Statistics, Science, & Public Policy:
The Two Cultures?

Shifting cultures: Stimulus to the individual

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This is the transcipt of an invited talk as presented to the conference Statistics, Science, & Public Policy: The Two Cultures? *at Hearstmonceux Castle, England. The session was entitled 'The University Culture'.*

The talk was intended to complement the presentation by Professor Mary Thompson of the University of Waterloo. The chair of the session was Dr. Suzanne Portier of Queen's University; the conference organizer was Professor Agnes Herzberg, also of Queen's University (Kingston, Ontario).

Transcript

Thank you Suzanne. And thank you Agnes for the opportunity to speak here today.

As Mary Thompson said earlier, she and I decided on complementary talks along a common theme of 'Shifting Cultures'. Mary addressed the wider context where university research culture shifts with respect to funding sources and societal expectations. My task is to look at those cultural shifts which have affected, or will soon affect, the individual university student and hence the university culture itself.

1 Shift in culture

In 1959, Snow was writing at a time when the 'scientific culture' was ascendant and enjoying great popularity. The twentieth century was a new age of enlightenment likened to that of the Elizabethan, with Rutherford as Shakespeare.

Although the twentieth century, and particularly the times between and after the two world wars, had been very good to science, it was not so good to the letters. George Orwell wrote “The literature of liberalism is coming to an end. As for the writer, he is . . . merely an anachronism, a hangover from the Bourgeois age, . . . from now onwards the all important fact for the creative writer is going to be that this is not a writer’s world.”[1] Overstated perhaps, but it does convey the widely held sentiment that it was a better time to start a scientific career than a literary one.[2]

For the most part Snow’s essay on the ‘Two Cultures’ was directed at the ‘other culture’ – the older, established culture of the literary intellectual. Just look at the tests he applies. It is hard to imagine, even now, that any native English speaking scientist could have made it through secondary school without having read at least one play of Shakespeare (and Shaw, and Ibsen, and Chekhov, ...); but it is still debatable whether a non-scientist should know the second law of thermodynamics (at least as *The Second Law of Thermodynamics*). A somewhat comparable literary challenge might be having read and appreciated Horace or Cicero.

Perhaps the most telling sign of this one-sidedness is that scientists, for the most part, seem to agree with Snow’s assessment while humanists have been quite dismissive of Snow’s ‘superficial’ and even ‘silly’ dichotomy.[3] Snow’s ‘scientific culture’, feeling its youthful strength and insecurity, wants recognition from the established ‘intellectuals’. To me, this seems to be more symptomatic of a shift than of a separation.

In his rebuttal to critics, written four years after the Rede lecture, Snow struggles to defend his choice of the word culture and of the number two. Parenthetically he remarks that “No one, I think, has yet complained about the definite article.”

The choice of ‘culture’ is defended by appealing to a dictionary definition meaning “intellectual development, development of the mind” and also to the anthropological distinction made between living groups of people. Were he to adopt a definition from Coleridge of culture being those ‘qualities and faculties which characterise our humanity’, Snow admits that neither the literary nor the scientific constitute cultures but rather sub-cultures. In this light, the cultural shift is one of emphasis. In Snow’s view, too long has our culture nurtured the literary and starved the scientific. Snow is interested in having the balance redressed.

Accepting Snow’s choice of the word culture, it is easy to see that the number two could be many more. Every specialization could be called a culture. Indeed, in the forty years that has passed since the Rede lecture, sufficient has been written on Snow’s ‘Two Cultures’ that it might legitimately constitute a specialization of its own – a humbling thought for those of us here who have been asked to address the matter for the first time.

Snow defends the number ‘two’ on grounds of simplicity – it crystallizes the two extremes for contrast. It is interesting that Snow briefly considers three by the possible separation of technology from science. He dismisses it because he has observed that the technologist,

[1]Quoted from de la Mothe, p. 34.

[2]This case is convincingly made by de la Mothe.

[3]E.g. Allan Bloom, Russell Kirk, F.R. Leavis, Northrop Frye.

when designing a new technology, goes through much the same experience as a scientist in designing an experiment. To this I feel compelled to add the words of the professional chemist, Primo Levi, whose fame is established as a writer. They should evoke kindred feelings from any theoretician:

> ... I now felt in the writing a complex, intense, and new pleasure, similar to that I felt as a student when penetrating the solemn order of differential calculus. It was exalting to search and find, or create, the right word, that is, commensurate, concise, and strong; to dredge up events from my memory and describe them with the greatest rigour and the least clutter."
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> From *The Periodic Table*, 1975, p. 160.

A more understandable justification would be that technology has so long been tied up with science that its separation seems unnatural to Snow.

One thing that the number two has resulted in is an entire cottage industry devoted to finding number three. Snow himself started this. Although 'technology' was rejected, in his rebuttal to his critics he did introduce what he saw to be the beginnings of a third culture. This third culture was being formed by the social sciences, in Snow's words those

> "... intellectual persons in a variety of fields – social history, sociology, demography, political science, economics, government (in the American sense), psychology, medicine, and social arts such as architecture. ... All of them are concerned with how human beings are living or have lived – and concerned, not in terms of legend, but of fact.
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> page 70 of *The Two Cultures* second edition.

Allan Bloom, in his 1987 book *The Closing of the American Mind*, identifies the big three disciplines which "rule the academic roost and determine what is knowledge" (p. 356). These are the natural sciences, which are doing well, the social sciences which are more robust being more in harmony with the natural sciences although in Bloom's opinion they only succeed in "aping ... the methods of natural science" (p. 358), and the humanities which are languishing having decided "to proudly set up shop next door" rather than to "humbly find a place at [the] court" of natural science (p. 358). The shift from Snow's view of the cultural problems to Bloom's is staggering.

Snow thought that when this third culture came into existence it would serve to ease communication between the two cultures. This was because this third culture would have to "be on speaking terms with the scientific one ... just to do its job." Perhaps it has but, if Bloom is correct, the communication sadly ended there.

More recently, John Brockman and others have seized on the communication between science and others as the hallmark of the third culture. His third culture consists of scientific thinkers who are able to communicate directly with the lay public. These include well known scientists like Richard Dawkins, Stephen Jay Gould, and Roger Penrose, and well known computer scientists like Daniel Hillis and Marvin Minsky.

The primary medium for discourse seems to be the internet where articles and follow up commentary are posted to open discussion groups. The principal web site is www.edge.org/3rd_culture. Whereas early scientists, at least as early as Archimedes, exchanged their ideas in letters written to other scientists, challenging them to think on them, this third culture purports to replicate the exchange but with a much larger collection of thinkers (scientists and the lay alike). The writers and commentators are the third culture, a culture of individuals whose ideas are reviewed by the public rather than by more traditional (and likely more conservative) peer system. Brockman writes

> "Unlike previous intellectual pursuits, the achievements of the third culture are not the marginal disputes of a quarrelsome mandarin class: They will affect the lives of everybody on the planet."

Heady stuff. Absent the internet, and so the immediacy of discussion, and this is just a bunch of scientists, albeit articulate ones, trying to communicate to the lay public. Nothing new to that.

In fact Snow had been quick in his rebuttal to point out the existence of such writers as J. Bronowski, G.H. Hardy, and A.N. Whitehead who in "some of the most beautiful prose of our time" (p. 63) wrote directly for public consumption. But this not a third culture in Snow's view, but simply additional evidence that science was deserving of the word 'culture'.

Scientists, curiously, have often not been kind to other scientists writing for the lay public, particularly if it is found to be promoting a pet theory. An early example is Descartes's biting review of Galileo's famous book, the "Two New Sciences":

> "... his fashion of writing in dialogues, where he introduces three persons who do nothing but exalt each of his inventions in turn, greatly assists in [over]pricing his merchandise."
>
> In a letter to the great experimental scientist Marin Mersenne (1588-1647), dated 11 October 1638

One is reminded of the current and much more public disagreement between Gould and Dawkins where one worries publicly that the other writes perhaps too well.

A more interesting, and to me much more plausible, candidate for a third culture is the one rejected by Snow, namely, technology. Not technology as Snow understood it in 1963. Far too much has changed since. And not that of the specialized technology expressly designed to address scientific questions. The critical technology here is the general purpose computer which now appears in schools and homes throughout every industrial society.

The ubiquity of this extremely malleable technology together with the instantaneous worldwide communication between its users has enabled the growth of what Kevin Kelly, the executive editor of *Wired* magazine, has called the 'nerd culture'.

Kelly coined the term last year in an essay in *Science*. There he described the nerd culture as an outgrowth of science but one which is quite separate from Snow's two cultures.

- The nerd culture pursues neither understanding of the natural world nor of the human condition; it pursues novelty.
- Questions are framed so that the answer is a new technology.
- It creates possibilities.
- Creation is preferred to creativity.

According to Kelly:

> The culture of science, so long in the shadow of the culture of art, now has another orientation to contend with, one grown from its own rib.

If Kelly is right, our culture is shifting in an important way again. This time in a direction which might affect science more than the humanities.

2 The student

Imagine a student now entering university. The 'nerd culture' is part of his or her culture. It could not be otherwise. What does this student expect of a university education? What do we expect of this student?

It is a time honoured tradition in academe to lament that students are not what they once were. But this just isn't true in any important way. In terms of intelligence and motivation little has changed since ancient Greece.

Students have always enjoyed, and will always enjoy, the contemplative and the puzzling. And, they have always been, and will always be, interested in personal gain – whether financial, or affiliation with an elite, or fame, or power for its own sake. It is no accident, for example, that students appearing in the Platonic dialogues are intent on honing their rhetorical and dialectical skills so as to acquire and wield political power. Nor is it coincidence that the elite of Athenian society would charge Socrates not just with impiety but also with the corruption of their youth. One can imagine the appeal of a classical education to a youth in classical times.

Our principal means to give meaningful power to students is through specialization. Acquiring some mastery of a subject requires spending considerable time immersed in it, exploring a terrain so well that it not only becomes familiar but that one can at least imagine how it might be extended into new territory. This is an intellectual power that every educated person should experience. Even so, a specialization which cannot assure the student a certain success in society after graduation will be avoided, if not shunned.

Natural science might still provide that path to success but the nerd culture has already informed students that computer science delivers in spades! It is fresh, exciting, important, modern and has yet to experience its Chernobyl.

Like earlier times in the natural sciences, the nerd culture presents an encouraging and friendly face. Internet newsgroups and the like provide a supportive and competitive forum for neophytes and experts alike. Recall nineteenth century science, when letters to Nature might recount the strange behaviour of a gentleman's dog, or describe flora and fauna observed on a trip abroad.

Start up costs are minimal. One achieves 0 to 60% effectiveness in real world application remarkably fast. Many budding computer science students make money with these skills before reaching university – graduate specialization is unnecessary. Think of the feedback to the student: older generations are amazed and the skills transfer easily to almost any area of application!

Intellectually, general purpose computers are machines which manipulate symbols – some of these just happen to represent floating point numbers. The technology is extremely malleable and so provides a new medium for representing ideas, expressing relationships, and modelling just about anything. The only bounds are the imagination and the finite but very large number of states.

This is power – power with some immediacy. Joseph Weizenbaum expressed it first, and best, as follows:

> The computer programmer, however, is a creator of universes for which he alone is the lawgiver. So, of course, is the designer of any game. But universes of virtually unlimited complexity can be created in the form of computer programs. Moreover, and this is a crucial point, systems so formulated and elaborated *act out* their programmed scripts. They compliantly obey their laws and vividly exhibit their obedient behaviour. No playwright, no stage director, no emperor, however powerful, has ever exercised such absolute authority to arrange a stage or a field of battle and to command such unswervingly dutiful actors or troops.
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> *Computer Power and Human Reason*, 1976, p.115.

Of course, Lord Acton's dictum applies. That this power corrupts was Weizenbaum's point, applied to the often over-reaching claims of Artificial Intelligence.

3 Challenges

The nerd culture is, I think, a genuine cultural shift. Perhaps not as large as that from a humanities dominated culture to a science dominated culture, but it does seem more a shift than a fashion. How we are to accommodate this shift is a significant challenge to the university.

The last shift, that heralded by C.P. Snow's Rede lecture, was accommodated at a substantial cost to the humanities – a cost from which we have yet to recover. Standing proudly aloof, as Bloom said of the humanities, seems a strategy intent on reducing one's influence. And aping the methods of the foreign culture is quickly seen for what it is.

Fortunately there is much in the sciences that is already heavily computational and this could easily be made more visible to the student. Gratuitous computational use, however, is not on – aping is aping. It is important to remember that, while we may regard the computer as a powerful and even essential tool, in the 'nerd culture' it is a medium for expression.

The challenge remains as to how we are to incorporate important cultural shifts. We have a new shift that requires addressing and we have yet to deal justly with the last much larger shift. The same questions still need to be answered. What should constitute an education? Must specializations be so specialized? And so soon?

Allan Bloom suggests that posing some of these questions would be a threat to the peace, yet pose them we must. But where?

The enduring attraction of these conferences is that they provide a rare and natural forum for these and like questions.

On that note, I thank you for your time and attention.