Two Great Problems of Learning

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Abstract
Two great problems of learning confront humanity: learning about the universe, and learning how to live wisely. The first problem was solved with the creation of modern science, but the second problem has not been solved. This combination puts humanity into a situation of unprecedented danger. In order to solve the second problem we need to learn from our solution to the first problem. This requires that we bring about a revolution in the overall aims and methods of academic inquiry, so that it takes up its proper task of promoting wisdom.

Two great problems of learning confront humanity: learning about the nature of the universe and about ourselves as a part of the universe, and learning how to live wisely.

The first problem was cracked, in essence, in the 17th century, with the creation of modern science. A *method* was discovered for progressively improving knowledge and understanding of the natural world, the famous empirical method of science. There is of course much that we still do not know and understand, three or four centuries after the birth of modern science; nevertheless, during this time, science has immensely increased our knowledge and understanding, at an ever accelerating rate. And with this unprecedented increase in scientific knowledge and understanding has come a cascade of technological discoveries and developments which have transformed the human condition.

But the second great problem of learning has not yet been solved. And this puts us in a situation of unprecedented danger. Solving the first problem without also solving the second is bound to create a situation of great danger. Indeed, all our current global problems can be traced back, in one way or another, to this source.

For solving the first great problem of learning enormously increases our power to act, via the increase of scientific knowledge and technological know-how. But without wisdom - without a solution to the second problem of learning - our immensely increased power to act may have good consequences, but will as often as not have all sorts of harmful consequences, whether intended or not. And just this is an all too apparent feature of our world. Science and technology have been used in endless ways for human benefit, but have also been used to wreak havoc, whether intentionally, in war and acts of terror, or unintentionally, in long-term environmental damage - a consequence of growth of population, industry and agriculture, made possible by growth of technology. As long as humanity's power to act was limited, lack of wisdom did not matter too much: we lacked the means to inflict too much damage on ourselves or on the planet. But with the immense increase in our powers to act that we have achieved in the last century or so, our powers to destroy have become unprecedented and terrifying: global wisdom has become, not a luxury, but a necessity. Solving the second great problem of learning, now that we have solved the first one, has become our most urgent priority.

But how can we solve this second great problem, the problem of learning to live wisely? Can it be solved at all?

We can at least improve our ability to solve the second problem. But in order to do this, there is one vital step that we need to take. We need to learn from our solution to the first problem how to solve the second. That is, we need to learn from scientific progress how to make better social progress towards a wiser world.

This is not a new idea. It goes back to the Enlightenment of the 18th century. That was, indeed, the basic idea of the Enlightenment: to learn from scientific progress how to make social progress towards world enlightenment.

Unfortunately, in developing and implementing this profoundly important idea, the *philosophes* of the

Enlightenment blundered. They botched the job. They developed the idea in a seriously defective form, and it is this immensely influential, defective version of the idea, inherited from the 18th century that is built into the institutions of inquiry that we possess today. Our current traditions and institutions of learning, when judged from the standpoint of helping us learn how to become more enlightened, are defective and irrational in a wholesale and structural way, and it is this which, in the long term, sabotages our efforts to create a wiser world, and prevents us from avoiding the kind of horrors we have been exposed to during the 20th century.

The *philosophes* of the 18th century - Voltaire, Diderot, Condorcet and the rest - assumed, understandably enough, that the proper way to implement the Enlightenment idea was to develop social science alongside natural science. Francis Bacon had already stressed the importance of improving knowledge of the natural world in order to achieve social progress. The *philosophes* generalized this, holding that it is just as important to improve knowledge of the social world. Thus they set about creating the social sciences: history, anthropology, political economy, psychology, sociology.

This had an immense impact. Throughout the 19th century the diverse social sciences were developed, often by non-academics, in accordance with the Enlightenment idea. Gradually, universities took notice of these developments until, by the mid 20th century, all the diverse branches of the social sciences, as conceived of by the Enlightenment, were built into the institutional structure of universities as recognized academic disciplines.

But, from the standpoint of creating a kind of inquiry designed to help humanity learn how to live wisely, all this amounts to a series of monumental blunders.

In order to implement properly the basic Enlightenment idea of learning from scientific progress how to achieve social progress towards a wise world, it is essential to get the following three things right.

1. The progress-achieving methods of science need to be correctly identified.
2. These methods need to be correctly generalized so that they become fruitfully applicable to any worthwhile, problematic human endeavour, whatever the aims may be, and not just applicable to the scientific endeavour of improving knowledge.
3. The correctly generalized progress-achieving methods then need to be exploited correctly in the great human endeavour of trying to make social progress towards an enlightened, wise world.

Unfortunately, the Enlightenment got all three points disastrously wrong. That the *philosophes* made these blunders in the 18th century is forgivable; what is unforgivable is that these blunders still remain unrecognized and uncorrected today, over two centuries later. Instead of correcting the blunders, we have allowed our institutions of learning to be shaped by them as they have developed throughout the 19th and 20th centuries, so that now the blunders are an all-pervasive feature of our world.

The *first* blunder concerns the nature of the progress-achieving methods of science. Scientists and philosophers of science today make the assumption, inherited from the Enlightenment, that science makes progress because, in science, theories are assessed impartially on the basis of evidence alone, *no permanent assumption being made about the nature of the universe independent of evidence*. But this is a nonsense. However highly verified a theory may be by evidence, there will always be infinitely many rival theories that fit the available evidence just as well, but which, in an arbitrary way, make different predictions for unobserved phenomena. Thus, given Newtonian theory, one rival theory might assert that everything occurs as Newtonian theory predicts until midnight, when gravitation abruptly becomes a repulsive force; another might assert that everything occurs as Newtonian theory predicts except for pure gold spheres, each weighing 1,000 tons, less than a mile apart in outer space, which attract each other in accordance with an inverse cube law. One can set out to refute these disunified rivals to Newton ("disunified" because these theories all postulate an abrupt change in the laws of nature when specific conditions are realized), but as there are infinitely many of them, and each requires a different observation or experiment to be refuted, this may take some time.

In order to exclude these rival, empirically successful, but disunified theories, it is necessary for science to assume that there is an underlying unity in the laws of nature, the universe being comprehensible to that extent, so that explanations for phenomena exist to be discovered (ultimately in terms of the underlying unity of physical law). Highly empirically successful theories that are disunified and non-explanatory (because they postulate abrupt changes in physical laws) are rejected because they clash with the assumption that the universe is comprehensible.

At once it is clear that science is confronted by a fundamental dilemma. In order to proceed at all science must assume that the universe is comprehensible in some way, to some extent at least. But it is just here, concerning the ultimate nature of the universe, that we are most ignorant, and most likely to get things entirely wrong. Science both must, and cannot, assume knowledge about the ultimate nature of the universe.

The solution to this dilemma is to construe science as making a hierarchy of assumptions concerning the comprehensibility and knowability of the universe, less and less being assumed as one goes up the hierarchy. At the top of the hierarchy no more is assumed than that the universe is such that some knowledge can be acquired. This assumption is legitimately a permanent item of knowledge since, if false, knowledge cannot be acquired whatever is assumed. It stands a good chance of being true because it asserts so little. The less one asserts, the more likely it is that what one asserts is true. ("Ultimate reality is not a chicken" is very likely to be true, just because the assertion says so little, there being an awful lot of ways in which the universe can not be a chicken.) Lower down in the hierarchy, those assumptions are adopted which seem to lead to the greatest growth of empirical knowledge. These assumptions are revised in the light of the empirical success and failure of the scientific research programmes to which they give rise.

This hierarchical view, in stark contrast to the current orthodox conception of science, inherited from the Enlightenment, is the key to the success of modern science. The basic aim of science of discovering how, and to what extent, the universe is comprehensible is profoundly problematic; because of this, it is essential that we try to improve the aim, and associated methods, as we proceed, in the light of apparent scientific success and failure. In order to do this in the best possible way we need to represent our aim at a number of levels, from the specific and problematic to the highly unspecific and unproblematic, thus creating a framework of fixed aims and methods within which much more specific aims and methods of science may be progressively improved in the light of apparent empirical success and failure. The result is that, as we improve our knowledge about the world we are able to improve our knowledge about how to improve knowledge, the methodological key to the rapid progress of modern science.

The adoption and explicit implementation of this hierarchical view by the scientific community as the official, orthodox conception of science would correct the first blunder of the Enlightenment.

The *second* blunder arises in connection with generalizing the progress-achieving methods of science. The task, here, is to generalize correctly the progress-achieving methods of science to arrive at a conception of progress-achieving rationality, fruitfully applicable to any problematic, worthwhile human endeavour (science being just a special case). Needless to say, having failed to specify the methods of science properly, scientists and philosophers have also failed to arrive at the proper generalization of these methods. What we need to do in order to correct this second blunder is to take the above hierarchical conception of the progress-achieving methods of science as our starting point, and generalize that.

It is not just in science that aims are problematic; this is the case in life too, either because different aims conflict, or because what we believe to be desirable and realizable lacks one or other of these features, or both. Above all, the aim of creating a wiser world is inherently and profoundly problematic. Quite generally, then, and not just in science, whenever we pursue a problematic aim we need to represent the aim as a hierarchy of aims, from the specific and problematic at the bottom of the hierarchy, to the general and unproblematic at the top. In this way we provide ourselves with a framework within which we may improve more or less specific and problematic aims and methods as we proceed, learning from success and failure in practice what it is that is both of most value and realizable. Such a hierarchical conception of rationality is the proper generalization of the hierarchical conception of science.

So much for the second blunder, and how it is to be put right. We come now to the *third* blunder. This concerns, not *what* the methods of science are, but *to what* they should be applied, when appropriately generalized.

This is by far the most serious of the three blunders made by the Enlightenment. The basic Enlightenment idea, after all, is to learn from our solution to the first great problem of learning how to solve the second problem - to learn, that is, from scientific progress how to make social progress towards an enlightened world. Putting this idea into practice involves getting appropriately generalized

progress-achieving methods of science *into social life itself*! It involves getting progress-achieving methods into our institutions and ways of life, into government, industry, agriculture, commerce, international relations, the media, the arts, education. But in sharp contrast to all this, the Enlightenment sought to apply generalized scientific method, not to social *life*, but merely to social *science*! Instead of helping humanity learn how to become wiser by rational means, the Enlightenment sought merely to help social scientists improve knowledge of social phenomena. The outcome is that today academic inquiry devotes itself to acquiring knowledge of natural and social phenomena, but does not attempt to help humanity learn how to live more wisely. This is the blunder that is at the root of our current failure to have solved the second great problem of learning. It is at the root of *the* crisis of our times: possessing science without wisdom.

In order to correct this third, monumental and disastrous blunder, we need, as a first step, to bring about a revolution in the nature of academic inquiry, beginning with social inquiry and the humanities. Social inquiry is not primarily social *science*. Its proper basic task is to help humanity build into institutions and social life quite generally the progress-achieving methods of hierarchical rationality (arrived at by generalizing the progress-achieving methods of science as indicated above). Social inquiry (sociology, economics, anthropology and the rest) is thus social *methodology* or social *philosophy*. Its task is to help diverse valuable human endeavours and institutions gradually improve aims and methods so that the world may make social progress towards global enlightenment or wisdom. And the primary task of academic inquiry, more generally, becomes to help humanity solve its problems of living in increasingly rational, cooperative, enlightened ways. The basic aim of academic inquiry becomes to promote the growth of *wisdom* - wisdom being defined as the capacity to realize what is of value in life (and thus including knowledge and technological know-how). Those parts of academic inquiry devoted to improving knowledge, understanding and technological know-how contribute to the growth of wisdom.

We need, in short, as a matter of extreme urgency, to bring about a revolution in the overall aims and methods, the structure and character, of our traditions and institutions of learning, so that the basic aim becomes to help humanity learn how to live more wisely, by increasingly cooperative and rational means. The scientific task of improving knowledge and understanding of nature would become a part of the broader task of improving global wisdom. The upshot of bringing about this revolution would be that we would at last have learned from our solution to the first great problem of learning how to go about solving the second problem.

For further details see: N. Maxwell, *From Knowledge to Wisdom* (Blackwell, 1984). See also N. Maxwell, *What's Wrong With Science?* (Brans Head Books, 1976); *The Comprehensibility of the Universe* (Oxford University Press, 1998); *The Human World in the Physical Universe* (Rowman and Littlefield, 2002); *Is Science Neurotic?* (Imperial College Press, 2004).

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