

ARE DISCIPLINES DEAD?¹

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On reading his obituary, Mark Twain is reported to have said ‘reports of my death are greatly exaggerated’. I want to make the same claim about disciplines.

I am a former chemistry teacher but my university career has been as a sociologist of education. Reflecting on this experience has led me to several conclusions about disciplines- one is that there are only a limited number of things one can say about disciplines ‘in general’; disciplines are incredibly diverse.

Secondly, disciplines are not only bodies of knowledge which have been established by specialists, they are ‘communities of enquirers’ in the sense that the philosopher CS Pierce used the phrase. As such, they have histories and are never static- some grow, others decline and new ones are established.

Thirdly, they are the product of the specialisation of enquiries, at least in the Western tradition, they can be traced back to theology and the emergence, through the re-discovery of the ancient Greek and Roman traditions, of philosophy. It is out of natural, moral, political and social philosophy that disciplines in the sciences and humanities that we know today have developed.

A similar question to the one we are considering tonight which is whether the professions like engineering are dying, killed by machine learning. The case is plausibly made by the Susskinds in their book *The Future of the Professions* who argue that ‘*the professions have no future*’. The Susskinds write as lawyers not engineers or sociologists. I think they are wrong for similar reason that the assertion before us this evening is mistaken. In their case they argue that the logical reasoning that lies at the heart of all professions can and will be increasingly be accomplished by machines. My view is that their argument depends on equating logic which can be represented electronically with professional judgment which is a specifically human faculty.

Two types of disciplines can be distinguished- the humanities and the sciences- both of which have their roots in the progressive secularisation of the first discipline- theology. As this evening’s conversation is about engineering, I shall be largely concerned with the scientific disciplines. However, it is worth remembering that the first disciplines as we know them that involve university-based teaching and research were established were in the humanities and established in Germany by Wilhelm Humbolt in the early 19th century. The scientific disciplines which effectively replaced Natural Philosophy were established in the latter half of the 19th century and remain the primary sources of innovation and led to the technologies such as steam power, electricity and electronics.

Let me re-pose the question for this evening’s discussion as follows:

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Have the purposes of disciplines and therefore their place at the heart of the university curriculum, become impediments to progress and the goal of producing new knowledge? Or, as I shall argue, do they remain integral to those goals.

The answer YES to the first question was given by Michael Gibbons and his colleagues in their influential book *The New mode of Knowledge Production*. Gibbons predicts the steady decline if not the death of disciplinary enquiry and its replacement by trans- multi- and non-disciplinary forms of enquiry. The development of new knowledge will begin with the problems we face in the 21st century in every field, not with the current state of disciplinary knowledge.

Today's disciplines inherit ideas such as 'knowledge for its own sake' and 'academic freedom' which are increasingly dismissed, especially by funders. However, this is, I will argue, mistaken. It is true that such ideas can be understood as secularised versions of theology's 'search for truth'. However, this secularisation rejected not only the concept of truth 'revealed by faith', it rejected the possibility of any absolute truth. This is replaced in modern disciplines by a 'search for truth' within the constraints of a particular discipline's epistemic and moral rules. Claims to truth in other words are not absolute but answerable to the 'community of enquirers' of the discipline and in Popper's sense, always open to refutation.

Why then will disciplinary enquiries always be with us—or unlike Mark Twain himself, never die? Does it make sense that they developed in particular historical circumstances but in their structure and purpose, though not their content, transcend those circumstances. They are, it can be argued like such ideas as democracy and universal adult franchise. I find it useful to distinguish an empirical answer from a conceptual answer to whether disciplines have a future... The former is found in the evidence of discoveries that have been made within disciplines and based on the idea of the search for better knowledge without regard to its possible use. The discovery of new knowledge that led to disciplinary enquiries of the early scientists such as Galileo and Newton, began according to the historian David Wooton not in enquires into the physical or material world but with Columbus's discovery of America. The existence of a whole continent was new knowledge- a discovery in the strongest sense. It is represented today by the disciplines of physics, chemistry and biochemistry and discoveries such as the Higgs Boson, graphene and the CRISPR-Cas9 genome editing system. As with many other discoveries that have gone on to be the basis of transformative technologies, could never have arisen from enquiries devoted to practical problems.

My conceptual answer is that the distinctive criteria for disciplinary enquiries are always internal to the 'truth seeking purposes of the enquiry in question and it is this condition that is the basis of new knowledge. This does not mean that disciplinary specialists may not have other purposes such gaining prestige and wealth or that those funding research do not do so in the hope that the discoveries they fund will lead to the solving of practical problems. For example leading edge cancer research, research into how to store energy do not begin with the disease or current energy costs. My argument is that what makes disciplines distinctive in the production of new knowledge is that the criteria for research questions are internal to the progress of the disciplines themselves and not directed to any external purpose. The 30 years search for evidence of the Higgs Boson is a good example of a disciplinary enquiry driven by internal priorities. Which of these discoveries becomes part of how production, transmission and communication are improved is another question.

Many but by no means all discipline-based enquiries have led to successful solutions to practical problems. The reason for this is much debated as is the length of time for such transfer to happen. Who would have predicted that in George Boole's discoveries in algebra over 150 years ago would be integral to present day microelectronics? The unarguable success of science-based technologies and medical treatments does not mean that reality necessarily takes a discipline-based form –we cannot ever know if this is true. To make such a claim would, involve collapsing knowledge into belief-and physics into theology. However what I would endorse is that it is the way disciplines limit criteria in their enquiries to whether they further their own internal purposes that accounts for the massive growth of our knowledge of the physical, material and biological worlds and our increasing ability to transform them.

There is however, a broader rationale for the disciplines that covers the humanities as well as the sciences even though they make no claims to generalise or predict. By locating enquirers within specialised communities of enquirers, disciplines free enquirers from the particular circumstances of their context and experience; their only constraints are the judgments of colleagues in the discipline. In the sociologist Basil Bernstein's terms they are thus able to 'think the not yet thought'. One could describe this as the socialisation of thought. In contemporary times this socialisation is gradually extended towards to become the universalisation of concepts in different disciplines. It is, in my view impossible to imagine a society of the future that does not retain such possibilities as central to the role of universities.

I have made, albeit briefly, a case for what might be called, at least metaphorically, the immortality of disciplines on the grounds that in representing the 'search for truth' they express something uniquely human that transcends both their origins but also history- in structure and purpose though not of course in content or concepts. . I want to end on a cautionary note. There are values that transcend the truths of disciplines, in the sciences no less than the humanities- current examples are the concerns expressed by scientists such as Stephen Hawkins and innovative technologists such as Elton Musk that the development of artificial intelligence could itself be a danger to humanity. A similar doubt about staying within the boundaries of the discipline was raised in her recent Radio 4 interview by Janet Doudner the discoverer of gene editing.

Disciplinary knowledge is never as autonomous from practice as phrases like 'knowledge for its own sake' imply. Disciplinarity represents an important priority if knowledge is to progress but not a dogma or an absolute.

Those who claim that disciplines are 'dead', are like many who assume the same is true of theology, whereas modern theology is less like a dogma and more expressive of faith that does not exclude doubt. Absolute truth is precluded for theology just as it is for discipliners- both involve the search for truth as a human and social activity.

My argument has been that although historically, disciplines have their roots in theology, this does not mean that they take over an absolutism that much theology now rejects. To extend this to the case of engineering is beyond the scope of this brief text. Engineering depends on discoveries in physics just as medicine has been transformed by discoveries in physiology. However, neither are not just applications; they are distinct forms of conceptual as well as practical activity and enquiry.

My objections to the claim that 'disciplines are dead' is that it can give practical use and more broadly, instrumental goals, a priority that denies the search for truth and forgets the extent to which knowledge builds on knowledge, not practice un-mediated by theory. In

a world in which disciplines are dead, we would be cut off from the source of innovation and new knowledge that is most distinctive of human attempts to understand our world. The best evidence for this is the consequences of the collapse of discipline-based science in Stalin's Soviet Union. Another example is the lack of new knowledge emerging from developing countries. This is partly the consequence of their historic lack of resources and under-development that is the product of colonisation. However, it also reflects current priorities of their governments that place little value on the autonomy of discipline based enquiries.

TO CONCLUDE

I think the assertion that 'disciplines are dead' is misconceived because it implies an over-dichotomous and static distinction between disciplines and applied research or trans-disciplinary enquiries.

Partly on account of their origins in theology, disciplines will always tend emphasise truth rather than efficacy. In the complex and confused world of today, the truth/efficacy distinction no less important than it was two centuries ago when the secularised disciplines began to be established and the conceptual issues within disciplines became increasingly distinguished from theological.

The secularised disciplines does not involve some absolute notion of truth and they will always be vulnerable to internal and external challenges. Only if you can envisage a society that no longer places a value on new knowledge will the 'search for truth' through discipline-based enquiries lose their importance. I cannot imagine a democratic society in which the disciplines are treated as relics of the past. Unless we have forms of social organisations like disciplines that allow the next generation to imagine the future, I cannot see that we will have one.

