering an interdisciplinary curriculum concerned the deeper learning connections this approach enabled for students:

I think the interdisciplinary names the fact that you're using the disciplines. Because that's the business of schools – it's to help students understand what the disciplinary structures are. ... they're going to understand the disciplinary structure better if they learn it in an interdisciplinary way. So they can see the connections. (Principal, December 2016)

It was also seen as “incredibly interesting for students to engage with” in their learning. According to one leader interviewed, “the interdisciplinary curriculum is just so powerfully interesting to kids”. Another interviewee also highlighted the collaborative benefits of the inquiry-based interdisciplinary curriculum approach. Teachers from different subject areas of expertise regularly come together in discussion to plan a new curriculum driven by a negotiated key inquiry idea. Examples of this in the past have included “the internet of things”, “climate change”, and the “ethical dilemmas of robotics”, to name just a few.

Those conversations, and that work, and the opportunity to do that around the table with people [referring to teachers] from different subject backgrounds, who often (not always) bring a different pedagogical experience and background, is a really rich learning experience. (Leader 1, December 2016)

In reflecting upon the school's beginnings, one leader described the very purposeful intent of vertical grouping of year levels as representative of another form of the integrated learning approach.

I think, when the school was established, it was very explicit and very purposeful in its set up in terms of showcasing 21st century learning, and so the vertically grouped year 10s and 11s was a real eye-opener for

people. People said it couldn't work. But it actually does – it works very well in terms of supporting kids to have more perspectives and to interweave all of the capabilities really. (Leader 1, December 2016)

The interweaving of year levels and subject areas creates greater meaning in learning for the students. It represents an authentic expression of how knowledge relationships in curriculum design, student groupings and teacher team facilitation of curriculum are cognisant of the essence of being an inquiring human being.

Whilst working in teams – it's a discussion – it's a difficult thing – you're not having to do it for each one of your classes – you're doing it together – that creates a whole lot of consistencies too in the outcomes that kids have – so that's an efficiency. In some ways it's more complicated and intense, but a lot more effective, because it creates more consistency in what the kids are going to come across. (Principal, December 2016)

Arbitrary schooling practices that are found not to enhance the learning experience of young people are made obsolete. The school's ongoing emphasis on teacher-led research and inquiry makes this possible. This process bears similarities to Illich's (1973) thesis of the need to de-school society's infatuation with historical institutions that fail to promote lifelong learning. In the case of the ASMS, this manifests as a “de-schooling schooling” project made possible by the school's rich culture of collaborative inquiry and reflection.

The kids actually see a point for doing what they're doing for connecting somehow to their next step. And that's where it's more than just “I know” stuff. It's “Can I do?” stuff and think about things ... it's being human really. (Leader 5, December 2016)

All the interviewed leaders spoke of the deeper learning benefits that come with interdisciplinary learning design. “Another fundamental here – it's about teachers learning, not teachers teaching. That was something very obvious in the beginning”. Therefore, these learning benefits were not only seen by leaders from a student learning perspective, but also from a teacher learning perspective.

With this – the curriculum structure. And then all of the other things go with it. There's not a faculty meeting – there's a team meeting. Instead of having a meeting around the discipline, you have a meeting around the students you are teaching. You know that sounds simple – but that's all it is. (Principal, December 2016)

The inquiry-based learning orientation of the interdisciplinary “way” also featured in the leadership interviews. It caused us to reflect upon the many ways in which this practice was affirmed by the leaders, along with its benefits. Through our hermeneutic thematic orientation to the interview data, a kind of “slicing” orientation to the conceptual data field in terms of the interdisciplinary approach continued to uncover more learning benefits.

Very inquiry-based and so fairly deep, rich tasks, where we'd introduce some conceptual information in a range of ways and then the students would have to work on some sort of problem, and very much collaborative learning as well. So the pedagogies go with the curriculum. You can't develop the curriculum without the pedagogy. (Leader 5, December 2016)

Forms of learning freedom, learning choice and learning relationships are enhanced through the ASMS inquiry-based interdisciplinary approach. Because of the interconnectedness of the learning space and the learning community, a learning culture exists that allows the students to seek out teachers – or other students, for that matter – to explain a learning concept that they may be grappling with.

The teachers know their students ... so there is a real challenge for teachers. Because students can choose what teacher they talk to – and it may not be the teacher that's assigned to their class. So that's another level of communication that you have to have. I've been working with somebody in your class. And we say push them away and tell them to go to their teacher. And they say “Well you explain it better than them”. So you can't say no. (Principal, December 2016)

Finally, as a powerful summary of the school's dominant ideology of “learning togetherness” that naturally grows out of the relational benefits of the interdisciplinarity of curriculum design, curriculum team facilitation and curriculum inquiry, the principal offered an impassioned plea to do away with industrial forms of mass schooling that privatise teacher work and in so doing debilitate teacher efficacy:

This working by yourself is very odd, you know. I mean the way we've set up a teacher in one classroom, hidden away, is very debilitating, I think. But I think the team work is the way we've changed what teachers think and the way they can share. (Principal, 2016)

The “Learning Togetherness” of the ASMS Open and ICT-Rich Learning Environment

From its developmental beginnings, a principal aspiration to “liberate cleverness in young people” became a driving force behind learning design at the ASMS in all of its possible manifestations. Architectural design represented one of the key “liberation” platforms. Built on the campus of Flinders University 15 years before, the design of the ASMS building represented a radical departure from the mass schooling design that for many years has placed students and teachers in narrow corridors for student movement that actually disrupt student movement and heighten pushing, shoving, noise and the need for teacher behaviour management monitoring – in other words, corridors create more behaviour management issues for teachers and more physical disruption for students. These physical schooling forms have also enclosed both young people and teachers in walled rectangular classrooms like tools in a compartmentalised toolbox for many years. Meanwhile, teachers have also been housed in their own faculty-walled staff preparation areas, areas often seen as psychologically “impenetrable” “no go zones” for students. Imposed privatisation of teachers with like subject discipline staff restricts opportunity for cross-fertilisation of “big ideas” across subject fields and learning between staff and students. In these privatised physical forms, student appointments with teachers are often undertaken by only those students who are bold and organised enough to meet with teachers for needed support. Appointments are not taken up by all students and, if there are too many student appointments, teachers struggle to find the time to attend to lesson preparation or other school duties. This form of building design in schools has never been an enabler of “ready at hand” (to use Heidegger's turn of phrase) learning. For Heidegger, “ready at hand” is “the primary way in which things are known – namely, non-reflectively – while we are engaged in concerned activity” (Koschmann, Kuutti, & Hickman, 2010, p. 27). However, at the ASMS the architectural form of the building, with its large open spaces and glassed areas filled with natural light, gives way to staff and students being readily seen as available to participate in the learning process. Furthermore, at the ASMS, “behaviour management is practically non-existent” (Leader 5, December 2016), with the physical space contributing to this.

There is the physical space, the fact that you have two teachers working with 60 kids quite comfortably, and the kids aren't climbing the walls because the kids are not stuck in a square room. Here – movable furniture, large spaces, kids who are prepared to actually move around – everybody brings their own device, so we're not limited; and I think the ICT is absolutely critical as well. (Leader 4, December 2016)

The principal, who has recently retired, spoke about her career-long support for open learning spaces. These were a feature of South Australia's move into open learning environments during the late 1970s (Collins & Yates, 2009), but waned and became almost obsolete ten years later. In her earlier career, she spoke about the learning benefits that open classrooms brought to team teaching and collaborative learning, but was not clear in those earlier days about just how powerful open learning spaces could prove for staff and teacher learning and relational connectedness until she came to the ASMS.

I've always liked the open learning spaces ... but it took me a while to learn how really powerful they are, even though I learnt to teach like that ... it's a completely different learning environment. First there are the open spaces ... [which] have enormous impact on how people feel in that building. When you're not in four corners and rows and corridors ... whoever thought up corridors? They all spill out when the bell goes, and off starts the bullying and pushing. It's just – well – prison, I suppose. (Principal, December 2016)

One leader spoke about how the open learning environment offered connections for staff and students across the disciplines and how the building was deliberately designed to make this happen.

It's a very 21st century environment in terms of providing links between a range of different disciplines, and it provides the opportunity for learning to happen in multiple ways. So that actual learning environment is fantastic. I've always said that going to the ASMS each day was like going to an educational palace. Because the way the building has been designed really did allow amazing things to happen ... (Leader 1, December 2016)

All of the leaders spoke about how the open learning environment gave young people physical freedom in contrast to the closed off nature of secondary school learning environments where teachers and students work behind classroom doors.

And when you talk to kids, that open learning environment creates the opportunity for choice. So you don't actually get told where to sit. There are no ... rows and no corners. That's what the kids told us ... they didn't feel hemmed in. And then it created all of those other things in the building like the first name basis, you can do other things in

the open, you can move chairs ... having a choice. And when you think about it – it's about honouring the learner that they can have some choice. (Principal, December 2016)

Although not entirely causally attributable to the open learning spaces at the ASMS, given that the culturally infused notion of “contributive leadership” and “interdisciplinary learning” are also in play, the building design has considerable impact on how teachers and students communicate and “intermingle” throughout the school day. In thinking about his previous secondary school experiences, one leader reflected on these differences as follows:

... there seemed to be much more communication than at ... schools where the Science Department is the Science Department and the PE is the PE Department ... and they rarely mix, apart from in the staffroom, and that's more from a social aspect. Whereas here, everybody seemed to intermingle with everyone. (Leader 3, December 2016)

Beyond the open physical space, the ICT-rich learning environment readily available to both staff and students throughout the building enables networked connectedness between students and teachers both inside and outside the school. Many teachers watch students attend to their work on “Google docs” and may enter these learning conversations in front of the TV at home.

... the other thing that makes the difference is that everything is online. It's hard to put your finger on it. It's ubiquitous. It's just how it is. I go around and ask kids well how do you keep yourself organised? Well, they've got all of these things that I've never heard of that they use. We don't teach any of that. Some of it's very sophisticated. When we talk about group work ... we're talking about this. When kids talk about group work, the first thing they do is set up an online learning community. It fascinates me, because it is totally improvised. And yet that's the way they work, and that becomes really important. (Principal, December 2016)

The ASMS learning space is resplendent with brightly coloured and well maintained soft movable furniture that keeps the school physical space moving in tune with presenting learning and teaching needs, making the learning environment at the ASMS a dynamic learning entity. For us, the wide open spaces and light filled learning areas appeared to make the school feel bigger on the inside than the outside. The Tardis in *Doctor Who* comes readily to mind.



Figure 1: The Learning Commons Area of the ASMS

Wherever you are situated in the “learning commons”, whether teacher, student or support staff, you have the opportunity to “be” in learning or to be “seeing” learning in action and even “hearing” learning unfold.

But then the whole environment lends itself to a learning space. So when you’re sitting in your office and you’re listening to people working with kids straight outside – right next to your desk – you are learning and you are seeing how that plays out. Whether you think it’s playing out the way you thought it was going to, or whether you’re thinking “Oh it’s not going quite the right way” – all of that is important in terms of professional learning. (Leader 2, December 2016)

In terms of “ready to hand” learning opportunities, the physical space of the learning commons, where most of the teaching activities are facilitated, enables students to conference their learning together. The principal aptly described these spaces as “*the beating heart where most of the learning happens – and this learning is often between students*”.

Like, most of the learning happens in the commons with students amongst students. There is a whole lot of untapped and uncategorised teaching that happens between them. And sometimes they might be teaching each other wrong things. However, that’s part of the learning mix enabled because of the curriculum and the space. (Principal, December 2016)

The “Learning Togetherness” of the “Contributive” Leadership Approach

“Contributive leadership” is a conceptual leadership term that belongs to and is continually advocated for by the ASMS leaders. The notion has been “part and parcel” of the school’s operational code of practice from its start. It is a term that does not as yet present in the research literature, and yet it presents as integral to the ASMS innovative growth storyline. Similar sounding leadership styles and concepts like distributed leadership, devolved leadership, shared leadership or even transformational leadership (Wang & Waldman, 2013) do not truly capture either the cultural essence of how the ASMS community works “in” leadership of innovation with one another or its learning growth trajectory as a STEM school with 21st century learning practices. Our understanding as researchers of the term has been garnered from the interview data. “Contributive leadership” denotes the innovative willingness of staff and students collectively and creatively to dream big in learning. It encourages both staff and students to contribute creative ideas for teaching (Palmer, 2008), fostering more authentic performance-based outlets for students to demonstrate their entrepreneurial capabilities in STEM learning.

The people who get on board with it and give it a try ... I think when I first started here I was probably a much more traditional business manager – you know, you look after the order of things; my personality is super organised. But I’d say that I’m much more flexible now in the way I look at things. I rarely say “No” to something, I say “Let’s see how we can make this work. You want to

give it a try?”. Because ultimately, if it’s going to benefit the kids, then let’s give it a go and let’s see the positive benefit of it. (Leader 5, December 2016)

The open and trusting professional learning culture of the school is critical to this flexible “way of being together”.

It’s such a collective [effort] – the way we’ve managed the curriculum to get to the point it’s at now has been such a group effort ... (Leader 5, December 2016)

The school has always sought to “push the edges” of how the project of schooling could best be undertaken for deeper learning. While it is acknowledged by the leaders that this “edge” will never be reached, it is recognised that the school’s culture of inquiry and research inspires staff and students to propose new learning ideas or programmes or to critique existing ideas in practice that may need more work. It is contributive leadership that drives the school’s approach to all learning activities.

Kids learning, teachers teaching, everybody learning – we’re all learning. And particularly different to other schools is the involvement of the support staff. We try very hard here to involve the support staff in Professional Learning activities so that we’re all going through the same things at the same time. (Leader 5, December 2016)

Contributive leadership views all staff as contributing learners themselves. It is a team-based orientation where ideas are given their optimal chance to ferment, to be expressed and then to crystallise into action. Some of these ideas emanating from staff and students include student-led annual community science fairs, students as entrepreneurs of new inventions on public display (the ice cream cone that does not leak or the umbrella that does not break), a specifically designed experiment (“muck around”) room secured through student voice, and regular invitations to school communities from around the world who are escorted around the learning commons by students. These ideas don’t always work, but, within the accepting experimental culture of the ASMS, that is “perfectly okay”.

They engage professionally and with their colleagues and the (research) literature – so they are learners themselves. They are open to new ways and new approaches and respectful of old ways – building on those, not throwing them out. Able to work with others in a team. Aren’t precious about their own subject-professional identity – they each see themselves as a facilitator of learning, not as the owner of knowledge and deliverer of knowledge. (Leader 2, December 2016)

One of the school leaders described contributive leadership in terms of a structure: “A structure to ensure we are all [referring to the whole learning community] contributing to the leadership of learning”. Yet another leader suggested that it gave the staff “the freedom to be creative”.

We use ... what we call a “contributive leadership” approach. We’ve worked in that model since the school began and we have had the privilege of being a small school and were able to have contributive ... we all sit, talk ... pitch in, this is our solution. As it’s gotten bigger [the ASMS student cohort] it’s become more challenging, and we’ve had to put more structures in place, and we’ve had to be clearer ourselves as a school about how those structures actually ensure that we all contribute to the leadership of learning. (Leader 2, December 2016)

Contributive leadership furthermore works across school boundaries. Partnerships with other schools seeking to embrace a STEM agenda are very important to the charter of the ASMS. It was described as especially important for people (schools) to know that there is somewhere they can look to, visit and see in action. This includes the development of partnerships with the northern schools of Adelaide that are feeling the full brunt of the collapse of the manufacturing industry and which have for many years struggled to break through the “destiny effect” (Bourdieu, 1999) of generational unemployment or under-employment by embracing schooling practices that can make the difference. Here, contributive leadership is not locked into the school’s “bubble” of daily operations, but rather is concerned with lending whatever support is needed to other school communities.

The other partnerships I think will be really powerful is the partnership with the northern Adelaide schools. We started that this year and that got great traction through having kids in their schools involved in our Science Fair and then sending teachers and kids along. And by all accounts it was just an amazing experience from their perspective. It was from ours! It was brilliant to have kids from other schools involved. It’s been a goal I’ve had. So I think the outreach is definitely happening. And I think that the huge focus now on the STEM – with the STEM strategy, the STEM works, with the Prime Minister with an innovation agenda. All of those ducks are aligning perfectly for the school to really influence and support schools in their development. (Leader 1, December 2016)

But “contributive leadership” also requires an intuitive “knowingness”. This is exemplified in the following comments of an experienced leader about *when* to “move” on something and *when* to “hold back”, “*when* to offer more support” and “*when* to trust” that things will happen well without intervention. Here, timing and trust are of the essence.

As a leader it's all about knowing when to hold them and knowing when to fold them ... support people with your initial scaffolds, support people to know what their roles are, and then let people do it. It's a bit like kids' learning. You know, you've actually got to trust them to do the right thing – catch them doing the right thing, support them when things aren't going as well as they possibly could, and then reviewing and improving next time. (Leader 1, December 2016)

One leader described “contributive leadership” as being about providing nuanced support to allow teachers to build a curriculum of connectedness for the students so that they can “play in the field” of ideas.

My role as a leader, it's essentially about supporting teachers to generate a curriculum that allows students to play in that field. I'm always going to be connecting up people who are doing it well, people who need more support, and a beginning teacher who is still figuring out how to do it (Leader 6, December 2016)

Another teacher described the creative potential of “contributive leadership”. Staff who come to the school with their own particular interests, expertise or passions, are given the opportunity to turn these into learning programmes. For example,

I think as people have come in with their own interests, and they've developed those, so it's enhanced the curriculum. For instance, someone was into model aeroplanes and so developed a course where he could share his love of that with the students. So that's one of the Adventure Space elective programmes. (Leader 5, December 2016)

In terms of professional learning, the “contributive leadership” approach can lead to at times difficult and challenging conversations between the staff. This is not seen as unwelcome, but rather as an expected relational core of working creatively with new ideas within a rich learning community. The ASMS view of professional learning (notice *not* professional “development”) is that it is available for all to participate in and leads to an exploration of theory in conversation with all.

... professional learning in not about “Here's a programme, learn it ... here's some theory ... let's have a look at it”. It's actually about exploring theory – exploring the evidence, having a look at what's going on in the world, and making connections to the curriculum that's being designed. So having the chance for teachers to do that and talk about that. And familiarise themselves with the Australian curriculum and SACE in a different way; not as a single entity that says you've got to work through it this way and have these outcomes in this form only. Those conversations, and that work, and that opportunity to deal with different pedagogical experience and background, is a really rich learning experience. I'm not talking about congenial conversation here, but one that is challenging, can be confronting, is really getting people to stretch their ideas and their way of operation. (Leader 5, December 2016)

Discussion of the Findings

An overarching ideology of “learning togetherness” presents at the ASMS. In Heideggerian terms, this is encapsulated in the phrase “ready to hand”, which speaks to the ASMS’s open building design and the ICT-rich learning environment which together promote student networking and team learning together along with ongoing collaborative learning relationships between the teachers and students. Learning togetherness takes on the mode of “present-at-hand” through ongoing interdisciplinary teacher teams coming together to wrestle intellectually with beginning with purposeful abstract forms of interdisciplinary curriculum design work. The contributive leadership feature of this is that it is the students who indicate how, when trialled, new curriculum forms need to be adjusted when lack of clarity presents. These critiques are taken up regularly by the teaching staff, who also provide feedback to the curriculum leaders about the effectiveness of the new curriculum. It represents a whole-of-school culture of inquiry and critique. For Heidegger (1927/1978, p. 103), “present-at-hand” in this purposeful activity is a mode of being where teams (teachers and students) together contemplate new curriculum design concepts in abstract ways. Once this has become well practised, it becomes “ready-to-hand”. At the ASMS, ready to hand also presents in the social forms of contributive leadership which manifest in students naturally working “with” students, students naturally working “with” their teachers, and teachers naturally working “with” teachers.

This mode of organisational life flows from deliberate planning supported by the relational schooling design in action. It represents a very sophisticated and intuitive pedagogical judgement about the school’s way of being that first presented during its developmental phase.

During the first few years of the ASMS, the principal at the time urged staff members to “*liberate cleverness*” in any way possible. The implication, according to the three leaders we spoke to who were all young teachers when the school was started, was that they were entrusted to do schooling very differently from conventional schooling forms, to experiment with forms of schooling that would inspire students to learn in STEM, and to want to talk about their learning with friends and family. They argued that the ASMS was by design an expression of powerful and dynamic learning engagement of a kind that knowledge transmission and memorisation could never engender.

The ASMS leaders have embraced beliefs and understandings around the need for teachers to know their students well, to discover their learning passions and talents, and then to improvise pedagogical ways to support them in becoming independent lifelong learners in the digital age. It was very clear that the role of the teacher was as a facilitator of this lifelong learner “*becomingness*”. Teachers were entrusted to move both young people and their own colleagues into ongoing collegial inquiry and experimentation in order for any

innovative practices in learning to flourish. The rationale for this is well captured by Su (2011), who indicates that the acquisition of static knowledge is no longer the educational call in these complex times of rapid socio-cultural change, and that the educational project has thus become rather to prepare learners with the capabilities required to apply knowledge in different ways in particular circumstances that highlight the need for a relational fluidity of capabilities in application.

The true medium of communication with the changing world no longer concerns any possession of externality but rather emphasizes the occurrence of learning in which knowledge is used and integrated based on its relevance to changing situations. (Su, 2011, p. 59)

We illustrate this relational learning fluidity as it presents at the ASMS in the diagram below, which has been created from the key themes captured through our component theory analysis approach. We will use the diagram as a conceptual organising technology to consider and discuss the findings further.

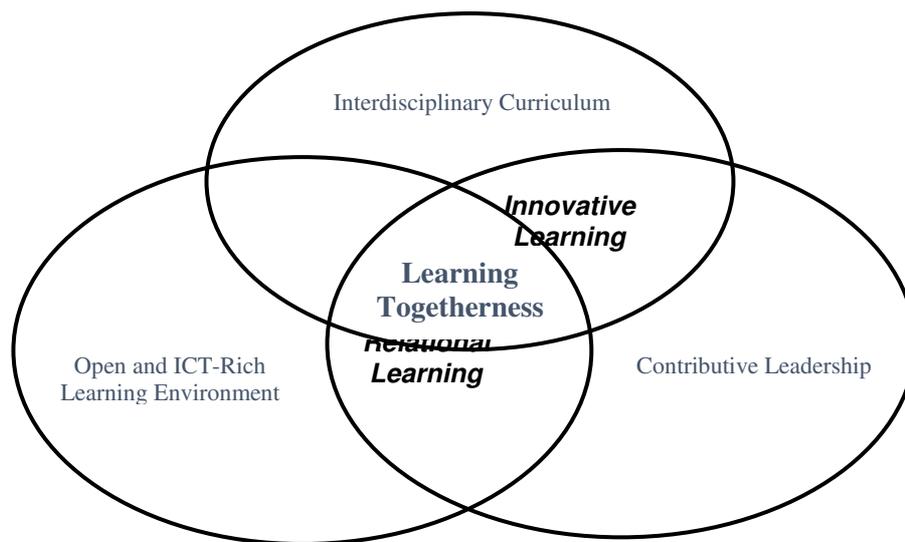


Figure 2: The Ideologies of Schooling at the ASMS

The ASMS presents as a living organic learning entity. Its modalities of practice, namely an interdisciplinary curriculum, ICT-rich open spaces design, and contributive leadership combine to nurture an interconnected flow of ideas that manifest the dominant ideologies of learning unique to the school’s ways of being. Meaningful, innovative and relational learning present as the ideological keys to learning togetherness that make the project of schooling at the ASMS an interconnected and culturally affirming learning community. These

three ideological keys have been formed over time as an expression of the school’s storyline. They keep the school community charged with new ways of working with one another for the betterment of student learning. They also attend closely to work futures and what the world is calling for from the millennial generation. According to Baumann (2000), to meet the challenges of these times of uncertainty and change, “*movement*” needs to structure our thinking and language to adapt rapidly. He argues that learners who have the capacity

to be “liquid”, and who are therefore flexible, will come to power in a constantly changing, learning-on-the-go society. Such learners are needed by the world, and these forms of learning are underpinned by the ASMS ideologies of schooling. The school leaders recognise that this generation of learners is the one that will need to address climate change, rampant consumerism in the first world, poverty in the third world, fear and hatred that inflames wars, cultural barriers across borders, lack of mutual understandings and unethical behaviours. We ask whether the ASMS is an expression of those schooling ideologies that best prepare young people for the challenges concomitant with the Third Industrial Revolution, a school that prepares young people with the necessary capabilities to address the multifarious adverse effects on our planet and our societies unleashed by the First and Second Industrial Revolutions:

We are beginning to realize that the Earth’s biosphere functions more like a self-regulating organism and that human activity that undermines the biochemical balance of the planet can lead to the catastrophic destabilization of the entire system. The spewing of massive amounts of carbon dioxide, methane, and nitrous oxide into the atmosphere over the course of the First and Second Industrial Revolutions has done just that. (Rifkin, 2015, p. 14)

Rifkin claims that the Third Industrial Revolution is upon us and is taking the form of a Sharing Economy, most pronounced at present in the European countries. The proliferation of new entrepreneurial enterprises including Google, Facebook, Twitter and YouTube, and thousands of other Internet companies, have been hugely profitable in creating new applications and establishing networks that lay the foundations for a Sharing Economy (the Third Industrial Revolution) to flourish.

Economists ... have argued that the productivity advances of the digital economy would not pass across the firewall from the virtual world to the brick-and-mortar economy of energy, and physical goods and services. That firewall has now been breached. The evolving Internet of Things will allow conventional business enterprises, as well as millions of prosumers, to make and distribute their own renewable energy, use driverless electric and fuel cell vehicles in automated car sharing services, and manufacture an increasing array of 3D-printed physical products and other goods at very low marginal cost in the market exchange economy, or at near zero marginal cost in the Sharing Economy, just as they now do with information goods. (Rifkin, 2015, p. 3)

In our assessment, the ASMS has made significant inroads in preparing young people with the entrepreneurial and

ethical capacity needed for furthering a Sharing Economy for a sustainable planet. As a public school, student social capital is seen to be as vital as finance capital, access to and inclusion in learning is seen as more important than individual knowledge acquisition, sustainability thinking supersedes the preoccupation of learning with individual consumerism, learning co-operation is more highly valued than inter-individual competition, and “exchange value” in the capitalist marketplace has been superseded by “shareable value” of the kind that takes place in the collaborative learning commons of the ASMS’s learning environment every day. When asked “How do you know the ASMS works?”, the present principal (who when interviewed was a senior leader driving professional learning both in the school and across the partnerships beyond the school) responded:

There are a lot of different ways. You can look at their retention, their attainment, their growth – which I think is the most significant, which is a lot of self-reporting, but also that qualitative elicitation of learning – and their progress and confidence, sense of ethics, agency and their own learning. It’s just amazing. You can look at fun, enjoyment – when you walk in the building, you get that sense that it’s a really buzzy kind of place and people are enjoying being here. When you look at data around levels of bullying and harassment, it’s low. You know, all that stuff tells us that this is working for kids. (Leader 2, December 2016)

And “feeling” enters this “knowingness” of success.

And people often talk about that feeling you get when you walk through that door. It’s almost uplifting, empowering knowledge, that when you walk through that door you’re part of something amazing and you give it your all, and you actually feel bad if you don’t. (Leader 5, December 2016)

Conclusion

The key to unlocking the ASMS ideological storyline is found in the words, “We’re all in this together”. Implicated in this “all” is habitual student and teacher team work contributing to interdisciplinary curriculum design and the student inquiry-based learning teams that form naturally to make sense of the big ideas that underpin the curriculum. The hard work of the ASMS school community throughout its years of ongoing development manifests as an exciting and invigorating learning adventure for the school leaders, teachers and students. In sum, it is the power of “ready to hand” relational learning design that drives learning engagement in any school community. In the case of the ASMS, “learning is connected with thinking, acting, and feeling

rather than being viewed simply as a cognitive activity” (Su, 2011, p. 69), and this thinking, acting and feeling works in attentiveness to the “present” and attunement to what the world is calling for in terms of preparing young people for the future:

Within the framework of Heidegger’s being, the proposal of developing lifelong learners repre-

sents a synthesis of the different dimensions of dynamic agentic operation – feeling, thinking, and acting – which is beneficial to the development of learning to “be”, an existential state that can be dynamic and flexible so as to meet the challenges of establishing authentic existence and knowledge for living with change. (Su, 2011, p. 70)

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