

21ST CENTURY CURRICULUM

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For curriculum to best support the cultivation of capabilities necessary to meet the major challenges of the 21st century it should be: *concise* to facilitate experimentation and use of a range of innovative pedagogical approaches; *deep*, that is, the content should focus on the philosophically problematic within each discipline and *broad* – covering the arts, humanities and the sciences.

How can curriculum best support the cultivation of capabilities necessary to meet the major challenges of the 21st Century? In this paper I will argue that a curriculum to support the cultivation of 21st Century capabilities should be: *concise* (not content-driven) to facilitate experimentation and use of a range of innovative pedagogical approaches; *deep*, that is, the content should focus on the philosophically problematic within each discipline and *broad* – covering the sciences, humanities and the arts.

I begin by defining some key terms. In order to give an account of 21st century curriculum, we need to define the major challenges of the 21st century, the capabilities necessary to meet these challenges, and the pedagogies that may best facilitate the cultivation of 21st century capabilities.

21st Century Challenges

By “21st Century Challenges” I mean challenges or *change imperatives* that are significant for the 21st Century – now and in the medium to longer term. These challenges include:

1. Social challenges - such as maintaining and improving the vitality of a democratic society. (Nussbaum 2010)
2. Economic challenges - such as preparing ourselves for employment in jobs that do not yet exist, creating ideas and solutions for products and problems that have not yet been identified, using technologies that have not yet been invented (Darling-Hammond 2011 page 2)
3. Technological/Scientific challenges - such as preparing ourselves for the increasing power of, and dependence on, science and technology; information overload; and increasing global integration (Gardner 2010 pages 7-8)
4. Health challenges - maintaining and improving our physical and mental health
5. Ecological/Environmental challenges - finding ways to live and work that are less harmful to living systems.

An alternative view of 21st Century Challenges is articulated by the Millennium Project. The Millennium Project – a futures research think tank - identifies 15 global challenges in the form of questions.

1. How can sustainable development be achieved for all while addressing global climate change? (Ecological)

2. How can everyone have sufficient clean water without conflict? (Ecological)
3. How can population growth and resources be brought into balance? (Ecological)
4. How can genuine democracy emerge from authoritarian regimes? (Social)
5. How can policymaking be made more sensitive to global long-term perspectives? (Social)
6. How can the global convergence of information and communications technologies work for everyone? (Economic/Technological)
7. How can ethical market economies be encouraged to help reduce the gap between rich and poor? (Economic)
8. How can the threat of new and re-emerging diseases and immune micro-organisms be reduced? (Health/Ecological)
9. How can the capacity to decide be improved as the nature of work and institutions change? (Economic)
10. How can shared values and new security strategies reduce ethnic conflicts, terrorism, and the use of weapons of mass destruction? (Social)
11. How can the changing status of women help improve the human condition? (Social)
12. How can transnational organized crime networks be stopped from becoming more powerful and sophisticated global enterprises? (Social)
13. How can growing energy demands be met safely and efficiently? (Ecological)
14. How can scientific and technological breakthroughs be accelerated to improve the human condition? (Technological)
15. How can ethical considerations become more routinely incorporated into global decisions? (Social)

By *challenge* I mean a demanding or stimulating situation, “something that makes demands on one’s abilities” (*Macquarie Dictionary*) and a *change imperative*. Each of the challenges also presents an opportunity – “an appropriate or favourable time” (*Macquarie Dictionary*) – to make the world a better place.

Each of the challenges is an ethical challenge. Even the economic and technological challenges relate to improving the human condition or increasing freedom.

These challenges are *change imperatives* – things we should or must do – and as such are ethical in nature.

21st Century Capabilities

By “21st Century capabilities” or, better, “capabilities for the 21st century” I mean capabilities necessary to address 21st Century challenges. These capabilities include:

1. Critical thinking – the ability to examine, reflect, argue and debate
2. Holistic thinking - the ability to understand how the whole influences and shapes its components
3. Creative thinking – the ability to go “beyond existing knowledge and syntheses to pose new questions, offer new solutions, fashion works that stretch existing genres or configure new ones...” (Gardner 2008 page 156)
4. Imagination - the ability to understand a variety of complex issues affecting the story of a life as it unfolds: to think about development, illness, death, relationships with other living systems (including humans) informed by a wide range of stories and perspectives (adapted from Nussbaum 2010 page 25)
5. Practical reasoning – including the ability to think about the good of all living systems, not just that of one’s own species or community.
6. Personal capabilities - including the ability to manage one’s emotional, mental, spiritual and physical wellbeing; relate well to others and form and maintain healthy relationships; plan activities independently, collaborate, work in teams and communicate ideas (MCEETYA 2008 page 9) and to lead. It includes the ability to access one’s own feeling life and the ability to notice and make distinctions among other individuals (Gardner 1993 page 240)

A more extended discussion of these capabilities is in Stevens (2013, forthcoming)

Amartya Sen (2010) points to the crucial role of public reasoning (open debate on political and ethical issues) in democracy and justice. (324) The reasoned scrutiny from different perspectives that public reasoning affords is an essential part of the demands of *objectivity* for ethical and personal convictions, including those about justice and injustice. Practical reasoning is a core capability underlying public reasoning. Practical reasoning is of critical importance in meeting 21st century challenges, since the 21st century challenges we considered are all ethical challenges.

21st Century pedagogies

By “21st Century pedagogies” I mean those pedagogies that are conducive to the cultivation of 21st Century capabilities. So, how can 21st Century capabilities, in particular practical reasoning, be cultivated?

The OECD states that to improve learning in school classrooms (not specifically 21st Century capabilities), policies need to ensure that schools combine the following practices:

- Promote the use of a balanced combination of student-centred instruction with aligned curricular and assessment practices.
- Ensuring that curriculum with high expectations is used in schools: such a curriculum allows promoting a culture of high expectations of success. (OECD 2012 page 136)

The OECD recommends that *both direct and student-oriented instruction methods should be used*. Direct instruction is built around problems with clear, correct answers that can be learned quickly. Student-centred instruction is associated with the teacher facilitating students' own inquiry by allowing them time to find solutions to problems on their own before the teacher demonstrates how a problem is solved. The OECD observes that while there is no consensus in the literature on which approach is better, *an over-reliance on either approach is not recommended*. (OECD 2012 page 138)

Van den Broek (2012) expands on the idea that teachers should not rely too much on one particular pedagogical approach. She identifies eight innovative research-based approaches to learning and teaching (page 5)

- *Fostering Communities of Learning* is a constructivist approach in which teachers help students discover important curricular concepts.
- *Learning by Design* is an inquiry-based science learning program based on case-based reasoning models.
- *Central Conceptual Structures (CCS)* theory describes developmental changes in children's thinking and what is needed to progress through stages in specific cognitive domains.
- *Web-based Inquiry Science Environment (WISE)* is an internet-based adaptive learning environment building on the principles of knowledge integration.
- *Cognitive Tutors and ACT-R theory* are intelligent adaptive software programs that provide students with scaffolded instruction and feedback.
- *Direct Instruction* aims to accelerate learning through clear scripted direct instruction by the teacher and scaffolded practice aimed at student involvement and error reduction.
- *Higher Order Thinking Skills (HOTS)* is for disadvantaged students especially to engage in Socratic dialogues about ideas and strategies to solve computer game-based problems.
- *Knowledge Building* is a constructivist teaching approach centred on building knowledge and creating knowledge communities.

These approaches are by no means exhaustive of innovative research based pedagogies. Van den Broek would urge teachers to use these and other approaches in combination and not rely too heavily on any one approach.

Similarly, the cultivation of 21st century capabilities, practical reasoning in particular, requires a balanced combination of a range of different pedagogies. Of particular importance in cultivating practical reasoning is the use of an inquiry based pedagogy called *Socratic pedagogy*.

The US based philosopher and educator Matthew Lipman developed and refined a dialogue-based inquiry approach to teaching critical thinking called *Philosophy for Children*. The approach is based on a 'community of inquiry' in which children learn critical thinking by working with one another and building on each other's ideas, questioning each other's underlying assumptions, and suggesting alternatives.

An example of such an approach is the 2010 trial of Ethics classes in New South Wales, Australia. Lessons were designed by Professor Phillip Cam from the Philosophy Department of the University of New South Wales for a process of discussion-based inquiry, in which students engaged in discussion of ethical issues, guided both by purpose-built thought provoking teaching resources and questioning from the teacher. The lesson topics were Fairness, Lying, Ethical Principles, Graffiti, The Use and Abuse of Animals, Interfering with Nature, Virtues and Vices, Children's Rights and The Good Life. (Knight 2010 page 47)

The lessons operate in the following way:

1. Ethical scenarios are transcribed onto cards and distributed, one to each group of two to three students.
2. Students engage in discussion of their scenario within their group and then declare their position, by placing the card on an appropriately marked place on the floor. (Where there is disagreement within the group or where all members of the group are unsure how to judge their scenario, the card is placed separately, at a place marked by a question mark).
3. Groups give reasons for their decisions about the placement of the cards.
4. Members of the class discuss the various placements and explore their disagreements. Discussion rules include the use of a Speaker's Ball, possession of which confers the right to speak
5. Members discuss general principles underlying their reasons and which principles are more important than others (Knight 2010 pages 9-10)

A similar approach is used in teaching mathematics in countries like Japan and China. Teachers pose a single well-chosen problem to students, which students reason through together. Students individually and as a group develop and present a variety of possible solutions for class discussion and further evaluation until everyone understands the concept from multiple perspectives. At the end of this process, the students may derive a formula or set of principles to characterise what they have learned. (Darling-Hammond 2011 page 13)

Socratic Pedagogy is an excellent tool for cultivating capabilities for public reasoning. Socratic Pedagogy engages students in philosophical thinking, in giving reasons for their views, accommodating counter-examples to their definitions and identifying principles underlying their points of view. Philosophical thinking is critical thinking par excellence. Philosophical thinking and debate about philosophical and ethical issues is public reasoning, par excellence.

Having said this, Socratic Pedagogy could be supported by the explicit teaching of logic, perhaps as part of Mathematics. Through worked examples, students could learn to identify, in a variety of texts, conclusions of arguments and the premises supporting those conclusions. Students could learn different ways of evaluating arguments, again through worked examples, and to distinguish between the validity of an argument (an argument is valid where its conclusion is entailed by its premises) and the soundness of an argument (an argument is sound if it is valid and its premises are true.) Students could learn to identify patterns of valid arguments. Socratic Pedagogy could also be supported by Active Learning pedagogy, such as a debate that allows students to take a position and gather data and develop arguments to support that view. Debates also give students experience with presentation of arguments. Asking students their personal views on an issue and then making them argue for the opposite position could enable students to better understand both sides of an argument.

21st Century curriculum

How can curriculum – a specification of what is to be taught – support the cultivation of 21st Century capabilities?

An important first step for curriculum to support 21st Century capabilities is to make 21st Century capabilities a part of the curriculum. For example, the Australian Curriculum, Assessment and Reporting Authority has included seven general capabilities into the proposed Australian Curriculum:

- Literacy
- Numeracy
- Information and Communication Technology capability
- Critical and creative thinking
- Personal and social capability
- Ethical behaviour and
- Intercultural understanding

These capabilities (particularly the latter four) map on to the 21st Century capabilities identified earlier.

Curriculum specifications in syllabus documents can influence the types of pedagogies adopted by teachers. For example, giving too much emphasis to propositional knowledge (knowing that...) in a syllabus over skills or capabilities (knowing how...), or specifying too much content (propositional knowledge) in syllabus documents can result in pressuring teachers to rely on didactic pedagogies to deliver that content. We have seen that 21st Century capabilities are best cultivated through using a combination of didactic and inquiry-based pedagogies. While in many English speaking nations there is a well-established division of labour between curriculum developers and teachers that curriculum authorities make decisions about what is in the curriculum and teachers make decisions about how to teach it, *curriculum developers need to be mindful of the influence on pedagogy that curriculum might have*. Care needs to be taken with the amount of content specified in syllabus documents. There are political pressures to include too much content in syllabus documents, since it is considered that to say that particular content should not be included in the curriculum is to suggest that it is not important.

Is it feasible to reduce the content specified in curriculum without compromising quality of education?

The current Global Education Reform Movement would answer this question in the negative. Since the 1980s, at least five globally common features of education policies and reform principles have been employed in attempts to improve the quality of education, especially in terms of raising student achievement.

1. *standardisation* in education....
2. *increased focus on core subjects* in curriculum, such as literacy and numeracy.
3. teaching with *prescribed curriculum*; in other words, searching for safe, low risk ways to reach predetermined learning goals. *This minimises experimentation, reduces use of alternative pedagogical approaches, and limits risk taking in classrooms and schools.*
4. *Transfer of models from the corporate world* as a main logic of change management.
5. *High stakes accountability policies for schools* (Sahlberg 2012 page 101)

However, at least one high performing nation, Finland, does not have a content driven curriculum.

Andy Hargreaves (2010) notes that “In Finland, the state *steers* but does not *prescribe* in detail the national curriculum. Trusted teams of highly qualified teachers write much of the curriculum at the level of the municipality, in ways that adjust to the students they know best.” (Page 53) Linda Darling-Hammond observes that the current national core curriculum is a lean document – featuring

fewer than 10 pages of guidance for all of mathematics – which guides teachers in collecting local curriculum and assessments. (Darling-Hammond 2011 page 169). This lean curriculum appears to be compatible, at least, with the use of a variety of pedagogical approaches. Darling-Hammond observes “Inquiry is a major focus of learning in Finland... In a Finnish classroom it is rare to a teacher standing at the front of a classroom lecturing students for 50 minutes. Instead, students are likely to be conducting science investigations; measuring, building or calculating answers to design problems; and reading and writing for a variety of audiences and purposes. Students are likely to be rotating through workshops, or gathering information, asking questions of their teacher, and working with other students in small groups.” (Darling-Hammond 2011 page 169)

Despite not prescribing its curriculum in detail, Finland is widely recognised as having a highly successful school system – amongst the most successful in the world. Indeed, contrary to the group-think of the Global Education Reform Movement, the OECD states that most successful school systems – those that perform above average in international tests and show below-average socio-economic inequalities – grant greater autonomy to individual schools to design curricula and establish assessment policies. (OECD 2010 page 14)

Integration of Curriculum

It is sometimes suggested that 21st Century pedagogies require an integrated curriculum rather than a subject-based curriculum. An integrated curriculum may have certain advantages over a subject-based curriculum in terms of encouraging learners to make connections across disciplinary boundaries. However, 21st Century capabilities can be learned *within* disciplines as well as across disciplines. Critical thinking, practical reasoning, holistic thinking, creativity and imagination can be learned in the context of a wide range of disciplines. Philosophy for Children does not need to be a separate subject but can be part of disciplines such as Art, History, Science, Literature, Mathematics and so on.

Matthew Lipman says that Philosophy deals with *essentially contestable concepts*—concepts that lie at the heart of any discipline when it is presented as a living thing rather than simply as a body of established knowledge. This suggests that one way of animating the disciplines with the spirit of inquiry is by attention to the philosophically problematic within them. Lipman writes:

Philosophy is attracted by the problematic and the controversial, by the conceptual difficulties that lurk in the cracks and interstices of our conceptual schemes . . . The significance of this quest for the problematic is that it *generates* thinking. And so when we encounter those prefixes, “*philosophy* of science,” “*philosophy* of history,” and so on, we are grappling with the problematic aspects of those disciplines. For insofar as academic disciplines take themselves to be non-problematic, the instructional approach they favour is that their students must learn what they are taught, whereas the more problematic the image these disciplines have of themselves, the more they will favour an instructional approach of joint, shared inquiry by teachers and students alike. . . It is when a discipline conceives of its integrity to lie in ridding itself of its epistemological, metaphysical, aesthetic, ethical and logical considerations [the philosophical, in short] that it succeeds in becoming merely a body of alienated knowledge and procedures. (Lipman 1991 page 33-34, Cited in Cam 2006 page 7)

Attending to the philosophically problematic within a discipline is one way of reducing the content in curriculum – making it less crowded, and at the same time generating or cultivating 21st Century capabilities such as thinking.

Attending to the Philosophically Problematic within Disciplines

How can the academic disciplines attend to the philosophically problematic within them?

Mathematics

Zeno's paradoxes can illuminate the mathematical notions of a point and infinity. For example in one of Zeno's paradoxes, he begins by hypothesizing that a line of any length, is completely divisible, 'through and through' into an infinite number of parts of equal length. Any line can be divided into halves, quarters, eights and so on. This sequence is infinite. The second step of the argument makes clear that these infinitely divisible parts either have a magnitude or they do not. If they do, then the line will be infinitely long since any magnitude multiplied by infinity is infinite. But if the parts have zero magnitude then any number multiplied by zero is zero. As Zeno put it if the parts are nothing then so is the line: it's just an illusion.

This paradox can serve to assist understanding of the sense in which points have no magnitude. At its most basic level the segment is just a set of points—if you take any spatial part of it, all you have is a point or set of points. Cantor gave an influential 'diagonal' proof that the number of points in the segment is uncountably infinite: there is no way to label *all* the points in the line with the infinity of numbers 1, 2, 3, As we noted above, it follows that we cannot immediately conclude that because they all have zero length so does the whole line. But that still leaves open the question of how the line gets extension from its inextended points.

Kondratieva concludes a paper "Understanding mathematics through resolution of paradoxes" with five recommendations.

1. Build a collection of paradoxes and include them in the teaching portfolio as a specific challenging activity in the classroom.
2. Teach paradoxes to illustrate a specific point. Make sure that the essence of paradox is understood in the context of the material being studied.
3. Allow the students some time to think on their own.
4. Engage the students into a discussion. Make them develop their conclusions, leading to a resolution.
5. State a resolution clearly.
6. Remember that the goal is to dis-equilibrate the learner in an aesthetically valuable manner, and then make use of her natural curiosity. (Kondratieva page 7)

An alternative to point 4 is that students could individually and as a group develop and present a variety of possible solutions for class discussion and further evaluation until everyone understands the concept from multiple perspectives. Neither the teacher nor the students need to arrive at a specific resolution.

Science

In a paper I presented at this conference in 2007 I suggested that what I called Ecological Science Education would include consideration of

- Synergies in physics, chemistry, biology
- the relationship between living and non-living systems – the water cycle, the carbon cycle, the nitrogen cycle the relationships between living systems
- the levels of life (e.g. bio-chemical, cellular, multi-cellular, societal, species, eco-systemic) and the relationships between these levels

Furthermore, Ecological Science Education would include a consideration of philosophical and ethical questions arising from the content of science. (Stevens 2007 pages 7-8). Questions that students might discuss include:

- What is life?
- How do living systems differ from mechanical systems?
- Do living systems have purposes? If so, what are they?
- Living systems have the appearance of having been designed for a purpose. Does this entail they are designed?
- Do living systems have interests? (Can they be benefitted or harmed?) If so, what are the implications for how we should live?
- Are all living systems competitive by nature and cooperate only in special circumstances? Or is the reverse true?
- Does evolution (natural selection) depend on competition?
- Are humans naturally competitive/cooperative? If so, what are the implications for how we should live?
- Are values (good, bad, beauty,) part of the fabric of the world?
- When did values come into the world?
- Are human societies super organisms – like insect societies?
- If so, what are the implications for how we should live? Do super-organisms generate obligations?
- Are human societies separate from nature? (Are insect societies separate from nature?)
- Is culture confined to human beings?
- Is culture separate from nature?
- Do living systems have separate selves? Do human beings have separate selves?
- What is human well-being or flourishing?
- What role does the perception of beauty play in evolution?

There are many different answers that may be given to these questions

Physics

At the beginning of their book *The Grand Design* Stephen Hawking and Leonard Mlodinow note that “humans are a curious species. We wonder, we seek answers... How can we understand the world in which we find ourselves? How does the universe behave? What is the nature of reality? Where did all this come from? Did the universe need a creator?” They observe “Traditionally these are questions for philosophy, but philosophy is dead. Philosophy has not kept up with modern developments in science, particularly physics.” (page 5) Having pronounced the death of philosophy on the first page

of their book, in succeeding pages they make a series of (dubious) philosophical conjectures such as “model-dependent realism” – that reality is relative to the model we use to explain it. Hawking and Mlodinow claim this is “based on the idea that our brains interpret the input from our sensory organs by making a model of the world.” (Page 7) But this trades on the model-independent reality of our brains, sensory organs, input from these, and “the world”. They engage in some philosophical speculation that “we are no more than biological machines and... freewill is just an illusion.” (Page 32)

Science curriculum could explore the philosophical debates in Physics – particularly the diverse views about the origins of the universe, theories of dark matter, dark energy and interpretations of quantum phenomena, as well as the mind-body problem, theories of realism and the problem of freewill and determinism.

Personal Development Health and Physical Education

If we are to successfully address 21st Century social, ecological and health challenges, then young people will increasingly need to reflect on, and discuss, issues about the source of value – good, bad, right, wrong, beauty, ugliness and worth. Personal Development, Health and Physical Education may be an excellent discipline in which to pursue these questions.

Historically there have been two kinds of views about the source of value.

The first is that the source of value is transcendent, it comes from beyond nature, for example, from God.

A second view about the source of value is that values arise not from a transcendent realm but from the valuing activity of human beings. (Grayling 2003 pages 1-2)

A third view, by no means as prominent as the transcendental and humanist views, is that value arises from life, and the valuing activities of life. All living things are internally organised for a purpose: to live, live well and live better. Relative to these purposes living systems have interests – they can be benefited or harmed. Some things are good for them and other things are bad. Relative to these purposes, living systems have intrinsic worth.

Our capacity to effectively meet 21st Century ecological challenges depends on our views about the source of value. The view that all living systems have interests and intrinsic worth tends to encourage ecological activism and gives it urgency.

To meet 21st Century ecological challenges, citizens will increasingly need to investigate what specifically makes their life go well. Is the acquisition of more and more material goods constitutive of our well-being? Is the acquisition of material objects that everybody else has constitutive of our well-being? Does our well-being consist in getting what we want, or does it consist in getting what we need (for good mental and physical health)? Is our well-being dependent on having what we need in an absolute sense or on having more than others? Is our well-being more about relationships than about having material goods (beyond what we need)? Is our well-being a matter of having and exercising our capabilities, or is it more related to our material wealth?

Critical reflection about what makes our life go well is necessary (though not sufficient) to effectively address the ecological challenges – as well as health challenges - related to an economy that would appear to be predicated on continual growth. (Jackson 2009)

Many syllabus documents are organised according to different outcome categories such as knowledge, skills, attitudes, values and ethics. This categorisation appears to presuppose a dichotomy between fact on the one hand and value on the other – and a dichotomy between what is the case and what ought to be the case (ethics). Values, attitudes and ethics are grouped together as being subjective – as belonging to the realm of opinion - not part of the furniture of the world, but a projection of the human mind. But if the source of value – good, bad, right, wrong, beautiful and ugly – is life, then they are part of the furniture of the world – and we come to know about values (what is good and what is bad) in much the same way as other facts. Whatever the truth about the subjective nature of values, this should not be pre-supposed in the way curriculum is organised.

Breadth of Curriculum

A curriculum that supports the cultivation of 21st Century capabilities will need to be a broad curriculum, requiring learning in the arts, humanities and the sciences.

The ability to traverse the whole spectrum from the humanities to the sciences (a form of Gardner's synthesising mind) is crucial to addressing ecological challenges. Too much specialisation in the humanities can result in a human-centredness that can impede cultivating the understanding of our place in nature that is arguably necessary to address ecological challenges. The study of the sciences is necessary to a nuanced understanding of our place in broader living systems. On the other hand, too much specialisation in the sciences can result in too little reflection on living well, in particular on consideration of the ethical issues which are necessary to address our ecological challenges.

Some areas of content are particularly pertinent to the cultivation of 21st Century capabilities and our prospects of addressing 21st Century challenges. Nussbaum argues that if democracy is to survive, the world's schools and universities have an urgent and important task "to cultivate in students the ability to see themselves as members of a heterogeneous nation...and a still more heterogeneous world, and to understand something of the history and character of the diverse groups that inhabit it." (Nussbaum 2010 page 80) This requires a great deal of factual knowledge about world history and cultures, the global economy, and the major world religions. In addition, young people need to understand our deep inter-connectedness with each other. As Nussbaum observes "More than at any at any time in the past, we all depend on people we have never seen, and they depend on us." (Nussbaum 2010 page 79)

I would add that If we are to successfully address our ecological challenges, young people must also see themselves as citizens of the biosphere. Schools and universities must cultivate in students the ability to see themselves as members of a heterogeneous nation, a still more heterogeneous world, *and a still more heterogeneous biosphere* and to understand something of the history and character of the diverse groups that inhabit it.

In addition to a great deal of factual knowledge about world history and cultures, the global economy, and the major world religions, this requires knowledge (or understanding) about biology, geography

and in particular ecology. Ecology and geography encourages a deep understanding of our interconnectedness with all living systems.

Conclusion

I have argued that for curriculum to best support the cultivation of capabilities necessary to meet the major challenges of the 21st century it should be:

concise to facilitate experimentation and use of a range of innovative pedagogical approaches;

deep, that is, the content should focus on the philosophically problematic within each discipline and

broad – covering the arts, humanities and the sciences.

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