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Indigenisation of the curriculum

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Aboriginalisation of the Australian Curriculum: A focus on Mathematics and Science in South Australia

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Introduction

Australian curriculum has struggled for many years with the "finding of place" for Aboriginal and Islander content. The justification for its inclusion into the Australian curriculum sitting alongside the powerhouses of Mathematics and Science has been an area of lengthy dialogue and deliberation. The Australian Curriculum Assessment and Reporting Authority (ACARA) 2008 have recently embarked on the inclusion of an Indigenous perspective through all subjects and units. It will be interesting to see how much is incorporated and how much encouragement is given in the domain of extension work and inclusion of the Indigenous perspective. There is also the possibility and encouragement for classroom teachers to alter the Indigenous perspective to a more comprehensive Aboriginal and Islander Unit of study. Government policy around Australian Institute for Teaching and Schools(ATSIL) and ACARA has sort to be more inclusive of the social make up of Australian society and this has in-turn been marked by the need to learn more and be more inclusive of Australia's Indigenous history. As Dr Chris Sarra explains …. "For educators there is tremendous scope here to engage positively with local Indigenous people in communities to develop relevant learning experiences"(Sarra) Australia, as a nation, is still in a quandary as it grapples and begrudgingly tries to move away from its Euro-centricity and adopt a more Australian and Asian focussed curricula. This is reflected in some of recent policy changes of the Federal government on one hand and on the other Minister Pyne's reignition of Prime Minister Howard's History wars as the ABC's Mungo MacCallum identifies.

Background context

Historically there was very little emphasis on incorporating Aboriginal studies units or an Indigenous perspective into the mainstream landscape of Australia's educational system. I refer to my experience of the South Australian education system of the late 70's and early 80's. During this time, most of my History and English subjects were Eurocentric with the odd foray into Asian studies, mainly including ancient Chinese and Japanese history. All English texts and references were the same, although poetry sometimes had some Australian content but not Aboriginal Australia. It wasn't until we undertook tertiary studies that we came into contact with prominent Aboriginal playwrights like Jack Davis, Oodgeroo Kath Walker and Kevin Gilbert. Mathematics and Science subjects taught concepts that were void of any Indigenous content. Only when I started studying and began teaching that the thought of incorporating Aboriginal studies or placing an Indigenous perspective began to manifest itself. From then, the opportunities seemed endless to incorporate Aboriginal knowledge's into the curriculum for the benefit of ALL students and that has been my mantra for many years.

The South Australian Certificate of Education (SACE) structure

According to the SACE website
https://www.sace.sa.edu.au/the-sace/teachers-schools/aboriginal-education/aboriginal-perspectives-in-subjects.

The SACE board encourages and advises any teacher wishing to undertake a course of study which involves and incorporates an Aboriginal perspective. It states,
"In partnership with Aboriginal and Torres Strait Islander communities and schools, the SACE Board supports the development of high quality learning and assessment

design that respects the diverse knowledge, cultures, and perspectives of Indigenous Australians."
As this is currently designed on a "good will" basis and not a compulsory instruction for teachers to integrate, students are in danger of not having any exposure to any Aboriginal content in the SACE years.

The SACE requirements

The Stage 1 and 2 Aboriginal Studies unit is quite comprehensive and requires extensive prior knowledge on behalf of the teachers in order to teach the subject respectfully and in a culturally safe manner. Students will be well placed on completion of the Aboriginal studies unit. Alternatively, teachers seeking to include an Indigenous perspective are "encouraged" to do so but it is not a compulsory requirement in the SACE years. Currently, as the policy states, it is the goodwill of the teacher to incorporate an Aboriginal flavour to the subject/s
https://www.sace.sa.edu.au/the-sace/teachers-schools/aboriginal-education/aboriginal-perspectives-in-subjects

- The Mathematics curriculum and what is required?

Currently Mathematics is transitioning in the South Australian school program and should be fully operational by 2017. In this transition stage there is great opportunity to embed Indigenous perspectives and Aboriginal knowledge systems into Stage 1 and 2, *Mathematics, Mathematical Applications, Mathematics Pathways, Numeracy for Work and Community Life*

- The Science curriculum and what is required?

Subjects in the Stage 1 and 2 SACE include, *Agriculture and Horticulture, Chemistry, Geology, Psychology, Biology, Physics, Nutrition and Scientific Studies.*
All the of these subjects have the option and encouragement of incorporating an Indigenous component

Students enrolled in their SACE also have the opportunity to study a subject of their own choosing.

Schools fortunate to have the South Australian Aboriginal Sports Training Academy at their schools, have a "ready-made" curriculum and supports for schools wanting to propose an alternative subject offering in the senior years. The curriculum area resource packages enable schools and teachers to utilise the unit plans. All unit plans and activities have a strong Aboriginal content wherever possible. In subjects that have a mainstream element, workbooks are still typeset with strong Aboriginal representations, either through pictures of Aboriginal or artist representations.

The Aboriginalisation of curriculum content and the interface between Aboriginal Knowledge systems and how it fits into a Western-style educational system

For tens of thousands of years or approximately 2000 generations, Aboriginal and Islander peoples have successfully co-existed on a land and sea mass, deemed "harsh and dry". Biographically it may be true to the Eurocentric society that travelled the world claiming tracts of lands from the world's Indigenous nations, but

Aboriginal people have managed to live with and prosper despite this supposed adversity. The intricate reading of seasonal and environmental change shows a greater depth of understanding than previously anticipated. To encompass this knowledge system into the school environment only strengthens the current curriculum. Complete incorporation into the curriculum is needed. For this incorporation to be completely functional, Indigenous topics will ideally be delivered through multi subjects with several teachers and community involvement. For example, looking at the significance of Aboriginal Art in History could also incorporate Mathematics looking at the pricing, sales and resale value of Aboriginal artists such as Albert Namatjira; looking at his life could also mean looking at the social policy of the time incorporating SOSE unit. Chemistry could also incorporate the use of Oxides in Ochre and their usage including as a commodity to trade incorporating Economics and Trade. The very nature and delivery allows for a multi-disciplinary delivery.

Value adding, complementing and enriching the curriculum and students' learning experience

Allowing for the incorporation of Indigenous knowledges is extremely enriching for schools, teachers and their communities. A mono-cultural view of societies inhibits those societies and paves the way for cultural devaluation and destruction. A society that values and celebrates its diversity will, through its educational system, encourage empathy amongst its children. Empathic reasoning within students allows them to view the world from another person's perspective. Students need to experience the most exhilarating educational learning opportunities possible to ensure a well-rounded education.

Collaboration, empowerment and involving the local community

It is important for classroom teachers first and foremost, to involve and incorporate Aboriginal Elders and community experts to enrich and make authentic their teaching program. This also presents opportunities for two-way learning and the importance of collaborations inclusion and celebration of two differing knowledge systems. It is possible for the two knowledge systems to be looking at, and incorporating those learning opportunities for students. Having witnessed this first hand with below example from Christies Beach High. A multitude of learning experiences were learned by both teachers and students working with elders and cultural experts.

The importance of integrating "Teaching on Country"

"Teaching on Country" literally means taking a group of students out of the classroom context and delivering the subject matter in a natural environment that is linked with context, ie if we are talking about making Boomerangs, we expose student to as much aspects of the learning experience as possible. This should include, Plant and tree selection "on site", designing shaping and production "on site" and incorporating any Dreaming stories associated with or about boomerangs. This educative process is a very enriching experience especially if delivered by local Aboriginal cultural experts or Elders or both.

It is important especially if including local Dreaming stories on the actual Country and viewing those sites of significance encompassed with other learning experiences. Plant usage, for example, can examine how plants are harvested and collected for medicinal purposes encompassed with Elders' knowledge and a chemical focus looking at traditional healing practices. Teaching on Country is especially important for Indigenous students as it reinforces that inter-connectedness to Mother Earth and the importance of remaining connected as

Aboriginal people all have particular relationships to certain areas of Country and these determine our obligations and responsibilities. Our knowledges and what we do in attending to Country, all relate to our particular areas of Country, our knowledge is localised" Carey (2008)

This is much more important in the metropolitan context where Indigenous students may have limited representations of themselves or their culture in the daily curriculum. One metropolitan Adelaide school has been bold enough to encourage the take up of Teaching on Country. Christies Beach High has a tremendous young girls' program, which involves teachers, elders, and students taking their engagement program to a quiet natural environment for a uniquely integrated learning experience.

An inclusive curriculum model for all students

Aboriginal society and its knowledge systems, has always been an inclusive educational model. Aboriginal students are somewhat autonomous and highly independent; especially the further away from urbanisation they are, prior to entering the school system. They would have viewed and had access to representations of their culture in the early stages of their young lives. This concept is more dependent on location and demographic. Often young children would have had plenty of opportunity to explore their local environments and can be observed moving about homelands and communities in a small family group with the oldest charged with the responsibility of the younger siblings. This behaviour is also observed in slightly larger regional towns if family units live within close proximity of other family members.

When Aboriginal students present to school settings, the curriculum needs to have representation of Aboriginal culture for students to have a "sense of belonging". It is important for teachers to be aware of this and adjust their teaching approach and curriculum accordingly. The "inclusivity approach" seeks to involve and incorporate all world views and celebrates diversity as opposed to a singular mono-cultural viewpoint. All students then have the opportunity to formulate their own opinions and reflections of a diverse curriculum that is very inclusive of Aboriginal content. Increasing the amount of Indigenous content in the domains of Mathematics and Science would draw from successful models that have existed in the Aboriginal cultural domain for thousands years. There is a great opportunity for Aboriginal and Islander students to see representations of their culture in all curriculum areas, especially in community- minded schools that involve cultural experts from the members of their community.

Celebrating and sharing of "Best Practice"

The teaching fraternity has always been a group willing to share its resources. To increase the number of resources, especially for the Mathematics and Science subjects, would reinforce already established Mathematical and Science viewpoints experienced by many Aboriginal students. Mathematics lends itself to Indigenous concepts of TIME and SEASONS,BOOMERANG Flight Paths, VOLUME in Fishing nets and fish traps, the Trigonometry between rock holes or sites of significance along a Songline. Science lends itself quite easily to Aboriginal Knowledges with many concepts intertwined. Astronomy, plant usage, natural land and sea-scapes, sustainable practices and theories, and how Aboriginal Australians interpret creation and evolution systems as a comparison to Western belief systems. Students can explore and compare Aboriginal intelligences and Western intelligences in the Mathematics and Science domains. It well maybe that the delivery of subject matter becomes an integrated approach which crystallises the two subject areas for effective delivery of the concept. This is very much what happens in primary, rural and remote schools. There still seems to be a lack of collective resources from these disciplines and therefore there is this disadvantage when delivering quality Mathematics and Science education with an Aboriginal context or perspective to support our graduand teachers.

Summary and recommendation

As the Australian education system moves to increase and incorporate an Aboriginal and Islander viewpoint in all subject areas of the curriculum, we are gradually finding shortfalls in the incorporation of such viewpoints and ideologies. According to Lowe and Yunkaporta (2013) there are many key concepts that have been omitted in the ACARA roll out of the new curriculum from Foundation years to Year 12. They noted this from a search for Aboriginal and Islander concepts, issues, culture from the ACARA website. Lowe and Yunkaporta explained in their "cultural, cognitive and socio-political evaluation" report, that those areas covered were "simple factual content rather than Aboriginal ways of thinking and doing" (p4).

The SACE, as previously stated, has limitations on the inclusion and incorporation of an Aboriginal perspective in its units of studies in year 11 and 12. Teachers are only encouraged to incorporate an Aboriginal or Islander viewpoints into subject areas. In doing so, the SACE board provides subject teachers with limited resources and literally leave course material and design to the classroom teacher. From a teacher's viewpoint, having access to as many high quality and diverse resources enhances both the teacher and student learning experience. The inclusion of varying world views in Science and Mathematics serves to enhance a student's learning experience.

Both discipline areas need to invest into the development and incorporation of high quality and culturally appropriate Indigenous units and resources for the enhancement and its curriculum. This investment will enhance all students' learning

experiences and value-add to the richness of their educational experience in the South Australian context.

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