

DOING SCIENCE: A THEORETICAL EXPOSITION OF A DUALISED KNOWLEDGE PLATFORM AND THE NEW UNIVERSITY ENTRANT

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Abstract

The University as the apex level of learning can only be better appreciated in terms of its preoccupation as a definitive source for knowledge enrichment. With plethora of programmes, and an emphasis on specialisation, some narrow parochialism may well confront its entrant. This concern is checked by the encouragement of cross-disciplinary interests that find a staunch elaboration in the teaching and promotion of General Studies programmes. And for core students of Science and Technology, the problematic of grasping the idea of the “other science” has been a daunting task. By explaining the nature, character and components of a dualised Science, it is hoped that some understanding may be gained to help ameliorate the difficulties faced by both in accepting and comprehending the wholesome nature of the scientific realm. Thus, natural science and social science come under review in this paper as a preliminary exposition to the bifurcated world of science and how to appreciate its knowledge claims.

Key Words: Science, Social Science, Theory, Knowledge, Freshman

Introductory Note: The Idea of a University

University programmes operate at the apex level of knowledge acquisition, and mainly for the development of first-rated manpower. By implication therefore, Universities serve the useful purpose of human resource development through teaching and research necessary for the shaping and sharpening of minds and, indeed, for the development of a virile workforce. To be privileged to undergo university training then provides the individual a handsome opportunity to fully develop ones mental climate, and to realize potentials in its fullest extent.

Such enterprise, as university learning entails, bears on the exposition of the individual to scholastic rigour. The latter assumes a ramified character, and this is revealed in the plethora of disciplines to which interested parties are attracted to profoundly explore. The idea of the university then must be properly understood in terms of that process of academic engagement involving encounters between people of different vocational interests and within a multiplicity of disciplines. It is intended to raise a self-reliant individual developed in the best tradition of a critical mind. Thus, the primary basis for attaining and attending to university programmes is to acquire a critical mind that can enable one respond effectively and efficiently to the challenges of a literate and increasingly complex world.

In the university, with taught and research programmes, undergraduates and graduate students are treated to training and retraining programmes with credible information much needed to update knowledge and to attend to day- to day living. We cannot overstate then, the raging problematic that is associated with ignorance, and its inherently abhorrent status. It is with a view to confining ignorance to the backwaters that people undertake the task of updating information. For, only credible and valid information or knowledge can take us to the next level. Therefore, it is a worthy aspiration to make a choice for apex learning interests through obtaining admission and studying in a university.

Yet there is need to fully grasp the implication of such choice as admittance to face a life immersed in

rigour, as well as excitement. With the mixes of pleasure and pain, one can understand the universalism that characterizes a university. The latter, as institutions of learning, play host to programmes ordered as disciplinary engagements that straddle the Arts, Humanities, Management and Actuarial Sciences, Social Sciences and Natural Sciences. The menu is quite enormous to choose from. But it is often advised or, indeed, conventional to settle for one thing at a time. By so saying, it is anticipated that students draw on a particular discipline to begin a march towards specialisation in a field of endeavour.

By making a choice for a particular study, we find the other engaged students with a variety of disciplinary interests to suggest immediately to us the limitations we suffer in terms of the extent of knowledge there is to acquire, and what we can really afford at a specific point in time. What is emphasized on is that, in the plethora of courses or disciplines to which we do not rightly belong, there exists enormity of knowledge claim that is on offer, worth our attention, but to which we cannot completely lay claim. This obvious fact presents us with a remarkable reminder of our limitations for which reason we may be hemmed in by parochialism that stem from the pursuit of a specific kind of knowledge. Hence, the General Studies Programmes in Nigerian Universities have become mediatory study engagements through which we can be relieved of ever disturbing parochialism associated with pursuit of narrow knowledge claims.

Therefore, the National Universities Commission, the regulatory body entrusted with accreditation of university programmes, deems it necessary to enlarge the knowledge base of students to check the problematic of ignorance that stems from parochial academic pursuits by allowing first hand experience on cross disciplinary interests among university students and university taught programmes. As a matter of fact, it ranks as statutory that students must pass the programmes to make for their graduation. Thus, floating fine mixes of Arts, Science and Social Science programmes, students are enjoined to peruse through a view lens, to explore for themselves, what preoccupies other areas of knowledge.

This is most necessary to accord students a sense of balance in their perceptions of the extent of the knowledge arena and, more so, to enable them cultivate a habit of respect for their likes that are in pursuit of other kinds of knowledge claims. Hence, arts oriented students, in the context of the General Studies programmes, May be treated to such subjects like science and mankind; science students may be invited to explore challenges in cultural studies, education and social sciences, which hardly form the core of their choice disciplines. Being part of this intellectual exchange experience, over the years, have produced rewarding results as vast number of students can say, at least, something about others. Thus, it is with a concern for broadening the views of students to erase the problematic of parochialism that stem from narrow specialization that the General Studies programmes are instituted, and remain as an active educational force in Nigerian academia. So far, Arts and Social Science Students are encouraged to embrace the knowledge of science, just as Science and Technology students are welcome to the idea of Arts and Social Sciences. With this as backdrop, this paper seeks to serve the purpose of a preliminary exposition not only the idea of the University and the General Studies programmes, but more importantly, to make the case for a stand the Social Sciences to students of science and technological orientation.

In what follows, we shall be examining concerns about science - that knowledge-driven engagement to which all science and technology students tend to preoccupy themselves with. Essentially, the core of our interest is to expose the “other science” social science by way of interrogating the nature of the natural science order from where it purports to draw life. We intend that it serves as a springboard for launching our understanding of social sciences to which such programmes like “Nigerian and African Cultural Development” or “Polity and Economy of Nigeria” belongs.

The Experience of Science

Science is an ever-engaging experiential concern. In current terms, there is a driving preoccupation with science, the scientific disciplines and scientific investigations. Therefore, given its ever- engaging nature, it will not be out of place to talk about the ubiquity of science, as science connotes an ever-present reality. Indeed, it expresses our constant, if consistent, effort to understand as it “Is”. Basically, because it points up to our effort to understand nature, science depicts knowledge knowledge of nature as it “is” rather than what it “ought to be”. To the extent that it hardly escapes our memory, then, the ubiquity of science can easily be felt in the reality of technological products emerging from it that make their presence before us. From the packaging of sweets to consumption of drugs, the constant uses of refined products of nature, and even the invention of synthetic products, we articulate concerns about pains and pleasure before the alter of science.

Today's world then, is essentially a technologically driven world that is predicated on science. The

impact of science has taken considerable toll on populations globally. It dictates and determines the pace of human and material development that can be assigned to respective locales. Certainly, it appears that there is no way we can deny or ignore the heavy presence of science in our world. In a nutshell, we are left to admit that the globe is affected with science, and can only get better with more science. This is particularly so in our ever increasing quest for precision and incontrovertible information.

Often times, when we preoccupy our minds with science and scientific development, it is usually to natural sciences that we think about, focus and draw upon. To this end, the reality of its nature appears a bit confounding. As a subject matter, the very nature of science admits more than a single shade of interest.

While scientific knowledge allows us to reason towards the natural sciences, it little occurs to us that there also exists the "other science". Natural science then, is not, and does not exclusively provide as the single shade of interest in the realm of scientific interests. Therefore, much as natural science exists and exerts enormous influence on society, it is not completely right to assume that it speaks all the truth in defining the wholesome nature of the scientific enterprise. Perhaps we need to note that we derive the scientific enterprise by observing and doing; and that in all of these, man is central to its articulation and successes.

It hardly occurs to us that much as reality or nature can be assessed from objective experimentations with inanimate elements in time and space, equally the same interest can be expressed and exercised in respect of man, who, himself, is the most important product of nature. Thus, whether man is studying nature by articulating his daily observations upon inanimate elements, or he is preoccupied with engaging self as a subject of scrutiny, we often sense the penchant to ascertain regularities in patterns of behaviour of the inanimate elements or pulsating human beings respectively. Persistent observations on regularities in patterns of behaviour through experiential endeavours allow us to dwell within the confines of an embedded scientific interest. For in both turns, man is both object and subject of scientific investigation, as both conductor and beneficiary of the outcomes that ensue from there. To the extent that man's behaviour can be subjected to careful observations enabling us not only to determine regularities in patterns of behaviours, but also in predicting outcomes on the basis of those observed regularities, man remains an object and subject matter of scientific investigation.

Scientific investigation, which more directly focuses on the actions and behaviours of man, invites us into the world of the social sciences. Here, a view lens is provided to study and understand man in terms of respective interests that range from his political and cultural origins, economic, behavioural and even his convergence in small groups. Hence, it makes sense to have an articulated study of man in the context of his organization for rule relationships (politics), his culture and origin in 'primitivity' (Anthropology), his relationship with production and distribution of wealth (Economics), his reading in terms of behaviour and attitudes (Psychology) and his organization as a group-driven being (Sociology).

From the foregoing, it implies that the world of science admits of a bifurcation into (a) the Natural Science and (b) the Social Science. In the latter case, Bluhm (1969:67) argues:

The behaviour of the individual person is taken as the basic unit of analysis. The relevant subject matters are the acts, attitudes, preferences, and expectations of Man in (social) contexts.

It is therefore, the case that the epicentre of the discourses in social science is man. He can be studied in terms of his organization of political life, economic, cultural origins, behaviours, and in his interactions/communication in small groups like wards, communities, nations and states.

To be sure, it would seem irrational to think that pulsating beings known for their flair for emotions can be held constant. Where this is very possible with inanimate objects, it proves rather difficult with man, whose persistent oscillations through love and hate have tended to affect the way he thinks and acts in varied circumstances. Such emotive considerations may well check our predictive abilities; and limit our quest for exactitude. It is in this respect that the enterprise of social science is often labelled inexact science.

By implication, the scientific realm is bifurcated into the strands of natural science and social science. Both strands represent spheres of knowledge claims with the aspiration to produce precise, if infallible, information upon which correct predictions and conclusions may be objectively derived from a

set of observed regularities.

Natural science is the more popular and the springboard for launching the other. But we do not need to forcibly latch on the world of social sciences. Essentially, the social sciences can be viewed as a derivative of the natural sciences. In an effort to understand social sciences then, it makes sense to note that there is need to properly explicate the nature and character of the natural sciences. For this, we intend to provide a comparative platform for appraising the social sciences. Firstly, however, we acknowledge that natural science, which comprise such disciplinary engagements represented by the likes of mathematics, physics, chemistry and biology, and all of its derivatives, represent a set of knowledge claims having inanimate objects or elements as the focal point of interest. In other words, it imposes a definite focus on nature as the phenomenon depicting reality.

The Logic of Science

Science is knowledge. Yet knowledge can be for a number of things and possesses degrees of correctness depending on the sources. Basically, the globe has for long been treated to three major sources of knowledge. These sources are drawn from the standpoints of *human intuition*, which allows us to accord some reverence to deep thought, particularly when they are employed to serve as explanations to extant puzzles facing human groups. *Magico-Religion* provides us with another vital source of knowledge generation, for we can sense the performing act of the magician or feel and believe the priests' and prophets' claims about the deities as real.

Both Intuition and Magico-Religion, although they purport to offer explanations about nature, are of limited utility as their knowledge claims appear closed to non-initiates and prevent them from proper verification. In other words, both stands admit of relatively low degree of openness as to permit doubts to be freely proven for correctness. Thus, deep thought, make believe, and the spiritual essence then, are usually difficult subjects of proof for the next person other than the one professing or practicing the act with respect to replication by others.

The third knowledge source draws on the value of experience. By going through similar experiences, we can replicate earlier outcomes and even arrive at similar conclusions. This knowledge source is regarded as *Empirical* or *Scientific knowledge*. For, not only does it allow us to share in earlier experiences, the open character of its procedures allows us to verify and validate or falsify claims and conclusions reached by others. Therefore, empirical knowledge, as scientific knowledge, aspires to permit the generation of credible generalisation which holds true and true at all places and every time. By its very nature, it is its habit to seek for exactitude. The fact, or exactitude therefore, defines the major preoccupation of science. Thus, scientific knowledge is employed to describe and explain reality by representing an issue as it “is”. Therefore, only empirical knowledge qualifies as real scientific knowledge.

The natural science is embedded in scientific knowledge. To assert such a claim is to admit that the experiences located in that context permit of empirically grounded facts. Thus, it can only plead for exactitude and abhors speculations. As noted by Kurzman (1988:131), “the feature which distinguishes scientific discourses from all others (is) the adherence to scientific logic”. Weber (1946:143) goes ahead to underscore such claim in his assertion that

All scientific work presupposes that the rules of logic and method are valid; these are the general foundations of our (scientific) orientation in the world.

Essentially, it would seem that the logic of science is predicated on observation of what constitutes reality. It is the observable regularities in pattern that scientific investigation relies on to reach credible and factual conclusions. Therefore, mere speculation or opinion does not pass for the factual until it has undergone sufficient scrutiny to stand the test as a valid scientific statement. Thus, “observation (constitutes) an innovative (and useful) method” for approaching scientific or empirical investigation (Dargie, 1998:66).

Scientific knowledge represents a unique kind of knowledge claim because it tends to represent reality or nature as it is. Thus, the specificity of scientific knowledge claims can better be appreciated in its persistent bearing on precision or exactitude. In this wise, accuracy of information based on observable data cannot be compromised. Indeed, we often think of mathematical exactitude to qualify the acute observations and conclusions reached as scientific investigation. Thus, a triangle, as a label, must of necessity, assume three angles and three sides with the summation of all the angles at 180 degrees; a square

also assumes the identity of an object of four equal sides and equal angles of 90 degrees each to make up a total sum of 360 degrees in all. For these objects, these characteristics hold true and true always irrespective of time and space, or whatever emotive interests we bear for them.

Therefore, it is the character of natural science that it allows no emotive interest from its practitioners or adherents. Hence, we tend to argue that scientific investigation must be entirely devoid of emotion in order to check distortion. It is in this respect that we assign to science the idea of being value free. For emotive interests taint the results that we reach such that our quest for exactitude or the factual becomes breached. As an empirically grounded engagement, natural science investigations rely very much on “the emphasis on the correctness of lived experience...” (Bruyn, 1966-7:317) derived from a detached stance from object of investigation to underscore their bearing with objectivity. Hence, Waizbord (2003:152) argues that, in drawing from scientific investigation,

it is in the nature of the empirical and methodological advances of the natural sciences (to ensure the) exert(ion) of considerable material and ideological influence on the history of societies, cultures and human lives. Reproducible experiences and controlled observations are taken as methodological exigencies for a discipline to be considered scientific and objective and not simply an illusory construction of the human mind unrelated to either natural or social reality.

Indeed, the concerns expressed above have serious implications for understanding our endeavour in appreciating social scientific discourse in particular. For, in several instances that pretend to offer objective analysis of the situation, we find that there have been several intrusions that succeeded in rendering its 'science' subjective. This concern can easily be felt in earlier representations of colonial anthropologists, also considered to be doing science, who offered many value-laden observations on indigenous societies. Today, it is doubtful if those earlier claims can stand the test as they are being refuted in the process of verification and validation made possible by the scientific method. Essentially, we need to approach science as the search for truth or reality. This is not considered in relativistic terms. Science seeks to deliver the truth as it “is” such that we can understand the real nature, character and patterns of the phenomenon called reality.

Therefore, the emphasis on scientific investigation entails, among other things, being able to describe and explain the phenomenon of reality in very precise terms. This would imply that scientific investigation is a fact-driven endeavour that seeks to understand what “is” rather than engage in what “ought to be”. By such characterization, emotive interests are usually kept outside of the confines of science. The intrusion of emotion into scientific investigation tends to taint the characterisation of reality. Thus, since it permits an investigator to inject value concerns which are apt to affect his findings, it is believed to diminish the worth and worthiness of science, properly so called. As such, where emotive interests prevail in the process of investigation, results or findings have tended to reveal subjective interests of the investigator. Ethical considerations are therefore, not admissible and permissible components of true, scientific investigation as they render our work value-laden.

The foregoing would imply that scientific investigation must display a penchant for value freeness. In other words, it is rational anticipation that all scientific investigators assume a disinterested disposition to the objects or elements of investigation. By so doing, the investigator succeeds in keeping values outside of his investigation to characterize his concerns as being value free. To the extent that the latter concern is achieved, such work, and the attendant findings, are said to be laced with objectivity. If a so-called scientific investigation is treated to doses of emotive interests, it tends to fall short of the expectations of objectivity in science, in being value-laden and therefore, subjective. At the same time, if the work reveals a dispassionate assessment in being considered value-free, it acquires the scientific character of being labelled objective. Thus, the true lot of scientific investigation is in attaining the status of objectivity. To this end, Waizbord (2004: 152) concurs that there is the “temptation to equate the natural sciences with objectivity....”

We need to note that once the nature of science is put in this form, the challenge of exactitude or precision remains a goal. Scientific exactitude requires that the representation we make assumes the character of certitude or correctness. For instance, the concept, a circle, must pass only for such and reveal a round object with 360° at all times and in all spaces. In other words, the choice for definitive identification that holds true and true always and everywhere must of necessity be sustained. All scientific representations, then, are expected to be exact.

Besides, we often emphasise exactitude in scientific investigation to court concerns about the quantification dimensions in natural science. As a task-driven engagement, we aspire for precision insisting

on a hundred percent (100%) in outcomes. In that wise, we make attempt to attain the exact to justify the factual or reality. Hence, it is also the goal of scientific investigation to draw up generalizations based on concrete or exact facts. In this wise, precision cannot be compromised for all scientific investigations.

The natural science prides in making exact representations of natural phenomena. It begins with simple observation that focuses on regularities in pattern characterizing the phenomenon under investigation. It is expected that, in the cause of observing and reporting, we should not allow for emotive or ethical considerations to ensure that we attain a value free conclusion. By so doing, such investigation then merits the characterization of an objective assessment as it yields what “is” rather than anything else. Subjective concerns therefore, represent limitations in the development of a properly ordered scientific investigation. By its very nature, all scientific investigation should remain open-ended as to allow for any doubting party to try and replicate the experience and attain the same result. Such process allows for proof to falsify and jettison claims where it proves doubtful or false; or validate claims, where it holds true. It is therefore, in the nature of the empirical or natural sciences to “aspire to” what Wolf (1968:94) refers to as “condition of methodological grace” in being value-free... rather than being merely exercises in the prejudiced distortion of ... facts” (Allen, 1975: 95).

Essentially, there is a permanent preoccupation of empirical science with methods. For, we often talk about the scientific method and by that we mean “a method of inquiry designed to explain natural phenomenon” (Hajjar, 1971: 145). As a method of inquiry or investigation, it enables us to attain “scientific knowledge” which, as argued by Miller (1979: 16), “provides a foundation for technological advances, for the solution of practical problems that arise in the daily affairs of ordinary people”. Indeed, the concern for scientific knowledge gives credence to a number of interests that help to hold investigations in a compact form to properly define it as science. Easton (1967 : 13) points this out in his eight (8) “intellectual foundation stones (of science) that include regularities, verification, techniques, quantification, value freeness, systematization, pure science and integration”. As a methodological process, it is a major preoccupation of scientific knowledge to therefore, reject distortion of the fact.

The Social Science Agenda: Nature and Interest

The dualized nature of science reveals the natural and social sciences. Whereas the natural sciences deal essentially with inanimate nature like matter, the lot of the social sciences has man as the epicentre of its discussions. The concern with man, therefore, defines the preoccupation with humanity. To this extent, because we refer to man as a social being, we derive the referent, “social being”, from the systematic study of humanity in its widest ramifications. Social beings are rationally driven pulsating beings and are, therefore, the prime object of social scientific investigations.

Earlier on, we referred to social science as the “Other Science”. By so doing, we mean to emphasise that it is a derived enterprise as it is patterned on the standards of the natural sciences. By implication, social scientific investigations are expected to adopt the methods and procedures of the natural sciences in the development of its interests. In other words, as scientific enterprise, it is considered an empirical interest. For such reason, the knowledge it claims must be experiential and replicable. Yet the sense in which we hold knowledge claims as replicable in the social sciences differ from that of natural sciences. Like inanimate nature, we cannot hold man constant as alternative or control element. However, as argued by Dilman (1996 :121), in the social sciences,

the knowledge they seek (as scientific knowledge) which is the only kind of knowledge they recognize is impersonal, general, inductive, (and) theoretical. It is to be applied to particular cases so as to obtain an understanding of individual people and help them to deal more efficiently with . . . problems....

Therefore, we tend to invest in social science methods and procedures derived from natural sciences to generate what can pass for credible generalizations. Indeed, it draws on the ideal of causality to state issues in terms of 'if A, then B,' kind of relations.

As scientific enterprise, therefore, the social sciences are involved in providing explanations to

phenomenon that defines social reality. Essentially, it takes pride in description and explanation of these relations between humanity writ large and doing so with a focus on regularities associated with human behaviours. It is expected that from the set of observable data that underscore the regularities in pattern, a social scientist would be able to draw-up law-like statements or, generalization that hold true and true, always and at all times. In other words, the truth of social reality should not be limited by space and time as to qualify as scientific. Thus, for the social sciences, there is a preoccupation with telling the truth about what constitutes social reality. Hence, it is in this respect that Fletcher (1969:341) posits that “the crucial impact of the social sciences on the world at large is one of demystification”.

The latter refers to a process of avoiding distortions to the fact and presenting or representing it as it is. Dealing with demystification therefore, is necessary to enable us lay bare the truth about social matter. As Kaufman (1938:442) commented,

The social scientist who deals with more general questions of his discipline soon meets problems which he cannot solve with the (distorted) knowledge at his disposal and with the methods familiar to him. Frequently such problems are presented to him by practical life; it is found that with the change of circumstance, general proposition which have hitherto served well, and have thus been considered absolute and unshakable laws, can no longer, or can only with modifications, stand the test of experience.

By the attempt to replicate that experience, we seek to prove the validity or falsities associated with prevailing knowledge claims, and reject whatever passes for distortion or falsehood. Thus, the opportunity to try and re-try to prove the truth-value of claims is equally made necessary by the fact that its conclusions must subscribe to the tenet of open-endedness that characterizes natural science investigations.

It is therefore, in the nature and interest of social science to seek and persistently plead the truth relative to human behaviour. Doing so, it is agreed, requires the adoption of the procedures and methods derived from the natural sciences. In accepting natural sciences as the standard, we draw on it to equally search for exactitude or facts about social matter. However, it is the case that social beings are thinking beings, and cannot be held constant in the same way we do inanimate matter. Therefore, there is the recognition that while it is right and proper to abstract self as a disinterested party, in the drawing of generalizations, a certain flow, if minimal, of emotive or ethical considerations may check our expectation of exactitude with our conclusions. Thus, we often give room to such vagaries as may be caused by the minimal injection of interest or value in the process of investigating social beings. This implies that it is often difficult to attain a point of precision at a hundred percent (100%).

To give consideration to possible error that may distort knowledge, it is hoped that it should so minimal as to make our conclusions equally agreeable. Hence, for reasons of the minimal limit of error, we often consider the vagaries as a check on exactitude. To this end, the hopeful aspiration of social science then, is to attain the proximate cause. In other words, we target our conclusions to what is nearest to the exact to sustain conclusions reached as valid and credible. This implies that it recognizes that, though minimal distortions may exist, there is need to ensure that our generalizations merit the label of proper scientific investigation.

Essentially therefore, social science is as abhorrent of distortions as natural science. While its aspiration focuses on exactitude in the reporting and representations of social reality, it hardly prides in giving room for emotive consideration for the error of distortion that often stems from the injection of subjective interest in emotive or ethical considerations. Hence, it earns the label, 'inexact science', because of considerations for social vagaries that check the aspirations of exactitude. Yet, it is to the explanation and description of reality that it focuses on. The prime subject of concern, then, is human behaviour in its fullest extent. Both in terms of methods and procedures of investigation, it draws on the methods and strategies of knowledge. Hence, as the “other science”, it is duly laced with scientific rigour to merit being considered a scientific enterprise.

Conclusion

The paper has attempted to examine the dualised platform of scientific knowledge giving rise to natural science and social science. It pleads for a careful appraisal of these concerns by the new entrant into the university who would sooner than latter be confronted with the demands of cross-disciplinary engagement necessary to shrink the boundary of intellectual parochialism. In arguing for the promotion of

cross disciplinary interest between new knowledge seekers at the university level, it is believed that a fair understanding of the logic of both sciences can help improve the concerns for cross disciplinary studies for all scientists.

Social scientists, like natural scientists, are united by methods and procedures for attaining generalizations or law-like conclusions. However, the subject matter of experience varies. In the case of social science, largely thought of as inexact science, the prime focus is on *Man*. Human behaviour, in all its ramifications, preoccupies the social scientist in his scientific investigation. For the natural sciences, which largely deal with inanimate matter, the quest for exactitude defines their representation of reality. Therefore, both strands of science, being important knowledge claims on reality, can only be viewed from the standpoint of their methods, strategies and procedures, to qualify as science. For the new entrant or freshman, an idea of both realms of science leaves him with a sense of balance on empirical knowledge claim.

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