

Invited Commentary

The Last Word

Should Systems Thinking be a Core Discipline in Education?

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A school or college curriculum is quite a complicated thing - many people have different views and ideas as to what it should contain. The definition of a curriculum is simply 'the subjects comprising a course of study', which immediately implies that we have divided up the potentially vast amount of knowledge that a student could learn, into separate compartments – the subjects. In medieval Europe the curriculum was mostly Latin and Greek and the study of grammar, rhetoric, and logic; later, subjects like arithmetic, geometry, music, and astronomy were added.

This subject division transformed slowly into what most people would now expect: reading, writing, arithmetic, of course, and then history, geography, other languages, chemistry, physics and biology and so on to produce the traditional curriculum with the emphasis now on science, technology, engineering and mathematics (STEM) to service the world of business. This creation of subjects, dividing knowledge into separate silos, continues throughout all formal education, with the number of subjects proliferating and splitting. In my original subject of study, mathematics, there are at least 97 major divisions¹ - and experts in one of these divisions are often unable to understand the experts in another. There is even a subject, a discipline, called mathematical knowledge management.

This is not a bad thing, the vast range of knowledge is just that, it is too vast for anyone to know everything. There are many contenders for the title of the last man (sic) to know everything that was to be known in their day: Aristotle, Erasmus, Da Vinci, Kant to name some but once we got past the 18th century things really took off and now we might soon be heading towards the point where knowledge is doubling every 12 hours (see Ray Kurzweil's views on the Singularity²).

What has all this got to do with systems thinking? Why should this subject be privileged above others and be considered as part of the core curriculum, at the heart of education, alongside what others might say are part of the core, subjects like arithmetic and English; why choose system thinking over say music for a core subject?

Perhaps we ought to look at what a curriculum could be from the perspective of what type of person do we want to emerge from the process of education. What knowledge then should a student learn? Of course we want good, kind, caring and thinking people to emerge. So, shouldn't the curriculum be shaped to answer some pretty big questions? Questions like: Who am I? What are my values? Where do I come from? How do I work? How does the world work? What is happening in the world and what is shaping the future? How do I look after myself? How can I be a good person? How can I contribute to others? How do I think?

If the curriculum were shaped to answer these questions then we can easily map the traditional subjects into them: biology, embryology, genetics, chemistry, physics, and nutrition all contribute to the question 'how do I work?' Most of these questions, however, are about processes, we have a worldview that is about change and flow. I work, I am alive, because I emerge from a flow of materials,

energy and information. If we are to equip students for life then a deep appreciation of process is essential and another word for process is 'system'; we need an appreciation of how everything is interconnected and interdependent, how everything has a history and is on a pathway to something uncertain. Learning that we are part of many different systems that support us, as we contribute back to them, must be at the core of a life-focussed curriculum.

The planet is a vast, self-regulating system, from the microbes in the soil to the elephant tearing up grass for dinner, everything is connected in this wonderful, complex and emergent world and we humans are well and truly embedded in it. And that is why I believe placing systems thinking at the core of a 'life curriculum' is vital.

Perhaps it is vital for another reason as well. What we have done, and continue to do, to our planet is transforming, disrupting, and in many cases destroying our systems. The biggest threat from these massive disruptions is climate change. Our activities are on such a large scale in such a tiny amount of time that we are likely to knock the whole planetary ecosystem into a different phase, a period of significant global warming (if we haven't already done so). That will create serious stresses and cause huge shifts in, you guessed it, all our systems – ecologic, economic, governance and society.

If enough people have the ability to appreciate the complexity and the systemic nature of the world then we might prevent further damage and at the same time we can restore and regenerate ecologies and societies. We all need to understand systems and to communicate in systems terms if we are to discover ways to regenerate and to restore the damage.

However, given the rather parlous state of systems thinking education (a quick search brought up only three or four universities in the UK that offer a degree or course in systems thinking) one is left wondering whether treating systems thinking as a discipline within the existing educational structure is the right way to go. It is within every other discipline and yet outside them all. It is pervasive and essential to every discipline, yet it is a meta-discipline. It sits outside the set of disciplines. One essential axiom of the theory of logical types, stated by Russell and Whitehead³, is that 'whatever involves all of a collection must not be one of the collection' - any attempt to do so will lead to nonsense and confusion, indeed paradox.

If we were to equate systems thinking with life in its widest sense then perhaps we can look at education as the 'progress of students making sense of the world and themselves within it'. Systems thinking becomes a skill, in fact the supreme skill.

While studying any discipline the student is also equipping themselves for life. A certain UK university has, on its website, a list of the top skills that employers want. It is a long list:

...verbal communication, teamwork, commercial awareness, analysing & investigating, initiative/self-motivation, drive, planning & organising, flexibility, time management, global skills, negotiating & persuading, leadership, self-awareness, personal impact/confidence, lifelong learning, stress tolerance, integrity, independence, developing professionalism, action planning, decision-making, interpersonal sensitivity, creativity.

Which discipline at that or any university teaches these? All these skills would easily be part of a systems-thinking life programme – not a discipline, outside the disciplines, but something else.

Of course, the study of systems thinking itself should remain - its history, its practice, its theories and its new directions. It is vital that there is a discipline and a research agenda for this within the university silos but it is not the place of universities to teach the skill of systems thinking.

ENDNOTES

- ¹ https://en.wikipedia.org/wiki/Mathematics_Subject_Classification accessed 19/4/17
- ² <http://www.singularity.com/> accessed 19/4/17
- ³ Whitehead, A.N., & Russell, B. (1913). *Principia Mathematica* (2nd ed., Vol. 3, p. 37). Cambridge University Press.

Ian Roderick started his career at the Building Research Establishment before joining Rank Xerox International to head long range forecasting and business modelling. Attracted by the then new world of personal computing he co-founded a successful software development company that was finally bought outright by a FTSE 100 company in 2000 - leaving him free to pursue his interests in systems thinking, the environment and social justice. In 2005 he started the Schumacher Institute for Sustainable Systems, an independent think tank. He has a BSc degree in Mathematics and an MSc in Operational Research and an MSc in Responsibility & Business Practice. He was President of the UK Systems Society from 2005 to 2008. He is also a co-founder of the charity The Converging World, which is building a wind farm in India, and he sits on the board of an environmental industry trade association called Low Carbon South West.