Harmony in Education: Applying the Principles of Natural Systems to Learning

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> *The truth is that many things on which your future health and prosperity depend are in dire jeopardy: climate stability, the resilience and productivity of natural systems, the beauty of the natural world, and biological diversity.*[1]

The Earth is a complex, self-regulating system. Like all systems, it is the sum of its parts; parts which are interconnected and interdependent in ways we are only beginning to understand. We know that the currents in our oceans regulate the climate of the entire planet and that the trees in our rainforests keep in check the amount of carbon dioxide present in our atmosphere. The Earth relies on the existence of a natural balance between its parts in order to function as a whole. This balance is one of many ways in which the natural world exists in a state of harmony. The Prince of Wales, Tony Juniper and Ian Skelly described this state of harmony in 2010:

> There is a deep mutual interdependence within the system which is active at all levels, sustaining the individual components so that the great diversity of life can flourish within the controlling limits of the whole. In this way, Nature is rooted in wholeness.[2]

But there is now an overwhelming body of scientific evidence showing that human activity is threatening the natural world's ability to sustain itself – and us. Human activity over the last two centuries, and particularly within the last sixty years, has caused accelerated change that has left its imprint on a global scale, as research from the Intergovernmental Panel on Climate Change makes clear:

> Warming of the climate system is unequivocal, and since the 1950s, many of the observed changes are unprecedented over decades to millennia. The atmosphere and ocean have warmed, the amounts of snow and ice have diminished, and sea level has risen.[3]

Our consumption of the planet's resources and our degradation of the environment are destabilising the systems upon which we depend, compromising the ability of the planet to support human life and human development. And yet we continue to behave in ways that suggest we are unaware of the very fact that we exist within a finite system. Our disconnection from the systems that sustain us is at odds with our fundamental reliance upon them.

A contributing factor to the ecological and environmental problems we now face is our tendency to consider things in isolation with little consideration of cause, effect or provenance. We are disconnected from the reality that lies behind the choices we make; a reality which is already impacting our collective wellbeing.

The cost of nature deficit

It seems that our disconnection from nature begins at an early age. The fact that children in western societies today spend less time outdoors, in general – and in natural environments, in particular – has been well-documented.[4]

Research commissioned by Natural England, which advises the government on issues relating to the natural environment, shows that in the two years to February 2015, just over ten percent of UK children had not visited a natural setting.[5] The definition of natural settings used for the purposes of the research includes parks, canals and nature areas; coast and beaches; and wider countryside such as farmland, woodland, hills and rivers. This is the phenomenon that Louv, writing in 2005, terms 'nature deficit disorder', noting that one outcome of this lack of interaction and engagement with the natural world is that 'for a new generation, nature is more abstraction than reality'.[6]

Making the case for action to address this disconnection four years later, he referred to the 'psychological, physical and cognitive costs of human alienation from nature' – costs which are particularly damaging for children in their formative years.[7] A study by Cervinka, Röderer and Hefler also shows a strong correlation in adults between a sense of connectedness with nature, and wellbeing (in particular, vitality) and meaningfulness. The authors of the study offer the following definition of meaningfulness:

> Meaningfulness, in contrast to depression, is understood as a developmental motive, referring to a human's need of being in the world and experiencing a sense of purpose in life. People scoring high on meaningfulness conceive their lives as fulfilling and relatively free from feelings of powerlessness, helplessness, fear and depression. They feel accepted by others and experience

social connectedness and high satisfaction in their lives.[8]

While there are, no doubt, many consequences of a lack of connectedness with nature which affect us as individuals, the impact of nature-deficit extends beyond our selves to threaten the collective wellbeing of humankind. Louv notes: 'Reducing that deficit – healing the broken bond between our young and nature – is in our self-interest, not only because aesthetics or justice demands it, but also because our mental, physical, and spiritual health depends upon it'.[9] This was echoed by research by the Countryside Commission, which identified engagement with the natural environment as a key factor in determining our 'contentment with life' and in achieving 'better social ties and sense of community, improved physical and mental health, strengthened economic prospects, reduced crime rates, and enhanced children's play and learning'.[10]

The environmental consequences of disconnection

A further consequence of our disconnection from nature is evident in our attitude to the environment and the esteem in which we hold the natural world; 'The health of the earth is at stake as well. How the young respond to nature, and how they raise their own children, will shape the configurations and conditions of our cities, homes – our daily lives'.[11]

Our view of nature and the beliefs we hold about our dependence upon it inevitably shape the choices we make in our daily lives, and the choices we make as consumers. This is particularly true of the choices we make about the food we eat. A 2017 study of more than 5,000 school children aged 5-16 years by the British Nutrition Foundation (BNF) revealed that some of them held some startling ideas about where our food comes from.[12] The survey found that more than one in ten of the eight to eleven-year-olds in the sample thought pasta comes from an animal, and almost one fifth of five to seven-year-olds believed fish fingers are made from chicken. Of the 11-14-year-olds surveyed, one in ten was unaware that carrots and potatoes grow underground and one in twenty of the oldest children in the sample aged 14-16 years thought cows produce eggs.

On the face of it, such misinformation might seem amusing. A more interesting question to ask – at least in the context of this chapter – would be: Why is it the case that a significant number of children appear to have so little understanding of the provenance of their food? The answer may lie in the study itself, which revealed that fifteen percent of the children surveyed had never visited a farm. Could this be another outcome of nature-deficit? Through the

eyes of some children (even some adults), the pre-packaged cuts of meat they see when they visit a supermarket may be entirely disconnected from the animal they came from. In the same way, the bags of pre-sliced carrots may be disconnected from the soil in which they grew.

The final question in the BNF study asked the older children, aged eleven to sixteen years: 'Where would you learn about or go to find reliable information about your food?'. 'School' and 'the internet' were the two most popular answers. It is encouraging to know that children look to their schools and teachers as sources of trusted information about food. However, a second study carried out by the BNF in the same year showed that only a quarter of primary school teachers and half of secondary school teachers had received professional development to deliver food education in the preceding three years.[13]

It is not our intention in this chapter to focus solely on children's ideas about food and food provenance. Rather, we use this example to illustrate one of the many ways in which our understanding of our reliance on the natural world has become divorced from reality. It is also important, however, to recognise the opportunity that schools, teachers and education policy makers have to counter this. David Orr talks of the role of educators in the development of children's 'ecological literacy' and argues for the need for educational policy to acknowledge and respond to this:

> More of the same kind of education will only compound our problems. This is not an argument for ignorance, but rather a statement that the worth of education must now be measured against the standards of decency and human survival - the issues now looming so large before us in the decade of the 1990s and beyond. It is not education that will save us, but education of a certain kind.[14]

An education of a certain kind

Humanity faces complex problems in securing for itself a healthy and sustainable future. Whatever the solutions may be to these problems, what is clear is that progress towards a more sustainable way of living will only be possible if, collectively, we undergo a shift in mindset about how we perceive the world around us and our relationship to it. There is a clear reference to this in the title of the 2010 book by HRH The Prince of Wales, Ian Skelly and Tony Juniper, *Harmony: A new way of looking at our world*, as the use of the phrase 'new way' in its title implies. It is our belief that we must challenge the way in which

we currently structure the education of our students and question whether it is fit for purpose.

We must offer our young people an education of a kind that equips them to engage with, and take the lead on, issues around environmental health and sustainability, and which counters thinking that see things in isolation. We need only look to the natural world to learn about the connectedness that exists within any system. By looking to nature for examples, we see how elements within systems are interdependent, how each element has its own purpose and role to play, and how the health of the system is preserved when there exists a dynamic balance between those elements. If we are to learn to replicate such systems, we need to find a way of working that facilitates a paradigm shift towards a mindset rooted in connectedness. This will be no small undertaking as our disconnected ways of thinking are deeply engrained but education has a key role to play in addressing this. We need to design a new model for learning that enables our young people to see connections and relationships. Furthermore, we need to support them in developing a greater appreciation of how essential this joined-up outlook is to understanding the relationship between actions and consequences. In the next section we will look at how the integration of skills and knowledge from different subject disciplines can help support children in developing the thinking skills needed to tackle some of the biggest challenges to planetary and human health.

The compartmentalisation of learning

Before we look at how we might achieve this kind of education, let us take a moment to reflect on the position that we, as educators, find ourselves in today. This chapter focuses on the education system in England, but the same issues occur in many countries. So far, we have created within English education a system that is organised neatly but artificially into compartmentalised subjects. This is engrained in the fabric of the National Curriculum here, in England, which 'is organised on the basis of four key stages and 12 subjects, classified in legal terms as 'core' and 'other foundation' subjects'[15]. Programmes of study published by the Secretary of State for Education, set out the 'matters, skills and processes'[16] to be taught for each subject at each key stage. By structuring the curriculum in this way, we have created rigid subject silos which do not accommodate the natural links between knowledge, skills and understanding across different areas of the curriculum. In our systems of assessment, too, we test subject-specific knowledge and skills in isolation from one another. We are perpetuating, through

the structure of the education in our schools, disconnected ways of thinking and looking at the world. This is a flawed approach if we are to live more sustainably.

There are certainly some schools and teachers who encourage students to make links between different areas of their learning and actively plan for teaching and learning to occur in a more coherent, cross-curricular format. But, as this is not a statutory requirement, whether or not a student is exposed to a more holistic model of learning is largely a matter of luck. In short, we have created a system in which separation – rather than connection and integration – is the norm. It is our belief that at its best, primary education – indeed all education – should be about helping young people to understand the world around them, and to make sense of it. Taking the child as its starting point, a more 'joined-up' approach to learning acts as a bridge between the child's natural inquisitiveness and the wider world. When we teach – and when we encourage young people to learn – in a more integrated, cross-curricular way, we support them in applying their learning to matters outside the confines of a particular subject, and in engaging with the world around them. Beane argues that this approach has two beneficial outcomes for students:

> First, young people are encouraged to integrate learning experiences into their schemes of meaning so as to broaden and deepen their understanding of themselves and their world. Second, they are engaged in seeking, acquiring, and using knowledge in an organic – not an artificial – way. That is, knowledge is called forth in the context of problems, interests, issues, and concerns at hand. And since life itself does not know the boundaries or compartments of what we call disciplines of knowledge, such a context uses knowledge in ways that are integrated.[17]

One chapter of the National Curriculum in England acknowledges that learning can be structured in ways other than distinct academic subjects. The Early Years Foundation Stage (EYFS) curriculum, introduced in 2008 and revised in 2012, sets out standards for the learning, development and care of children from birth to 5 years of age. It is applicable to all early years settings, extending through nursery school and into the first year of formal schooling. The EYFS curriculum is structured not in terms of subjects but in terms of areas of learning and development. These are: communication and language; physical development; personal, social and emotional development; literacy; mathematics; understanding the world; and expressive arts and design.[18]

The introduction of the EYFS curriculum has created a learning environment

which recognises the importance of child-initiated learning and values fluidity over rigidity. The adult may shape the learning by selecting the activities to which the child has access, but their role is then to support the child in taking their learning forward. The child is involved in influencing the content of learning, bringing their own interests and prior knowledge to an activity and determining the way in which that activity will develop. The child is equally central to the structure of the learning – he or she is the unifying thread running through his or her interaction with each element of the curriculum. Two years after the introduction of the EYFS, Ofsted noted an increase in the proportion of children meeting expectation in personal, social and emotional development at age five, which rose from 72% in 2008 to 77% in 2010. Over the same period, increased attainment was also noted in communication, language and literacy, with 53% meeting expectation in 2008 compared to 59% in 2010, and in children reaching a good level of development by the age of five (49% in 2008 and 56% in 2010).[19]

Despite the perceived success of the EYFS, this acknowledgement that young people learn well when they are free to explore and to make connections across traditional subject boundaries is not reflected in the curriculum beyond the child's first year at primary school. From Year 1 onwards, when children are five or six years of age, the curriculum taught in our schools is structured around defined and separate subjects.

> In the modern curriculum we have fragmented the world into bits and pieces called disciplines and subdisciplines. As a result, after 12 or 16 or 20 years of education, most students graduate without any broad integrated sense of the unity of things. The consequences for their personhood and for the planet are large. For example, we routinely produce economists who lack the most rudimentary knowledge of ecology. This explains why our national accounting systems do not subtract the costs of biotic impoverishment, soil erosion, poisons in the air or water, and resource depletion from gross national product... As a result of incomplete education, we've fooled ourselves into thinking that we are much richer than we are.[20]

At the level of primary education, students may learn about materials in Science and about our oceans in Geography. But unless the learning is structured in a way that encourages them to bring together their knowledge from both subjects, students may not develop an understanding of the ways in which these two areas of learning are linked. They may not, for instance, see the consequences of our use of materials such as plastic on the health of the ecosystems in our seas and

on the sustainability of the oceans' resources. On the other hand, if we make what is learnt in the classroom relevant to the world in which our students live, if we support them in engaging with the issues that affect their future wellbeing and encourage them to act purposefully to resolve these issues, the outcome of their learning becomes much more purposeful.

The effect of assessment systems in perpetuating separateness in learning

The compartmentalisation of knowledge and skills within mainstream education in England today is evident in teaching and learning, but also permeates the systems of assessment that we use to judge student outcomes. Whether through formal examination or teacher assessment, the judgements made about a student's educational success are subject specific: grades are awarded and decisions about attainment are made in separate areas of the curriculum. The systems of assessment used in our schools follow a linear model of academic progress measured against criteria of increasing complexity that lead towards the end goal of a final, summative grade.

The selection of content to be assessed – the domains that form the basis for testing and against which a student's abilities are judged – represents a further separation of perceived high-value knowledge and skills from the rest of the content within a programme of study. By creaming off certain knowledge and skills from the rest of the curriculum to form the focus for testing, this tested content takes on a higher status. In this way, 'higher value' content is set apart from the rest of the content taught in the classroom: it becomes disconnected. Whilst there is clearly a need to measure learning outcomes, it is not hard to see how inevitably, (although unintentionally), what we choose to assess begins to dominate the content taught in the classroom.

In recent years, a growing number of voices within the teaching profession and within the wider education community have expressed concern over the narrowing of the curriculum as a result of the dominance of the 'standards agenda' and high-stakes testing. More recently, Ofsted has joined the debate on the narrowing of the curriculum, with Her Majesty's Chief Inspector, Amanda Spielman, noting:

> Across the whole education sector, a mentality of 'what's measured is what gets done' trumps the true purpose of education, and curriculum thinking – the consideration of what needs to be taught and learned for a full education – has been eroded.[21]

These are observations that have also become increasingly apparent to those outside the education sector. Ofsted's 2017 interviews with parents of primary school-aged children revealed that around half of those surveyed 'believed that test preparation had reduced the teaching time available for the other foundation subjects or for reading for pleasure'.[22] The Ofsted Chief Inspector also notes a corresponding narrowing of the curriculum in secondary education, with many students selecting the subjects they will study to GSCE level a year earlier than was previously the case, in order to maximise the time spent studying towards the Year 11 exams.[23] The impact of high-stakes testing on the breadth of content taught in schools has implications that reach further than the educational experience of individual students:

> The dominance of testing as part of American and British school reform policies insures that many of the skills thought to be most useful in the twenty-first century will not be taught. Thus, students and their national economies will suffer when nations rely too heavily on high stakes testing to improve their schools.[24]

In the next part of this chapter we will look in more detail at how one school has responded to these issues, developing cross-curricular learning and a broad and distinctive curriculum.

The development of a connected, nature-inspired curriculum

The school in question is Ashley Church of England Primary School, located in Walton-on-Thames, near London. For the last five years, it has been pioneering an enquiry-based curriculum based on nature's principles of Harmony. Even before the school began to develop its nature-inspired curriculum, the everyday practices of the school community had for many years been shaped by a concern for sustainability:

> The school hadn't just created a garden where children could learn about growing vegetables. Its allotment was supplementing the school kitchen's procurement program. The school wasn't simply aiming to reduce food waste. The children were weighing and monitoring the food discarded at the end of every lunch sitting and using the data to help the kitchen staff revise menus and refine portion sizes.[25]

Figure 1. Young beekeepers learn how to maintain a hive and how bees work together

The school decided to take this further, introducing Harmony principles as the frame for learning across the curriculum. The Harmony curriculum developed at the school has three main aims:

Firstly, to reconnect children with nature. As you might expect, the school emphasises the importance of learning *in* nature and learning *about* nature, but also supports children in learning *from* nature. To take an example from the Year 2 curriculum, in the summer term the children in this year group explore the enquiry question: *Why are bees so brilliant?* As part of this learning enquiry, they identify the roles of different types of honey bee within a hive – an example of diversity at work in the natural world. They carry out beekeeping activities to maintain the school's hives (learning *in* nature), learn about the bees they identify in the hive and how they work together (learning *about* nature), then apply what they have learnt to their own lives, looking at how diversity is beneficial to the different social groups they are part of (learning *from* nature).

Secondly, to engage the children in problem solving, drawing on their knowledge and understanding of content from different curriculum subjects. The focus for a half term's learning is framed for the children as a question, often

with an environmental or ecological focus. This might be 'What are the cycles of our solar system?' or 'How can we build community in our town?'. At the end of each enquiry, each class is asked to reflect on the enquiry question, based on their learning and experiences across all subjects over the half term. By structuring learning through cross-curricular enquiry, students experience connectedness in their learning first-hand. As Beane notes: 'Curriculum integration begins with the idea that the sources of curriculum ought to be problems, issues and concerns posed by life itself'. These may be categorised as 'self- or personal- concerns' and 'issues and problems posed by the larger world'[26].

Thirdly, to make learning purposeful. At the end of each learning enquiry, the children work together to create a Great Work that represents a culmination of their learning in all subject areas. This could be an art exhibition, a meal to share with their parents, a puppet show, the planting of a fruit orchard or the creation of a soundscape – to name but a few. This approach embodies a valued system at work.

When we structure the education of our young people in a way that allows them to draw upon and link together knowledge and skills gained in different areas of the curriculum, we create a very different learning experience – one that highlights and accentuates the value of connections in what we learn and the importance of good working relationships in achieving successful outcomes. These are essential life skills. As educators, we need to recognise that in order to help students experience a sense of connectedness, we must as educators develop practices that model this connectedness:

> all education is environmental education. By what is included or excluded we teach students that they are part of or apart from the natural world. To teach economics, for example, without reference to the laws of thermodynamics or those of ecology is to teach a fundamentally important ecological lesson: that physics and ecology have nothing to do with the economy. That just happens to be dead wrong. The same is true throughout all of the curriculum. [27]

When children learn from the principles that maintain wellbeing and balance in the natural world, they can learn how to live in a more sustainable and balanced way. By presenting learning to the children in this way, the school hopes to counter the effects of the 'crisis of perception'[28] which is distorting our understanding of our relationship with nature.

Principles of Harmony as a lens for learning

Ashley Primary school works with seven principles of Harmony, inspired by HRH The Prince of Wales, Tony Juniper and Ian Skelly's 2010 book. These are: the principle of Geometry; the principle of the Cycle; the principle of Interdependence; the principle of Diversity; the principle of Adaptation; the principle of Health, and the principle of Oneness.

The principle of Geometry – which allows children to explore and respond to the geometry that exists in the natural world – cuts across all learning throughout the academic year. Of the remaining six principles, one is explored by the children in each year group as the focus of their learning enquiry each half term. In this way, by the end of their time at the primary school, a child who has attended since the start of Reception will have explored each of the principles in seven different ways.

If we take the principle of the Cycle as an example, we can 'map' the learning enquiries through which a child will have explored this principle by the end of their time at the school:

- What can we learn about farm animals? (Reception)
  Including the life cycle of chickens and other farm animals
- Which is my favourite wildflower and why? (Year 1)
  Including the life cycle of flowering plants, seed collection and sowing a wildflower meadow
- How can we bring traditional tales to life? (Year 2)
  Including looking at how traditional stories are passed on from one generation to the next
- How can we learn to identify native trees through the seasons? (Year 3)
  Including a focus on how trees change through the cycle of the seasons
- What are the cycles of our solar system? (Year 4)
  Including an exploration of the orbit of the Moon around the Earth, and the Earth around the Sun and how this affects the cycles of day and night, months and years.
- What journey does a river take? (Year 5)
  Including a focus on the water cycle
- How do the Inuit of the Arctic live with nature? (Year 6)
  Including an exploration of how the Inuit live in harmony with the cycle of the seasons

Figure 2. Children collect and sort seeds from the school's wildflower meadows, ready to be sown in new areas

Using Harmony principles to frame learning

As an example of learning in Year 3, in the autumn term children are posed the enquiry question: *How can we identify native trees through the seasons?* This enquiry is linked to the Harmony principle of the Cycle. To explore this question, the children first use identification keys to name different trees growing in the school grounds, then focus on one tree to create their own identification key for others to use. Alongside this learning, they measure and order the heights of different trees in maths and reflect upon the variety of tree heights. In their Geometry learning, the children explore symmetry in the leaves of different trees and use this knowledge to help them in their identification of native trees. In Science, they learn about why the leaves of deciduous trees change colour in the autumn and why these trees shed their leaves. This links to other Science learning about the process of leaf decay, which contributes to the creation of healthy soil. In English, they write non-fiction texts about the importance of healthy soil to tree growth and poetry about the colours and atmosphere of autumn. Also, in Science, children learn about the parts that make up a tree's seed, and how through the process of germination, a shoot and root grow. They also learn about the function of fruits and how trees disperse their seeds in a variety of ways.

Learning in other subjects is also linked to the central enquiry focus. The children work with watercolours and resist techniques to create artwork depicting a silver birch forest, they taste and comment on native apple varieties and cook with apples in Design Technology. The children return to this enquiry throughout the school year, to observe changes to the trees in different seasons, producing a booklet to record what they have found out. For their Great Work, the children plant native fruit trees in the school's orchard. The fruit from these trees will contribute to the learning of future cohorts of children in the school; in this way the children themselves contribute to cycles in learning at the school.

Exploring nature's Geometry in the classroom

Everywhere we look, we see patterns, shapes and proportions that are repeated in micro and macro form throughout the natural world and in ourselves – even throughout the universe. Exploring these patterns is a great starting point for learning and helps children experience the awe and wonder of nature – and develop a reverence for it. The principle of Geometry is a key part of every learning enquiry at Ashley School and each week's learning begins with a Geometry activity.

> The practice of geometry provides a different lens for learning. It helps young people to see how things are. We teach geometry every week in our school and it has produced some stunning results. As the students learn the proportions and ratios of Nature's patterns, they start to understand that there is an order to life that gives it balance and harmony. They see the world from a different perspective, and they begin to develop a much deeper insight into what harmony means. Geometry is a mindful art. [29]

The school has worked closely with the Prince's Foundation School of Traditional Arts (www.psta.org.uk) to bring the principle of Geometry to the curriculum.

The children themselves have a lot to say about their Geometry learning. They appreciate the fact that it helps them develop a 'new way of looking at the world', giving them a new perspective on familiar things as well as providing a route in to learning about aspects of the natural world that are new to them. The following quotes from conversations with the children at Ashley School, gathered in the course of research into the school's curriculum development work, clearly show this.[30]

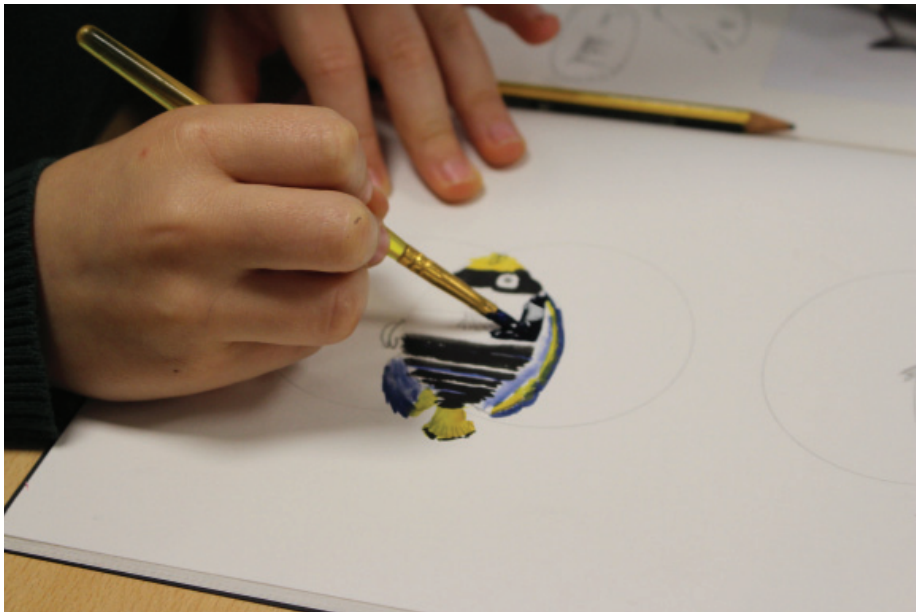

Figure 3. Using the vesica piscis created by overlapping circles, a Year 5 child works on a fish painting

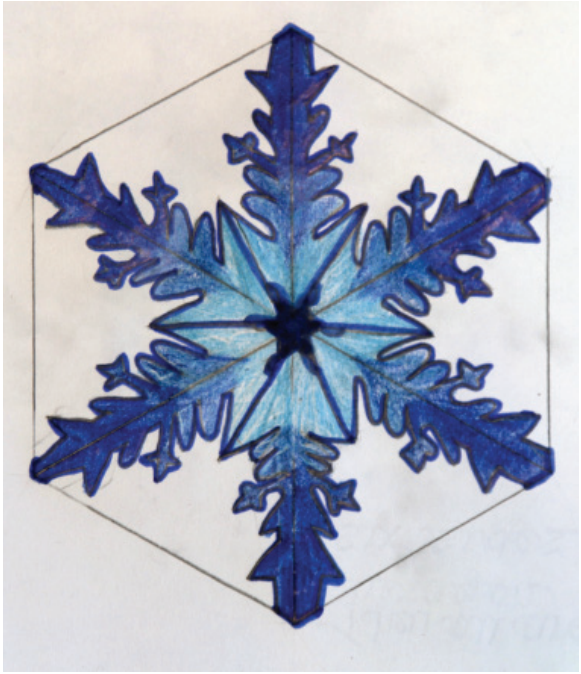

Figure 4. A Year 6 child explores the Geometry of snowflakes as part of their learning about the Antarctic

The research is available in full on The Harmony Project website.

www.theharmonyproject.org.uk.

'You start to notice the patterns in different things. You pay attention to the detail, to what things really look like. Like a Jaguar has rosettes in its fur. It makes you want to learn more about the animal.' Charlie, Year 3.

'The Geometry is really interesting because you might look at something you've known about for a long time but it makes you see it in a different way and really concentrate on that. It's more interesting to actually do something like making a five-petaled flower from the orbit of Venus and Earth than just being told about it. After that you might decide to look at the orbits of other planets, too.' Charlie, Year 4.

'You can take something small as a starting point then the learning leads on

> from there. There are big ideas and beauty in the small things. You learn to see beauty in the whole world.' Eden, Year 5.

There is also reference to a sense of wellbeing in some of the children's responses to their Geometry learning, as the following quote from one Year 6 child reveals:

> 'The Geometry learning makes me feel calm. There's not one answer so no-one's ever going to tell you that's wrong or right. You just keep trying and changing things until you have something you're happy with.' Hannah, Year 6.

A more holistic approach to planning

As might be expected, this kind of organisation of National Curriculum content into learning enquiries, and into the school's wider distinctive curriculum, requires a shift in working practices.

> Usually the process of planning and delivering a curriculum of learning starts by referencing the National Curriculum and pulling curriculum objectives into a planning document. This is a very logical thing to do, but it means that the National Curriculum objectives drive the learning and, if planned in subject-separate ways, the learning quickly becomes very disjointed and disconnected. It can all feel rather piecemeal and even pointless from a student perspective.[31]

Instead, teachers at Ashley School take as the starting point for their planning a principle of Harmony and from this plan an enquiry to frame learning across all subjects. In Year 2, for example, the students explore the principle of Health through the enquiry question, 'What does it mean to be healthy?'. In PE, they learn about the effects of exercise and experience different forms of activity, including yoga and karate, that contribute to different aspects of our physical and mental wellbeing. In Science, they learn about the importance of hygiene and the role of different food groups in contributing to good health. In History they learn about pioneers in the field of healthcare, and in Maths they investigate the symmetry and asymmetry of the human body and learn to measure the body accurately using hand spans, as well as metric units of measurements. In English they write poems about wellbeing; instructions about effective hand washing; and recipes for making healthy meals. At the end of the half term, the students

research and prepare their own healthy meal, which their parents are invited to share.

This web of interconnected learning allows children to reflect on different ways in which the question at the centre of their learning enquiry could be answered. They are provided with opportunities to participate in debate about the challenges we face and to design projects to secure a healthier, more sustainable world in which we can all thrive.

The students' own reflections give perhaps the best indication of the impact of teaching and learning based on principles of Harmony. In the younger years, the children's responses to their learning enquiries may be simply articulated but show an emerging connectedness in their thinking. Olivia, age 6, responded to the question, 'What does it mean to be healthy?' by saying: 'Smiling makes you healthy'. Her exploration of the principle of Health had allowed her to start making a connection between emotional wellbeing and overall health. As we might expect, the reflections of older students show greater sophistication. Sam, age 10, was asked to reflect on his enquiry question, 'How can we ensure our oceans stay amazing?' and responded: 'Plastic rubbish is killing the creatures of the ocean. Because all the creatures are connected to each other, if we kill the creatures, the food chain will be destroyed. We need to work out how to stop this'. Sam shows a more developed understanding of the interdependence of elements within a system and is beginning to articulate the need for humans to change the way they work to maintain the wellbeing of that system.

Outcomes of a Harmony curriculum

Research into the outcomes of the introduction of a Harmony curriculum at Ashley School is still at an early stage.

In the school year 2017-18, researchers at the University of Canterbury Christ Church included the school in a study of three schools developing their own curricula around concepts of sustainability. The study revealed two key outcomes of this approach to learning and to building a school community around principles of Harmony. Firstly, the children were aware that their education at the school was preparing them for life outside and beyond their time in school. Secondly, the children knew that they were being supported in developing leadership skills and had a sense of their own agency as a result. The researchers noted that these outcomes are not attributable to any single initiative at the school but to a 'holistic and multi-layered approach' that relies on the involvement of the entire school community.[32]

Standards in the core subjects of English and Maths remain a priority at the school and attainment is high. The balance between securing core skills and knowledge, and purpose in learning is constantly reviewed and refined to ensure it is right. We can check outcomes by examining the results of SATs. These are national tests that children take twice during their primary school life, first at the end of Key Stage 1 (KS1) in Year 2, and then at the end of Key Stage 2 (KS2) in Year 6. For the academic year ending 2018, Key Stage 2 (KS2) SATs results were significantly above the national average:

Children working at, or exceeding, expectation at the end of KS2 (%)

	Ashley C of E School	National Average
Reading	98	75
Writing	93	78
GPS*	98	78
Maths	93	76

*Grammar, Punctuation and Spelling

Hand in hand with this high level of attainment, the students are supported in developing less easily quantifiable skills that we increasingly see are important to other aspects of their learning and personal achievement. For example, through engagement in activities linked to the principle of Geometry, both teachers and students have noticed an improvement in fine motor skills; greater attention to detail, better concentration and mindfulness; and high levels of self-esteem through the realisation of challenging, high-quality geometry work.

The challenge for educators

If we are to secure for ourselves a healthy and sustainable future, it is clear that we need to change the way we think about the world and our place in it. And if we believe this to be necessary, we must face another fact: we will not succeed in shifting the paradigm in a reductive education system that teaches for separateness.

> 'We need to teach our children, our students and our corporate and political leaders the fundamental facts of life: that one species' waste is another species' food; that matter cycles continuously through the web of life; that

> the energy driving the ecological cycles flows from the sun; that diversity assures resilience; that life, from its beginning more than 3 billion years ago, did not take over the planet by combat but by networking.'[33]

For educators, this poses a new challenge: How do we develop thematic and integrated ecosystems of learning, relevant to the age in which we live and appropriate to the age of our students? What is a certainty is that we cannot afford to continue with an education system which does not prepare our young people to bring about the revolution in thinking and practice that will address the challenges we face now and in the future.

Notes

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