Trust as a necessary attitude in learning and research

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Introduction

Let me start by turning the above title around and examine the counter proposition that learning and research do not need an attitude of trust. Indeed, the way in which modern governments wrap controls, accountability and deliverables into higher education betokens a complete lack of trust in teachers, researchers and administrators. One may even go so far as to assert that to have trust in what one receives as teachings or research findings ought to be treated with caution and severely challenged to determine the extent to which they withstand criticism. Trust then becomes a soft, if not lazy, response to what is on offer. Can grant application examiners afford to trust the assertions of the supplicant? How much documentation does one need to provide to establish identity and qualifications? And yet without trust the system will grind to a shuddering halt.

The legal principle *caveat emptor* implies that the purchaser has to be on guard against the predations of the seller. Were a sale to be made then, notwithstanding the misgivings of the purchaser, goods and money will have changed hands. This tells us that in accepting a proposition the purchaser takes a chance.

This chapter consist of an examination of what it means to take a chance and the extent to which an attitude of trust influences the evaluation of the decision to act. This will use the elements of the system of higher education as exemplars of situations in which both trust and distrust exist of necessity as counteracting influences that govern the behaviour of the taught and the teacher/researchers. This implies that we control our position on the trust–distrust axis so as to arrive at outcomes of maximum benefit. How we may do this in the context of higher education will be examined further below.

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[2]In writing this paper the author has been informed by his experiences working as a Biochemical Engineer in major industries for 7 years followed by leading a group that was developing enhanced processes for the production of foot and mouth disease vaccines at a government research laboratory (10 years) when he moved to the University of Surrey as a Professor of Microbiology and Head of the Department of Microbiology. After 10 years he was appointed to a Professorship in Science and Engineering Ethics, which he held for 9 years before being appointed Emeritus Professor of Science and Engineering Ethics.

Trust

From the point of view of the individual, trust is an essential attitude if one is to operate in the world. From the moment of conception, humans relate to the world outside themselves on the basis of trust. They learn that their sense organs provide them with a set of signals that enable them to survive. They respond with eating movements when presented with food and make the necessary noises when irritated by excretions. The material world becomes ever clearer and physical as they relate what they see to the pressure sensors of their hands and feet. As they can remember such sensations and the associated images and sounds, they begin to trust such relationships and use them to acquire more knowledge of their world and its properties. This is a process that continues until their final demise. Somewhere in the first third of this progression, the individual might experience an exposure to higher education.

Trust then is the essential link between the individual and the world. If the nature of that link is violated and despoiled then living would become unsustainable. At the same time, the learned relationships between sensations and the physical world that are conjectured by the mind cannot be taken for granted; things change. Realities are not fixed in time and space, and as we cannot arrive at the truths about our world, we have to rely on what we trust to be close approximations or our best guesses.

Although we may not be able to check up on a purported truth or statement about the world, we continually examine the collateral evidence that enables us to accept what is presented. What is the source of information? Is it a reputable source? Does it check out when examined? What do others think? How did others fare when exposed to the same treatment?

Although we hold (as our best guess) that there is an objective world out there, we can only relate to that world via our subjective feelings of confidence, reliability and trust. When that trust is found wanting, the relationship between that person and what was trusted is severely damaged. To regain trust and confidence there has to be an extended relearning process that takes time and effort, much more time than was devoted to the initial generating of the original trust.

However, when there is trust and that trust has been tested and found to be sound, then the confidence to build, innovate and take risks for progress follows. The need for defensive attitudes is set aside and the positive gains from open and transparent interactions between trusting individuals can flower. An expanding universe of discourse and action becomes available from which all can benefit.

Higher education

There is not a single definition for the term higher education. In some spheres it is related to any formal education for students who are over a certain age, normally ≥17 years. Others discount certain training courses in subject areas that do not have the intellectual rigour of the traditional subjects taught in universities. In general, it is recognized that in higher education, there are undergraduate,

postgraduate and research training courses for students seeking degrees and higher degrees. In such educational experiences students are exposed to descriptions of specific areas of knowledge, some understanding of the way things and people work, and training in various skills and arts. These abilities enable the practical examination of what is, and the construction or manipulation of materials of the physical, social, commercial and industrial worlds.

However, higher education is not just the relationship between academics (teachers) and students (learners). The institution that delivers this education is embedded in a matrix that includes the society at large, the government and its ministries as well as the business and commercial worlds. The institutions that constitute the higher education world are themselves complex organs of government, policy, administration and executive action. For the most part, much of the funding for the operation of the institutes of higher education comes from the taxpaying members of the society as modulated by the maw of the government and its ministries, although at the time of writing, a higher proportion of the financial support for the higher education system is being extracted from students. However, notwithstanding this source of funding the government maintains a controlling interest in what happens in higher education by its control of the funding purse. The way it imposes this influence determines the trust relationship between the institutions and their controllers.

In most countries with higher education systems, it is becoming more evident that the government and its ministries are less trusting of the higher education establishments that they part-fund as time, progresses [1]. The manifestations of this thinning of the degree of trust are to be seen in the way the universities are required to comply with a variety of 'control' instruments. These vary from country to country and with time, but normally contain elements such as rules, regulations, recommendations, protocols, audits, reviews, inspections, assessments, referees, evaluations, league tables and benchmarks. These have the cumulative effect of disenfranchising the academic from his or her vocation, which is to teach in a way that they believe will provide the students with the most benefit. They create an atmosphere of compliance. Deviance and experimentation are shunned. Adherence to teaching protocols, curriculum topics, and examination rules and regulations is required. Trust is clearly at low ebb.

This distrust applies to the funding of research students as well. In the mid-1980s, a new approach to research funding was instituted in the U.K. and the U.S.A. There was a basic change of attitude on the part of the funding agencies, which now encouraged competition between researchers for a limited supply of research funds. As it was recognized that such a requirement may lead to cheating and fraud, the funding agencies in the U.S.A., particularly the NIH (National Institutes of Health) and the NSF (National Science Foundation), required that all those who won in the competition for grants should be educated in research ethics. The promotion of such teachings was supported by the NSF and the ABET (Accreditation Board for Engineering and Technology) who now examine engineering students in ethics. In the U.S.A., an ORI (Office for Research Integrity) was instituted. Cases of falsification, fabrication and plagiarism that were beyond the legislative or regulative capability of individual universities were referred to this agency.

In addition to these changes, Higher Education Institutions are now being vigorously urged to engage with commerce and industry and provide the latter with the innovations that will lead to new companies and jobs [2]. Indeed, it is expected that the educational institutions will acquire more funding from such outside agencies, which will relieve the pressure on the government to provide funds for higher education. There is also much talk about the possible privatization of the university system. This implies a new set of relationships that have unique trust conditions. Commerce and industry are driven to achieve profits for stakeholders (although in the larger companies much activity seeks to expand the area of authority of individual managers irrespective of the effect that it has on the bottom line). In such situations companies can take advantage of the need for academics to acquire funding from industry by providing opportunities to test materials, drugs and equipment as part of the research activities of the university.

Teaching students

It is often held that the teaching process involves the transference of the material in the lecturer's notes to the notes of the pupil without going through the head of either. Indeed, Kevin Carey's commentary in *The Chronicle of Higher Education* (28 January 2011) notes that when the Collegiate Learning Assessment test was applied to a statistically representative group of students from 24 U.S. colleges, approximately 36% of students learned nothing from their 4-year college education. It was the students who were engaged with the humanities, social sciences, hard sciences and maths, as opposed to business studies, education and social work, who were required to read widely and deeply, who did not spend much time earning money to pay their fees and who did not engage in campus club activities who made most progress in learning [3].

To understand the position of trust in the process of education it is first necessary to obtain a sense of what the educator seeks to achieve. In the first instance a rough set of targets for an educator might be to:

- Inspire curiosity
- Inculcate criticality
- Instil capability
- Institute communicability
- Induce competitiveness
- Infuse cooperativeness

It all begins by being curious. Without curiosity it is difficult to motivate the learning process that leads to capability. However, such a learning process has to be gated by an attitude of criticality. What one learns needs to be examined, tested, checked and reviewed to determine the reliability with which it can constitute an element of one's learning, memory or tool set. This implies that the trust that is expressed when a student believes the statements of a teacher have to be less than total. Of course, the degree of distrust will depend on the subject area. In

physics, engineering, chemistry and biology the lecturer might include practical demonstrations of the material being taught. In these subjects the students may perform experiments themselves. They may come to learn that what they are taught and what they experience is never quite as cut and dried as the assertions of the textbook, lecturer or demonstrator. Indeed, the application of the scientific method does not deliver truth or perfect laws and relationships. Rather, the testing of hypotheses (or guesses) cannot prove anything, but it does deliver a change in the level of confidence or trust one might have in the hypothesis that is under examination. When stringent tests of diverse kinds have been applied to a hypothesis and it has withstood the need to be altered, then the level of confidence may build up to levels where we consider the hypothesis to be a theory or law. However, such a trust in a well-tested hypothesis may yet come adrift as information builds and new instruments and techniques are developed. For example we have:

- The flat earth became a spherical earth
- A universe that just existed became one that had an origin (singularity)
- An earth-centred solar system became a sun-centred solar system
- A cooling earth became a warming earth
- Life was created changed to life emerged and evolved
- From a continuously variable world to a quantized world
- From an immaterial mind to a materially based mind
- From a system of humours to a blood circulation system
- From a largely empty universe to a universe with dark matter and energy
- From a universe without an ether to one that expresses an energy field background of emergent and disappearing energetic entities
- From all dinosaurs being cold blooded to at least some of them being warm blooded

In other subject areas the need for criticality or distrust is even more necessary. The teaching of history, sociology, psychology, philosophy, ethology, anthropology, archaeology, economics and the like requires a critical attitude because in each of these areas, the evidence that is adduced to assert hypotheses is less than complete, less than accurate and less than wholly reliable.

In the U.K., there has developed a suspicion that academic standards have fallen. This engenders a degree of distrust by the public in the processes of higher education. They realize that the academy is under financial pressure and that one solution is to take on more students [4]. This changes the student/teacher ratio, and teaching has to become more efficient (teach more students for less money). It also means the mechanization of examination procedures (multiple choice questionnaires marked by computers) and the virtual elimination of the personal tutorial. The careful nurturing of the developing mind is of a lower priority than the processing of the maximum number for the minimum of funds.

So, whereas an attitude of trust is necessary as a first-order approach to learning, it is just as important to retain a critical (distrustful) frame of mind and to challenge the seeming or purported truths that are presented.

Research

Researchers in higher education engage in three major activities. First, they engage in investigations using a method akin to the scientific method described above. Secondly, they publish their findings, and thirdly they have to apply for grants in order to finance their continuing investigations. Whereas a student might have some reservations about the taught material (subject dependent), the researcher has a full-time job in challenging the hypotheses of the day. At a time when a convincing story can be told with an acceptable degree of certainty (never 100%) the researcher writes a paper setting out a hypothesis to be tested, the test system(s) and the results of the application of the tests or experiments. This paper is sent to a journal for review and publication. The reviewing referees examine the paper for consistency with the existing literature and knowledge base and on occasion they may suspect that the paper authors have fabricated or falsified data. They may also note instances of plagiarism particularly as it is possible to check texts electronically. So, the reviewer approaches the document in a questioning state of mind. Although, in the first instance a reviewer may give the benefit of the doubt to the author, he or she has to be convinced that the work is genuine and also progresses the addressed field of endeavour. This requires both a trust that the work was effected as reported and that some progress has been effected thereby. It should be noted that authors often complain that in the review process their work has been stolen, that the reviewers have taken an excessive time in the review process so as to publish their own work first, that the reviewer's comments are inappropriate or wrong and that the reviewer has misunderstood the basic tenets of the paper. The submission of a paper therefore constitutes, of necessity, an act of trust.

It is not dissimilar in the writing of a grant application. Here, the researcher knows that the incumbents on the reviewing board may, either consciously or subconsciously, steal ideas and methods from the submission. On the other hand, the board is often presented with claims in the application that are distortions and exaggerations of what is the state of the research of the applicant and what the applicant asserts is achievable during the tenure of the grant. Again, this material is taken on trust, but with reservation. If all applicants are to be distrusted then there would not be any grants awarded. So there has to be some degree of trust both on the part of the applicant and on the part of the reviewing board.

Other stratagems are brought into play. A principal investigator may apply for a grant application on the basis of work that has already been carried out, but not yet published. Alternatively, the amount of money requested may be more than that required to achieve the aims of the application, in which case additional research may be carried out to provide the basis for the next grant application. Aspiring researchers starting without these facilities are severely disadvantaged when in open competition with principal investigators with a track record up their sleeve. Under such conditions, how can the system inspire trust?

The researcher has other ways of presenting his or her results. At conferences, verbal or poster presentations are made and the participants have the option of questioning the author and affirming the value of the experimentation. Additionally, work may be ensconced in a patent so as to acquire intellectual

property. Here, the trust system comes to the fore as, although the patent is supposed to provide a description of the method such that a person active in the field can produce the same results, the document filed is often full of ambiguities and variances that prevent the ready adaptation of the intellectual property to practical methods. When a researcher is aware that his or her research is directed towards the obtaining of intellectual property, it is necessary that such research remains secret until the patent is issued. During such a period issues of trust of fellow researchers and competitors becomes paramount.

The relationship of trust between the broadcast media and the researcher is fraught. Although it is often possible to have a full and frank exchange with a reporter who is well versed in the area of the research, the presentation in the press is often under a headline that distorts the basic thrust of the message as purveyed by the researcher. However, there is little doubt that many programmes presenting science via television and radio enable researchers to address directly a wide public in a way that is consistent with what they hold to be their best guesses. The building of a relationship of trust between researchers and the general public is a necessary condition of modern living. The extent to which this is achieved is uneven. Notwithstanding the best efforts of the researcher, there seems to be a vocal minority of individuals who refuse to trust the statements of researchers [5]. This has the effect of making researchers wary of expressing themselves in public and thus creating a sense of distrust.

There is another relationship that needs to be examined; this is the relationship between a research student and his or her mentor and/or supervisor (in some North American universities this may be one or two people). There are many areas where students may feel aggrieved with the behaviour of their boss; whether it is a lack of acknowledgement or indifference, sometimes there are personal issues, at other times the issues are financial. Yet, notwithstanding these impediments to a fruitful teaching–mentoring relationship, research students do produce theses and go on to other laboratories. In these often difficult relationships, trust is high in demand but scarce in supply.

The professional academic

Hippocrates (~460–370 B.C.E.) tackled the problem of the distrust of medical specialists by members of the public by swearing an oath that contained commitments to ‘do no harm’ and to respect with confidentiality the situation of the patient. This commitment to an oath administered by a society of peers has become a method of enabling individuals with special skills and knowledge to practise their calling in a way that is acceptable to the general public. At present, teachers and researchers do not engage in such a relationship with the public. It may be that were they to adopt such a mechanism, there would be an easing in the relationship of trust between academics and the general public. To achieve this end institutions have to be established that regulate and affirm the education of the academic (in theory and practice) to create and use a code of conduct whose terms are available for public scrutiny and maintain a membership register of fully qualified and committed teachers and researchers. In this way academics may join

their colleagues in medicine, dentistry, law, architecture, surveying, engineering (all sub-disciplines), biology and others.

Trust in Higher Education Institutions: conclusions

The proposition that trust is a necessary attitude in learning and research cannot be faulted. It can, however, be qualified. As trust is an emotion, it can be expressed in varying degrees. A high degree of trust signifies that a person can engage in a relationship with a person or thing with a high degree of certainty, confidence, reliability, assurance and dependability. One's relationship with the surrounding world is of this nature (except when in the presence of a practising magician or illusionist). When it comes to dealing with other universes, heavenly beings, ghosts and spirits, one generally has a low degree of trust in such entities. This dichotomy is also present in academia. Depending on subject area, imparted information, demonstrations and other teaching and learning devices, a student will have adopted a degree of trust that is consonant with the application of a critical attitude and further readings or experimentation. In the area of research, trust is given, taken and, on occasion, abused. Some of the issues surrounding this situation may be resolved by the professionalism of the student researcher and his or her mentor or principal investigator. The achievement of professional status may be the gateway into a more trusting relationship between academia, researchers and the wider public. Yes, it is necessary for the incumbents of the domain of higher education to express an attitude of trust, but such trust needs to be tempered with caution, reserve and testing.

Comments by Jens Erik Fenstad[3]

People similar to myself, scientists with some additional experience from university administration, research councils and other grant-giving institutions, and often with a background from various types of international organizations in science and science policy, are much concerned with the issue of trust, or rather with the growing phenomenon of distrust in higher education and research that we now witness. Some of us belong to the generation who had their formative years in the early post-war period, when science was held in high esteem (so we claim), when money flowed freely, with few questions asked. The situation has changed, the flow of money is no longer so free, and words such as distrust, duty, responsibility and accountability are hitting hard. We are justifiably concerned, and we have strong opinions. But, beyond mere opinions and personal experiences, do we have the necessary knowledge to meet the current challenges to the higher educational system?

Such knowledge exists and it is the merit of Spier's paper that he starts with a general discussion of the notion of trust. However, Spier's paper is very general, and at times almost inspirational in tone, which may be necessary when you argue for immediate action, but is not sufficient for long-term strategy and

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planning. In an editorial in 2007 in the *European Review*, 'Worrying about trust', Piotr Sztompka [6] gives a brief introduction to the topic of trust as "one of the central research topics in sociology and political science". My point here is that we need to bridge the gap between the opinions of the practitioners and the knowledge of the professionals if we are to develop successful strategies to deal with the challenge of trust in higher education.

The issue of trust has many dimensions. To quote Sztompka [6]:

> *"One important line of research on trust has focused on so-called 'vertical trust', 'political trust' or 'public trust', meaning trust toward government and other institutions of the state (as opposed to 'horizontal trust', among common people). Increasing evidence indicates that 'vertical trust' in rulers and institutions of rule has been consistently decaying and turning to indifference and active distrust."*

I have included this quote from Sztompka to highlight that the vertical distrust we experience in institutes of higher education and research is part of a phenomenon common to many types of institutions. There is no easy answer to why we experience this increase in distrust. On a very superficial level we may assert that it has to do with the increased internal complexity combined with the increased external importance of these institutions. The causes of this distrust may be similar to all these institutions, but will or should the response necessarily be the same? It is here that our awareness of the gap noted above becomes important. Quite naturally, the government and other official bodies seek general answers and methodologies to deal with questions of trust and accountability. Since they have their agents within the higher educational system, i.e. the increasing body of internal administrators, the general methodologies are also imposed, with few questions asked, on this system. People on the other side of the gap, i.e. professors and students, may be upset, but indignation and mere opinion is not enough. Knowledge, both sound empirical and sharp theoretical, is needed to build systems that balance freedom and accountability in a reasonable way.

I have little to add to Spier's thoughtful discussion of the importance of horizontal trust within the Higher Education Institutions, particularly the relationship between student and teacher, both at elementary and research levels. I shall rather follow up with a brief comment on his remarks on social responsibility. This is an issue of horizontal trust where the collective 'we' of the academic profession is replaced by the single individual and his or her duties towards society.

Academic Duty is the title of a 1997 book by the former president of Stanford University, Donald Kennedy [7]. I have discussed his book and similar themes in a recent article, 'Science between freedom and responsibility' [8], where I note that:

> *"Kennedy points to a certain imbalance or lack of awareness in the scientific community. Freedom is a widely shared value. But freedom has a counterpart, duty, which means an acceptance of individual responsibility. Everyone – scientist or not – has a duty to see his or her activity in a broader social and ethical context."*

Jane Lubchenco, the current head of the NOAA (National Oceanic and Atmospheric Administration), voiced a similar concern in her retiring presidential address in 1998 to the AAAS (American Association for the Advancement of Science) [9]. She points out how science and, we may add, the higher educational system, had been successful and thus earned the freedom and trust it enjoyed under the old social contract, which was valid for a long period after the Second World War. But now, she argues, the "immediate and real challenges facing us have not been fully appreciated nor properly acknowledged by the community of scientists whose responsibility it is, and will be, to meet them". A similar challenge was issued by John Holdren, the current Science Advisor in President Obama's Administration, in his presidential address in 2008 to the AAAS [10]. In the final paragraph he discusses what more individuals can do. He urges everyone concerned with these issues to go out into society to participate and to argue, "indeed to 'tithe' 10% of your professional time and effort working in these and other ways to increase the benefits of S&T [science and technology] for the human condition and to decrease the liabilities". If we read Lubchenco and Holdren in a broad enough sense, we see a duty for all in the higher educational system. Academics tend to complain about what is done to them, but few will listen. Perhaps to 'tithe 10%' as Holdren suggests, will be a necessary, but not sufficient, step towards rebuilding the freedom of and trust in the higher educational system.

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