

Trick or Truth: The Mysterious Connection between

Physics and Mathematics

by

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1. INTRODUCTION

There is a growing tendency, albeit, not just in the natural sciences, but in all the academic disciplines to emerge as unique research programmes in their own right. This, most especially in Nigeria is often necessitated by the need to be allocated research grants that could exclusively be disbursed to them as opposed to being lumped in a conglomerate of departments in a Faculty that would be of less impact in their research initiatives.

While some universities, for instance, treat geography as a natural science; others are seen to accommodate it in their departmental structure as a social science. To most curriculum connoisseurs, this veering from one discipline to another does not really matter. What matters to them is rather the contributions of such a newly carved out discipline to the collective repository of knowledge it avails mankind.

In much the same vein, there are some academic disciplines that are often seen to have derived their explanatory impetus of natural phenomena from other disciplines. Physics is one of such disciplines. The literature on perceived co-operative relations between physics and other interdisciplinary areas of research is replete with instances such as its intersection with biophysics, quantum chemistry and mathematics; to mention but a few.

Mention has also been made as to whether these connections are a product of “trick” or “truth”. These conflicting views are not out of place in the scientific discourse. Rather than being out of place, I see their emerging propositions as furthering the transmission of knowledge from one age to another. I see this

essay doing just that; more so; as one would be expected to establish whether the mysterious connection between physics and mathematics is either a “trick” or “truth”.

One cannot poach on a subject matter such as concerns “Trick or Truth: The Mysterious Connection between Physics and Mathematics” without first embarking on a proper definition of the index terms inherent in it. The imperative of this cannot be overemphasised; more so; as it makes for a proper understanding of what is being communicated to the recipients of such an intellectual exercise.

2. DEFINITION OF INDEX TERMS

Words must be duly explained or defined otherwise uncertainty could blurr the true meaning of what one is trying to convey in a subject matter. In this essay, four index terms have been identified namely: trick, truth, physics and mathematics. We shall try the much we can to explain each and every one of them beginning with the word: trick.

2.1. TRICK

The free Dictionary in its notes and comments on the word: trick did outline several meanings to it. Two of these definitions caught my attention. One of them saw the word: trick as “an indirect means to gain an end”, while the other sees it as having to do with “an indirect, usually cunning means of gaining an end”. For the purpose of this essay, we shall suffice with the definition which sees “trick” as “an indirect means to gain an end”.

2.2. TRUTH

From a philosophical premise, “truth” is most often used to mean being in accord with fact or reality, or fidelity to an original or to a standard or ideal. Falsehood is the commonly understood opposite of “truth”.

2.3. PHYSICS

Physics is defined as the branch of science concerned with the nature and properties of matter and energy.

2.4. MATHEMATICS

Mathematics is the abstract science of number, quantity and space, either as abstract concepts (pure mathematics), or as applied to other disciplines such as physics and engineering (applied mathematics).

Deductively, one is by this essay- “Trick or Truth: The Mysterious Connection between Physics and Mathematics” expected to establish whether the connection between physics and mathematics is premised on “trick” or “truth” So much on definitions. We now turn to the real dynamics of the co-operative relations between physics and mathematics.

3. PHYSICS AND MATHEMATICS CONNECTION: IS IT A DYNAMICS OF TRICK OR TRUTH?

Viewed against the background of the word: “trick” being seen “as an indirect means to gain an end”, the mysterious connection between “physics” and “mathematics” could only be seen as “trick” if the grounds of their intersection are outside the realm of the human mind. Conversely, it could be seen as “truth” if the point of their convergence is at the realm of the human mind. How is it so? One may ask . The answer is simple: both physics and mathematics are concerned with the workings of the human mind.

According to the assertions made on the Math-Physics Connection from Valdosta State University, mathematics is much, much more than just a tool of physics. The proponents of this school of thought went on to state that,

Since mathematics is a product of our imagination,
then somehow the structure of the universe itself
seems to be imprinted on the human mind.
And if that is the case the relationship between
Mathematics and physics does indeed boil down

to the chicken-and-the egg question.

Deductively, the mysterious connection between physics and mathematics cannot be said to be “an indirect means to gain an end” that is reminiscent of “trick” but a relationship that is “in accord with fact or reality”; just as “the chicken and the egg question” is a clear cut “truth”.

The literature on the mysterious connection between physics and mathematics is replete with several instances of a genuine co-operative relation that is “in accord with fact or reality”.

Albert Einstein, for instance, when confronted to explain the effectiveness of mathematics in the study of the physical world states that,

At this point an enigma presents itself which in
all ages has agitated inquiring minds. How can it
be that mathematics being after all a product of
human thought which is independent of experience,
is so admirably appropriate to the objects of reality?

Albert Einstein’s use of the phrase “admirably appropriate” as characterising the mysterious connection between physics and mathematics speaks volumes on the “truth-status” of the relationship. Even as his response to delineate mathematics and physics recounts:

For some results or discoveries,
it is difficult to say, to which area
they belong: to mathematics or
to physics.

This presupposes a blend between the two subjects devoid of “trick” that is usually achievable through “an indirect means to gain an end”. Eugene Wigner concurs with the afore-cited scholars when he states that,

The miracle of the appropriateness of the
language of mathematics for the formulation

of the laws of physics is a wonderful gift which
we neither understand nor deserve. We should
be grateful for it and hope that it will remain
valid in future research and that it will extend,
for better or for worse, to our pleasure, even
to our bafflement to wide branches of learning.

While much is written about the “truth-status” of the rapport between physics and mathematics, not much; if any; is written of its having sprung from “an indirect means to gain an end.” The dearth of literature on the latter as opposed to a relatively stupendous contribution on the former constitute a significant commentary on the “truth-status” of the connection between the two subjects. Why? Scientists hardly make incursions on propositions that are obviously fallacious. And perceiving the connection between physics and mathematics as being premised on trick is typical of such fallacies.

Physics is broadly understood to be the general analysis of nature conducted in order to understand how the universe behaves. Mathematics on the other hand is generally perceived by the Pythagoreans to be the language of nature. Thus, without the language of nature (mathematics) which serves as tool, the physicist cannot do much in his bid to understand how the universe behaves. Thus connected, both subjects can be said to have assumed the dimension of an inseparable coefficient and as such cannot be said to be premised on trick.

Especially indicative of this is the fact that before giving a mathematical proof for the formula for the volume of a sphere, Archimedes used physical reasoning to discover the solution. Certainly, this cannot be said to be “indirect means to gain an end”, which is what “trick” is, but an advertent resort “to a standard or ideal,” which is what “truth” stands to represent.

From the days of Pythagoras to the 19th Century when Mathematics became increasingly independent from physics, their functional perspective has always been that of a “tool” and “a rich source of inspiration and insight,” with mathematics playing the role of a tool for physics, while physics served as a rich source of inspiration and insight in mathematics. One could without

hesitation state that it is a symbiotic relationship that dated well before the Pythagorean era as opposed to a “trick” that was foisted on the flourishing co-operative relationship that exists between the two subjects.

As opposed to being foisted as a product of a “trick”, mathematicians had long predicted the needs of physics and advertently worked towards meeting such needs. As historians of the era recount:

The creation and development of calculus were strongly linked to the needs of physics. There was a need for a new mathematical language to deal with the new dynamics that had arisen from the work of scholars such as Galileo Galilei and Isaac Newton.

It is, however, worth mentioning that there was little distinction between physics and mathematics at that time. Physics was an inseparable coefficient of mathematics. The so called mysterious connection between the two subjects was thus “in accord with fact or reality, or fidelity to an original or to a standard or ideal” as to warrant their relationship being premised on “truth”. It was quite the contrary to a “trick”, which would otherwise have been foisted on them by “an indirect means to gain an end”.

Custodians of the literature on the mysterious connection between the two subjects saw the relationship as being premised on “truth” and not “trick”. Newton, for instance regarded geometry as a branch of mechanics, which is part and parcel of physics. It was an inseparable co-efficiency devoid of “trick” that has prevailed even currently with increasingly sophisticated mathematics such as “superstring theory” being used in physics.

4. CONCLUSION

From the foregoing, one cannot help but conclude that the mysterious connection between physics and mathematics is premised on truth.

Significant scholarly commentaries that give credence to the “truth-status” of the rapport between the two subjects range from their concern with the workings of the human mind; their symbiotic relationship , which sees mathematics as a tool for physics to the predisposition of physics in inspiring and giving insight to mathematics.

Thus, far from being premised on trick; one would not be wrong if we conclude this essay with the disposition that: of a truth physics is an inseparable coefficient of mathematics.

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