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Some thoughts on Interdisciplinary Studies are expressed

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Article

During the past one or two decades, a new field is visible on the horizon of human thoughts - the field of Interdisciplinary Studies. These days a beautiful poster decorates at least one door in every university - The Institute for Interdisciplinary Studies. To avoid this becoming just the latest architectural fashion, it becomes necessary periodically to ask the question, " What, after all, is Interdisciplinary Studies other than a catch-phrase for something so nebulous that it can include everything, very much like the Theory Of Everything in physics?"

The reason for such a periodic "Quo Vadis, Interdisciplinary Studies?" is that otherwise the field is in the danger of becoming any other overspecialised field with no relation to other fields. What this means is that the individuals in such an institute are busy in their overspecialised interdisciplinary studies without knowing what their next door colleague is doing. For some fields , like mathematics, this unfortunate situation may be acceptable, but for interdisciplinary studies it becomes a contradiction in terms.

I am not capable of answering "Quo Vadis, Interdisciplinary Studies?" but at least I can try to answer "Quo Vadis, Mr. Mann?" in this paper

I divide the Interdisciplinary Universe into the following spectrum of Sub-universes:

The Mathematical Universe, The Physical Universe, The Biological Universe, The Psychological Universe, The Philosophical Universe, The Historical Universe, and The Literary Universe.

For me this particular order is very important because it demonstrates the basic differences between these Universes. If Mathematics and Literature are at the two extremes of this spectrum, there is a reason.

The main difference between them is that in mathematics everything is tightly woven through very exact definitions. In literature everything is loose and "anything goes". Another way

to say this is that to study mathematics you have to follow a very specific order like high school algebra to trigonometry to calculus. Without knowing trigonometry, you cannot proceed to calculus.

In literature you can start anywhere, like Hardy or Keats before Shakespeare. In principle you can be a very great writer and scholar of English without ever having heard of Shakespeare. Nothing in literature requires that you have to know or study Shakespeare to be a great writer in English. The fact that all English writers know of Shakespeare is purely "accidental" and is not by any "Intellectual Law or Decree".

In mathematics it is just the opposite. You have to know the ideas of leading mathematicians and that too in a specific order. Nobody can call himself a mathematician if he has not heard of Bernhard Riemann, and before knowing about the ideas of Riemann you have to know the ideas of Euclid. You cannot approach Riemann first and

Euclid later. By knowing the ideas of Riemann or Euclid, I do not mean you have to read their original works. It is usual and normal to use modern books instead of their original papers.

So the question arises: Can we talk about "interdisciplinary studies" between opposites like mathematics and literature, and how would that be defined?

I have problem in imagining such a study, but long before the term "Interdisciplinary Studies" existed, mathematicians like Bertrand Russell and Ludwig Wittgenstein carried out such a study of mathematics, philosophy, and language (not literature).

And their conclusions: they reduced philosophy to the study of language.

Whether we agree with their conclusions or not, this is a great example of "interdisciplinary studies" hundred years before the term itself existed.

Going back to the spectrum of the Intellectual Sub-universes, we notice that as we proceed from mathematics to literature, the exactness and the tightness decreases and the vagueness increases. Already physics is not so exact and tightly bound as mathematics. Mathematicians are never tired of complaining about the lack of rigour (tightness) of many physical theories. And in physics you can be a great theoretical physicist without ever having stepped inside a physics laboratory. In other words, like literature, there is no law or decree which says that in order to be a great physicist you have to know experimental physics. If today I (a small theoretical physicist) visit a physics laboratory, I may not even know the names of the various apparatus in the lab.

Towards the other end of the spectrum, philosophy is quite vague with many interpretations of the same ideas, but it is still tighter than literature - philosophers cannot talk of witches flying on brooms with impunity as writers often do with glee.

Again, long before the label existed, interdisciplinary studies in physics and philosophy have been a very respected field. And I assume this field is one major component of any Institute of Interdisciplinary studies. Unfortunately, philosophy has acquired a bad reputation in many physics circles. The reason is that some "philosophers" misuse the inherent vagueness in philosophy to make equally vague statements about physics, which is wrong because physics is much more exact. But except for this misuse, the interplay between physics and philosophy is not only healthy but absolutely necessary.

I personally do not know of any interdisciplinary study of mathematics or physics and history. Here the history of mathematics or of physics is not regarded as an interdisciplinary study. To me history of mathematics or physics is a part of mathematics or physics. I had a more exotic or weird interdisciplinary study in mind like that of mathematics and the history of the Second World War. To my knowledge such an interdisciplinary study does not exist - the usefulness of such a study may itself be called to question.

Now I state my First Principle of Interdisciplinary Studies:

In the spectrum of the Intellectual Universe, the closer two Sub-universes are, the greater the chances of a very fruitful interdisciplinary study of them leading not just to new insights but also to concrete new results. Conversely, the further the Sub-universes are from one another, the lesser the chances of a really fruitful study or really new scientific results.

This principle explains why the interdisciplinary study of neighbours like mathematics and physics has been so fruitful since the past two thousand years, even though nobody used the " Interdisciplinary" word.

In principle, there should be no problem in extending the spectrum by including other fields. The benchmark rule is how exact and tight the field is compared to mathematics. By this rule, chemistry can easily be included after physics. I find it reasonable to include economics after chemistry. The reason is that economics, like chemistry, is "exact enough" to interact with mathematics, but the fundamental concepts of economics are more vague than those of chemistry - sometimes they are just vague psychological concepts.

As I said before, philosophy can enter into an "Interdisciplinary Hug" with any other field. But because of its intrinsic vagueness, this "Bear Hug" may not be so useful to the other field or fields.

In future the real and most fruitful "Interdisciplinary Hug" would be between mathematics, physics, biology, and to some extent psychology. This "Interdisciplinary Hug" will define the twenty first century, just as the "Bear Hug" defined the cold war.