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Developing Teachers' Environmental Literacy through Inquiry-based Practices

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ABSTRACT

This paper is concerned with a gap in the discourse concerning the development of environmental literacy. Much of the research available concerns the development of environmental literacy in students; however, our assertion is that unless the teacher has developed environmental literacy themselves, they cannot develop such literacies in their students. Hence, this paper will consider the development of environmental literacy in teachers as a necessity for enabling the development in students. As environmental education is predominantly delivered through an interdisciplinary infusion model, the recommendation is for a teacher's environmental literacy to be developed alongside their inquiry literacy. This paper uses the Australian Curriculum to explore how a curriculum potentially impacts on the development of environmental literacy, and the synergistic relationship between environmental literacy and inquiry literacy.

Keywords: Australian curriculum, science, environmental literacy, inquiry-based teaching, sustainability, teachers

INTRODUCTION

> Everyone now makes decisions that have implications for the natural system – as a worker, as a consumer, as a parent or as a member of a community group. Our urban structures, our legal system, our economic development choices, our use of transport, our recreations and amusements, our diet and the way we live our daily lives all have significant impacts on the natural environment. The argument for universal environmental literacy is simply an argument that we should understand the effects of our choices, rather than continuing to do unnecessary damage through our ignorance (Lowe, 2002, p. 1).

This is a position paper where the notion of developing environmental literacy through inquiry-based practices is explored. The premise is that one would assume that teachers themselves would have to first become environmentally literate before they can effectively provide opportunities for students to engage in activities to develop environmental literacy. We have extrapolated this view from the understanding of Wilke's (1985) notion that "if teachers do not have the knowledge, skills and commitment to environmentalise their curriculum, it is unlikely environmentally literate students will be produced" (p. 1), and from the National Research Council (2000) view that "for students to understand inquiry and use it to learn science, their teachers need to be well-versed in inquiry and inquiry-based methods" (p. 87). The focus of our work is on the teacher and the development of his/her environmental literacy through inquiry-based practices so as to develop environmental literacies in their students. Even though environmental literacy has long been recognized as the key goal of environmental education, Veisi, Lacy, Mafakheri, and Razaghi (2018) claim that insufficient emphasis has been given to research investigating how best to develop environmental literacy. We aim to add to the knowledge of how to develop environmental literacy by considering the environmental literacy of the teacher being necessary for the development of environmental literacy in the student. Campbell (2013) claims that improving environmental literacy among Australians is essential and that helping people to read the environment, to understand and act on changes and trends in the

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Contribution of this paper to the literature

- Considers environmental literacy in terms of the teacher, and not the student.
- Explores the potential of the Australian Curriculum as an enabler of environmental literacy.
- Explores the synergy between environmental literacy and Inquiry-based practices.

world is needed. Smith (2014) conducted Australia's first large scale study into student environmental literacy, finding that the attitudinal and awareness aspects of environmental literacy may be reasonably well developed in students, but that this is not being translated in to actions, and that most students lack the knowledge and a thorough understanding of environmental issues that they will need if they are to leave school with more than functional levels of environmental literacy (p. 257).

Of particular interest to our research is the Atabek-Yiğit, Koklukaya, Yavuz, and Demirhan (2014) study, which found that participating in activities and classes related to the environment had a positive influence on environmental literacy. Teachers are therefore key to the development of environmental literacy in their students; however, the ability to address environmental issues depends on the teachers' competence in the subject matter and pedagogies relevant to environmental education, as well as the teacher's personal dispositions, which influence their function as role models (Pe'er, Yavetz, & Goldman, 2013). The teacher is responsible for 'double-purpose' learning "where the students acquire knowledge and skills and at the same time, learn how to contribute to a sustainable transformation of society – they learn to live together with a deep respect for the environment and dignity for all" (UNESCO – MGIEP, 2017, p. 19). Interdisciplinary learning that allows multiple and complex answers which engage students in inquiry-based practices are needed. Kennelly, Taylor, and Serow (2012) explored the link between teachers' pedagogical knowledge and environmental learnings. Their teachers identified aspects of constructivist learning environments where they critiqued and created teaching plans, used an inquiry learning project that obligated the investigation of an issue of their choice and undertook an action in response. Our paper continues to explore this link between environmental learnings, environmental literacy and inquiry-based pedagogies. We do this by structuring the remainder of the paper to consider firstly, the characteristics of being an environmentally literate citizen. This is followed by a consideration of the *Australian Curriculum: Science* (Australian Curriculum, NDb) as a base for developing environmental literacies in Australian school students. To conclude this paper, we present the literature in relation to the *teacher* developing environmental literacies through inquiry-based practices. We highlight the skill base that a teacher requires to effectively develop literacies in their students – thus giving promise to the development of environmental literacies when the curriculum may be lacking.

ENVIRONMENTAL LITERACY

The Belgrade Charter and Tbilisi Declaration (UNESCO–UNEP, 1978) laid down goals and a framework for environmental education that are still being widely acknowledged in spite of more recent developments in the field (Goldman, Yavetz, & Pe'er, 2014; Hollweg et al., 2011). One of these recent developments is the notion of 'environmental literacy', which relates to the knowledge and skills that go beyond scientific concepts specific to the environmental sciences (Bodzin, Shiner, & Weaver, 2010). Early attempts to define environmental literacy are often attributed to Disinger and Roth (1992) who wrote, "Environmental literacy is essentially the capacity to perceive and interpret the relative health of environmental systems and take appropriate action to maintain, restore, or improve the health of those systems (p. 2)". Roth (1992) also stated that a person needed to experience an effective environmental education in order to become an environmentally literate citizen who was sensitive to, and who had appropriate knowledge of, environmental concerns. In addition to this empathy and knowledge, the environmentally literate citizen could also problem-solve, plan and collaborate on environmentally based action strategies.

Therefore, to describe an environmentally literate citizen, we need to describe that person in terms of their "environmental sensitivity, knowledge, skills, attitudes and values, personal investment and responsibility, and active involvement" (Veisi et. al., 2018, p. 3). These characteristics are the current important goals of an effective environmental education. Over time, since the Belgrade Workshop and the Tbilisi Conference, through to the Veisi et. al, description of the environmentally literate person, various frameworks for environmental literacy have been developed. We highlight the following 4 frameworks (emphasis added):

- Ajzen & Fishbein (1980) - environmental attitude, belief, conservation knowledge and responsible patterns of behaviour and *interrelationships of these components*
- Roth (1992) - three-level *developmental continuum* for individual acquisition of environmental literacy: nominal, functional, and operational

- Simmons (1995) - affect, knowledge of ecology, knowledge socio-political issues, knowledge of environmental issues, skills, both *potential and active* environmentally *responsible patterns of behaviour*
- Varisli (2009) - environmental knowledge, environmental attitude, environmental *sensitivity*, environmental *concern*

These frameworks illustrate that over time, environmental literacy involves cognitive understandings, values, empathy and sympathetic perspectives that all need to be developed over time. We advocate that by interconnecting the components, or as Ajzen and Fishbein (1980) point out, by considering the interrelationships of the components, we can be empowered to "make informed decisions and responsible actions for environmental integrity, economic viability and a just society, for present and future generations, while respecting cultural diversity" (UNESCO, 2014, p.12). Ajzen and Fishbein surmised that attitudes and associated behaviours stem from ones beliefs about these behaviors. Intent has a critical role as a predictor of whether or not someone will complete a specific behavior (for example, in relation to an environmental act). The two major determinants of intent are one's attitude toward the behavior and the perceived pressure of what is 'normal behaviour'. Individuals will have intent to perform a specific behaviour when they believe important "others" think they should perform the specific behaviour. Therefore, if a teacher is displaying an environmental behaviour, the the student is likely to adopt the behaviour as being the nnorm and correct behaviour.

In the following section, we explore the *Australian Curriculum: Science* (Australian Curriculum, NDb) for its potential to develop environmental literacy in Australian youth.

THE CURRICULUM AS AN ENABLER OR DISABLER

We use the *Australian Curriculum: Science* (Australian Curriculum, NDb) to illustrate its apparent inadequacy for developing environmental literacy. The editors of this special issue, Hokayem and Jin, provided the following as the definition for environmental literacy:

> The ability of students to master scientific knowledge and practices that will prepare them to analyse, interpret and evaluate critical issues in complex natural and human systems in order to make responsible and informed decisions about the environment.

This definition clearly identifies that both knowledge and practices along the lines of scientific inquiry are involved. To analyse, interpret and evaluate requires a questioining stance from the teacher and the student – components of inquiry literacy (Kidman & Casinader, 2017). We consider the *Australian Curriculum: Science* as potentially inadequate for developing environmental literacies associated with such a definition. The inadequacy lies in the *Australian Curriculum: Science* not explicitly allowing for the development of a Futures perspective therefore inhibiting the considering of human systems as being responsible for the environment.

In the Australian Curriculum, the key environmental learnings are intended to come from the *Sustainability* Cross-Curriculum Priorities (CCP) (Australian Curriculum, NDa). Asia and Australia's engagement with Asia, and Aboriginal and Torres Strait Islander histories and cultures, comprise the other two priorities. These three mandatory priorities are given particular salience to ensure that they also are attended to throughout the Curriculum by teachers (see **Figure 1**). Sustainability is intended to be a familiar concept taught across the disciplines and year levels. Environmental learnings should therefore emerge in multiple disciplinary contexts, enabling the development of a cumulative, coherent, and usable understanding of our environmental concerns. Hill and Dyment (2016) join our scepticism as to the future implementation successes of the CCPs. Hill and Dyment found that teachers report not to have the time, content knowledge or interest to incorporate Sustainability into their general planning, resulting in this particular CCP not living up to its title of being a *priority* (Casinader & Kidman, 2018). **Figure 1** also indicates that there are eight *Learning Areas* (presented as individual disciplines or as sets of related disciplines) named in the Australian Curriculum. The Australian Curriculum is completed by the seven *General Capabilities*. The distinctiveness of the Australian Curriculum lies in this three-dimensional curriculum that recognises the importance of disciplinary knowledge, skills, and understanding (in for example Science or the Humanities); general capabilities (critical thinking and ethical understanding); and Cross Curriculum Priorities (for example Sustainability) (Kidman & Casinader, 2017). The General Capabilities and the Cross-Curriculum Priorities are not additional subjects. Instead they are to be embedded within the teaching of the eight Learning Areas. The three dimensional integrated structure reflects a belief that students will begin to see knowledge as interdependent and connected, and not as separate subjects (Kidman & Casinader, 2017).

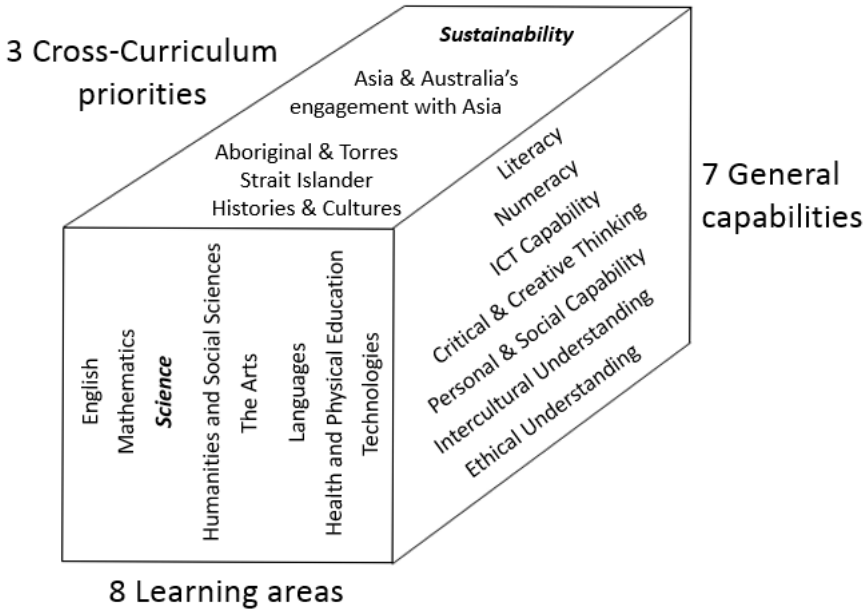

Figure 1. Structure of Australian Curriculum
(Source: Modified from Kidman & Casinader (2017)

In relation to the Sustainability CCP and the Science learning area, contexts for investigating and understanding chemical, biological, physical and Earth and space systems are provided. Nine Organising Ideas (in three groups – Systems, World Views, and Futures) in the Sustainability CCP, five Content Descriptors from the Science Understanding strand (in Years 4, 7 9 and 10), and eight Content Descriptors rom the Science as a Human Endeavour strand (in Years 1, 2, 3, 4, 6, 7, 8, and 10) in the Science curriculum guide the Teacher as to what is required. Also provided is the following description of the intersection between the Sustainability CCP and the Science learning area (Australian Curriculum, NDa, emphasis added):

> By *investigating* the relationships between systems and system components and how systems respond to change, students develop an appreciation for the interconnectedness of Earth's biosphere, geosphere, hydrosphere and atmosphere. Relationships including cycles and cause and effect are explored, and students develop *observation and analysis skills* to examine these relationships in the world around them. In this learning area, students appreciate that science provides the basis for *decision-making* in many areas of society and that these decisions can impact on the Earth system. They understand the importance of using science to *predict* possible effects of human and other activity and to *develop management plans or alternative technologies* that minimise these effects.

We highlight the terms *investigating, observation* and *analysis skills, decision-making, predict,* and *develop* as these relate to the Science Inquiry Skills (SIS) strand of the Science curriculum. Whilst the teacher is provided with the Content Descriptors from the Science Understanding strand (see **Table 1**), and the Organising Ideas from the CCP (see **Table 2**), the notion of using inquiry-based pedagogies is perhaps less obvious – especially for the inexperienced teacher, or the 'disciplinary chauvinist' science teacher:

Table 1. Sustainability in the Australian Curriculum

Year Level	Strand / Sub-strand Content Descriptor
	Australian Curriculum: Science
½	**Science as a Human Endeavour / Use and influence of science** • People use science in their daily lives, including when caring for their environment and living things
¾	**Science as a Human Endeavour / Use and influence of science** • Science knowledge helps people to understand the effect of their actions
4	**Science Understanding / Earth and space sciences** • Earth's surface changes over time as a result of natural processes and human activity
6	**Science as a Human Endeavour / Use and influence of science** • Scientific knowledge is used to solve problems and inform personal and community decisions
7	**Science Understanding / Biological sciences** • Interactions between organisms, including the effects of human activities can be represented by food chains and food webs **Science as a Human Endeavour / Nature and development of science** • Science knowledge can develop through collaboration across the disciplines of science and the contributions of people from a range of cultures **Science as a Human Endeavour / Use and influence of science** • Solutions to contemporary issues that are found using science and technology, may impact on other areas of society and may involve ethical considerations
8	**Science as a Human Endeavour / Use and influence of science** • Solutions to contemporary issues that are found using science and technology, may impact on other areas of society and may involve ethical considerations • People use science understanding and skills in their occupations and these have influenced the development of practices in areas of human activity
9	**Science Understanding / Biological sciences** • Ecosystems consist of communities of interdependent organisms and abiotic components of the environment; matter and energy flow through these systems • Chemical reactions, including combustion and the reactions of acids, are important in both non-living and living systems and involve energy transfer
10	**Science Understanding / Earth and space sciences** • Global systems, including the carbon cycle, rely on interactions involving the biosphere, lithosphere, hydrosphere and atmosphere **Science as a Human Endeavour / Use and influence of science** • Values and needs of contemporary society can influence the focus of scientific research

Table 2. Australian Curriculum Cross Curriculum Priority – Sustainability

Organising ideas (OI)	
Systems	
OI.1	The biosphere is a dynamic system providing conditions that sustain life on Earth.
OI.2	All life forms, including human life, are connected through ecosystems on which they depend for their wellbeing and survival.
OI.3	Sustainable patterns of living rely on the interdependence of healthy social, economic and ecological systems.
World views	
OI.4	World views that recognise the dependence of living things on healthy ecosystems, and value diversity and social justice, are essential for achieving sustainability.
OI.5	World views are formed by experiences at personal, local, national and global levels, and are linked to individual and community actions for sustainability.
Futures	
OI.6	The sustainability of ecological, social and economic systems is achieved through informed individual and community action that values local and global equity and fairness across generations into the future.
OI.7	Actions for a more sustainable future reflect values of care, respect and responsibility, and require us to explore and understand environments.
OI.8	Designing action for sustainability requires an evaluation of past practices, the assessment of scientific and technological developments, and balanced judgements based on projected future economic, social and environmental impacts.
OI.9	Sustainable futures result from actions designed to preserve and/or restore the quality and uniqueness of environments.

Source : Australian Curriculum (ND, a)

> Many science teachers are … 'disciplinary chauvinists' who place a higher priority on teaching content from their own disciplinary specialisation rather than engage the interdisciplinary or cross-disciplinary demands of environmental science. … The question remains as to whether science teachers understand environmental education as environmental educators understand it. Those who control the science curriculum appear to have only a very superficial understanding of environmental education and their representations of environmental education for science educators reinforce the view that science is a limited vehicle for environmental education within the curriculum (Gough, 2008, p. 41)

A cross examination of the Sustainability CCP and the Science curriculum, indicates that the *Systems* view (exploring the interdependent and dynamic nature of systems that support all life on Earth and our collective wellbeing), as well as the *World view* (relationships between living things (including people) and their natural environment) are discernable in the Science Understanding Content Descriptors of Table 1, however quite scantly. The *Futures* component of Table 2 (that highlights the importance of long term viability is not just confined to the natural environment, but should also incorporate ecological, social and economic systems) is reflected in the Science as a Human Endeavour strand of the Science curriculum. The scant coverage of the environmental issues by the Science curriculum in terms of the *Systems* and *World view* organising ideas combined is a concern. The *Futures* component has a greater spread of exposure throughout the curriculum, compared to the four year levels of the of the *Systems* and *World View* approaches.

A further concern lies with the location of the embedded topics. The teacher is mandated to teach the Content Descriptors (as shown in Table 1), however they are not required to teach the Elaborations that accompany each Content Descriptor. Elaborations are clarifying ideas to assist the teacher should they require content guidance. They are not mandated. Yet the majority of the Organising Ideas relating to Sustainability are contained in these Elaborations. Furthermore, although the intent is that the Learning Areas are to be taught through the CCPs, this is not actually a requirement. We therefore ask what then is the point of the CCPs?

Although environmental education/sustainability appears to be prominent in the Australian Curriculum, the reality for such infused curricula is that it may be considered as dispensable - it is not a subject for examination or further education entry (UNESCO – MGIEP, 2017). As such, a number of barriers exist impacting upon its delivery and the development of environmental literacy in Australian youth. The barriers emerging from the literature are:

- Lack of teacher environmental literacy in the first instance (Goldman et. al., 2014; Kennelly, et. al., 2012);
- Lack of teacher inquiry literacy (Kidman & Casinader, 2017) necessary to effectively develop environmental literacy in our youth;
- Perceived lack of learning time (Hill, 2013; Hill & Dyment, 2016);
- Piecemeal curriculum as a result of the infusion model (UNESCO – MGIEP, 2017; Smith, 2014), and
- Attitude towards environmental education sustainability curriculum (Pe'er, Yavetz, & Goldman, 2013).

James (2006) argues that "teachers have struggled to implement environmental education under previous, simpler curriculum key learning area based models… so it is debatable that they will be able to implement the more complex ESD [ESD – education for sustainable development] perspectives within a more complex three stranded curriculum model without considerable support" (p. 10).

ENVIRONMENTAL LITERACY AND INQUIRY LITERACY: A SYNERGY

We notice that in preparing this paper, and our earlier work, that much of the research relating to literacies is housed in relation to the student. Take for example the above definition supplied by the Editors of this special edition: "The ability of *students* to master scientific knowledge and practices that will …" The focus is upon the student, and not on the teacher. The literature in relation to the teacher developing literacies is narrow in its scope (Kidman & Casinader, 2017). The scant research may relate to the role of the teacher undertaking inquiry-based teaching, but rarely does it consider the inquiry literacy levels of the teachers themselves in inquiry-oriented classrooms. We find this gap interesting given our earlier assumption that teachers themselves would have to first become "inquiry-literate before they can effectively provide opportunities for students to engage in inquiry-oriented activities, such as asking questions, conducting investigations, gaining understanding based on evidence, reporting their findings and reflecting" (Kidman & Casinader, 2017, p. 9).

We are therefore left with a dilemma. To develop environmental literacy in our youth, we rely on the teacher being environmentally and inquiry literate, and we rely on an enabling curriculum. However, much of the available research indicates that in Australia we do not have this. We need teachers and curricula that can effectively promote "learner-centred approaches, learning-by-doing processes, and seeks to engage and guide rather than lead and

inform" (Smith, 2014, p. 64). The challenge is for teachers and students to work together on complex issues directing their learning in ways that are of most relevance to them. The notion of 'relevance' is critical. To be environmentally literate, one needs to take action, be a self-determined participant in the "transformation of unsustainable paradigms, policies and practices" (UNESCO - MGIEP, 2017, p. 16). We contend that there is a lack of self-determined participation. We are informed that teachers may have, and may develop in their students, the knowledge, understandings and skills, but "lack the dispositions – that is the attitude and determinations – to use them" (UNESCO – MGIEP, p. 22). UNESCO – MGIEP attribute this knowledge-action gap to a lack of insight in terms of pedagogies. The traditional science favoured pedagogies need to be modified to allow for the active and self-reliant involvement of the students. Enriched issue-based, problem-oriented content accompanied by transformative pedagogies – student-centred, inquiry-based practices that aim at developing agency of learners are necessary to develop environmental literacy. The teacher needs to recognise that his/her students are active social agents from a particular 'place'. This 'place' needs to provide the context for the learning – on a localised scale. Stevenson (2007) encourages teachers to connect the content they are teaching to the students' local place or community and lived experience, while also exploring the relationships of respective influences of the global on the local, and the local on the global. Laurie, Nonoyama-Tarumi, McKeown, and Hopkins (2016) outline that with respect to information, students need to "analyse it; make sense of its abundance and complexity; cooperate with others to synthesise information; and communicate the results" (p. 227). They no longer need to memorise all information – it is more about working with information to create new information and understandings for the better good. The topics need to 'matter' to the students and to the teacher.

However, we must recognise that teachers themselves may not be familiar with this form of progressive pedagogy. Kidman (2017) and Kidman and Casinader (2017) indicate that many teachers struggle with teaching via inquiry-based practices as they themselves did not experience this form of learning. Classrooms that might appear to foster such progressive pedagogies will not be optimal unless the teacher is 'familiar' with "pedagogies conducive to deeper learning and adequately supported to create an environment that allows students to develop these [ESD – education for sustainable development] competencies" (UNESCO-MGIEP, 2017, p. 25). Both the teacher and the students need to be able to 'think', 'value' and 'act' in an intertwined way. Author 1 and Author 2 (2017) explain the intertwining is essential when considering literacies. We contend that the mere use of multiple frameworks is not sufficient; the frameworks of knowledge, skills and attitudes, or think, value and act must become intertwined. It is possible the student will then "develop the ability to recognise assumptions, use critical and logical thinking, and acknowledge alternative explanations. It is essential that the student is at the centre of the process as a participant, becoming more and more independent" (Kidman & Casinader, 2017, p. 7). The critical frameworks that require intertwining by progressive pedagogies are a) cognitive skills, b) socio-emotional skills, attitudes or dispositions, and c) actions. Critical inquiry is the central to all three frameworks.

It is also worthwhile calling upon the early work by Sinclair Bell (1993) relating to the development of literacies in terms of inquiry. Sinclair Bell proposed four key elements that need to be considered in literacy development – the *user* who acts within a *society* to learn a *text* through a *process.* The *user* is the learner – we propose the teacher is also a learner; therefore the user is both the student and the teacher. The *society* includes the curriculum, cutlure, and social setting in which the literate behaviour is being developed. The *text* includes all forms of print or electronic print, as well as oral language and sound, images and other sensory information that can be accessed and gathered for scrutiny or reflection. The *process* includes the inquiry oriented teaching continuum, locus of control, intellectual sophistication, and learning activities (see Kidman & Casinader, 2017). By considering the *society* more deeply, we conclude there needs to be a curriculum imperative where the learner (the teacher initially) learns the conceptual understandings of inquiry learn how to engage in the inquiry process as an independent learner, and finally they gain an understanding of why it is important to develop an inquiry literacy and to be a critical consumer of environmental information. The starting point is with the teacher – often through a small *action research* project. The project can be in collaboration with another teacher as this not only helps to improve, but also to drive the acquisition of the new progressive pedagogy. The common four-phase cyclical process is followed (plan, action, observation and reflection (Kemmis & McTaggart, 1988)). A Sustainability action research project is one that is of personal relevance to the teacher, involves the teacher as the key stakeholder, and is on a topic that is fluid, able to be explored over time, and relates to our general exploitative, materialistic ideas and practices. The teacher needs to select a topic to select a topic that allows him or her to explore the social or environmental injustices many take for granted. An example may be the teacher becoming more cognisant of their own and their students' outdoor experiences and discoveries, of their respect for the natural environment by deliberately planning for opportunities to observe the natural environment. As action research has a focus on critical inquiry and self-evaluation, it is a useful tool (Smith, 2014) for developing an inquiry literacy to support a developing environmental literacy. When the teacher and students join forces, the action research is renamed and reimagined as an inquiry project. Over time, teachers and students need to learn to identify personally relevant environmental concerns. They need to learn to pose questions to be explored and to develop appropriate action plans. Observation and critical reflection become crucial as the plan is enacted. It is crucial that these action skills of participating, negotiating, persuading,

partnership building, responsible consumerism, political and legal action, and eco-management are developed (Smith, 2014).

By employing a critical inquiry approach, students and teachers alike develop the ability to think critically, and to engage with issues as an ongoing process. A teacher who can teach via inquiry, foster critical thinking and integration abilities, enables their students to identify problems, propose solutions, find evidence both for and against the proposed solution and evaluate the solution based upon evidence.

CONCLUSION

The focus of our work is the teacher and the influence of the teachers' environmental literacy on the development of the students' environmental literacy. There is scant research literature available relating to literacy development in the teacher, let alone in relation to environmental literacy, and its associated inquiry literacy. In this paper we explored the notion that unless a teacher has the requisite literacy (environmental and/or inquiry), then he/she cannot be expected to develop corresponding literacies in their students. Being environmentally literate goes beyond just having the associated knowledges and skills. A futures orientated disposition is required. Without this trilogy, a teacher will struggle to develop environmental literacy from classroom activities. We have considered the *Australian Curriculum: Science* as a base from which Australian students can develop their environmental literacy, and found it potentially inadequate. Environmental education is not taught as a separate learning area in the Australian curriculum. Instead we use an infused model where Sustainability is to be embedded in all learning areas. The *Australian Curriculum: Science* does not include content descriptors relating to all of the Sustainability Organising Ideas and the notion of critical inquiry-based practices and progressive pedagogies is not explicit. A teacher who is not environmentally literate or inquiry literate will struggle to deliver the intended curriculum. One may argue that a science teacher cannot be expected to teach everything – especially if the Sustainability CCP is intended to be taught in all learning areas. The same can be implied for all teachers across the curriculum, thus allowing for Sustainability to be dismissed as someone else's problem. All teachers need to develop their own environmental literacy so they can assist their students to develop their environmental literacies across their learning areas. We contend that action research by the teacher, and then progressive pedagogies in the form of inquiry-based teaching and learning along side their students is needed in Australian schools. The use of the progressive pedagogies may adress some of the inadequacies of the Australian curriculum.

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