Volume 9, Issue 6, June – 2024 International Journal of Innovative Science and Research Technology
ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/IJISRT24JUN020

Initiating "Discourse Analysis" as a Tool to Differentiate Between Science and Pseudoscience: Another Valuable Tool to Advance Objectivity and Rigour in Science

[1]Sujay Rao Mandavilli
Institute for the Study of the Globalization of Science

Abstract:- We begin this paper by presenting a broad overview and a history of the now mature and variegated field of discourse analysis in linguistics. We also present the various common present uses and downstream applications of the field of discourse analysis, as applied by both specialists and non-specialists in various fields, and also explore various possible specialist and non-specialist extensions of this approach. We then also interface this with different areas of hermeneutical study and analysis. We also proceed to propose an entirely new application and extension of the field of discourse analysis, one that can be used to peruse texts in order to distinguish between science and pseudo-science in scientific and scholarly research papers and publications, and in internal and third party reviews as well. This approach and methodology can be applied and orchestrated by critically perusing texts and documents to identify vested interests and logical flaws and fallacies as represented by standard and commonly identified logical fallacies in science. This approach, when then applied over a large volume and corpus of texts and documents, can be used productively, beneficially, and gainfully to identify and document new types of logical fallacies as well. Therefore we will be essentially and effectively be killing two birds with one stone. This will naturally be to the immense overall benefit of science and scholarly activity as a whole.

I. INTRODUCTION

The term "Discourse analysis" is applied to define various qualitative methods that explore the structure and configuration of language, and forms of expression of language as understood in its social and cultural milieu or context. In brief, it means the analysis of discourse, where discourse is language in active use i.e., "a language in use", in a social setting. This social setting would also set the norms and cultural preferences for the usage of the language in question, and an analysis of the social and cultural attributes of the text generator as well. This is also compounded by formal grammar, orthography, and semiotics, which is present in virtually every language under the sun. It is also applied along with formal and structured processes of communication which are dynamic frameworks that describes how messages – including written messages and formal text - travel between a sender and receiver through the medium of various communication channels. This approach also analyses disturbances to the free flow of information, which are known as noise. It also collects and gathers feedback in the due course of events. According to the standard English Oxford dictionary, discourse analysis is defined as: "In linguistics, it is a method of analyzing the structure of texts or utterances longer than one sentence, taking into account both their linguistic content and their sociolinguistic context; analysis performed using this method." This is therefore, a fairly broad field of study with many existing and potential widespread applications; its core essence cannot therefore be easily summed up, other than in a specialized treatise on the subject.

An all-comprehensive and an all-encompassing definition of the term may also continue to elude us, and at least for the time being. It often draws and borrows heavily from several distinct fields of study such as such as sociology, social and cultural anthropology, core and applied linguistics, pedagogy, philosophy and psychology. The term 'discourse analysis' is first attributed to the American semiticist and structural linguist, Zellig Harris in his 1952 article published with the same name, i.e. 'Discourse Analysis', and some other related papers, though Leo Spitzer may have also made earlier contributions to the field in the 1920's . Michel Foucault interpreted discourse analysis in terms of power and resistance, and also translated many related works into French. In his words and view, discourse analysis could be defined as a method for the analysis of oral free-flowing speech (which may be either formal or non-formal) or logical and self-coherent writing (the latter is simply known as, or referred to a text), in order to magnify and amplify the scope of descriptive linguistics, and identify patterns of coherence and cohesion in texts. Dell Hymes – who proposed the term linguistic anthropology- also made many important contributions to this field by originating what is today known as the speaking model.

In 1975, Sinclair and Coulthard also developed a model for the description of teacher-pupil talk. Other scholars and thinkers such as John Gumperz, Erving Goffmann, J.L. Austin, Roman Jakobson, John Searle, M.A.K. Halliday also greatly contributed to this new and

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/IJISRT24JUN020

emerging field. (Harris 1952) (Brown & Yule1983) (Cook 1989) Linguists belonging to the Prague linguistic school (or the Prague linguistic circle that was founded in 1926) also made many important contributions to this field. James A. Lauriault reliably used this technique for the study of Quechua legends, and the study of Shipibo, a language of Peru. Discourse analysis has had practical application in a variety of disciplines in the various fields of the humanities and the social sciences, and these include, for example, linguistics, pedagogy, sociology, anthropology, social work, psychology, etc. This is only a very short list, and other applications have of course, been proposed both in subfields of the above disciplines, and in other related and closely allied disciplines and fields of study.

II. APPROACHES TO DISCOURSE ANALYSIS

The term 'discourse analysis' has been gainfully employed by a variety of different people in various academic disciplines, and various fields of study ever since its institution as a formal and distinct field of study. Many, if not most of them were linguists, while several others were not- they preferred instead to call themselves anthropologists, sociologists, etc. However, going by the very name of this field of study, there was almost always an interface and an overlap with various fields of linguistics and communication studies. We now present below, some of the practical implications and downstream uses of the commonly used field of discourse analysis as they exist today.

➢ *Self-Analysis and Other Forms of Social Analysis*

Erving Goffman (A Canadian-American sociologist and social psychologist of repute) and some other researchers propose a description of how language is situated in particular social and cultural circumstances of life, and how it reflects, and adds, meaning and structure in those circumstances, both to the self, and to others. According to the American linguist Deborah Schiffrin, in addition to the interaction between self and the other, we must also focus on how the organization of social life in institutions and establishments, provides contexts through which an analysis of communication can be much more reasonably and reliably be performed. Language is one of several symbolic mechanisms that echo and reflect social identities and relationships through continuing social interactions that use interpersonal interactions as its basis. Meaning is also conveyed, received, processed, analyzed, and even negotiated through such formal or informal mechanisms of discourse. This may be facilitated through situations, formal and informal occasions, encounters, participation frameworks, and so on, and so forth. In addition, communication also adds a wealth of meaning to the self, and to the individuals who are drawn from all walks of life.

➢ *Interactional Sociolinguistics*

Interactional sociolinguistics which was essentially founded by the American anthropologist and linguist John Gumperz and the sociologist Erving Goffman is an important subfield and sub-discipline lying well within the boundary of linguistics that uses discourse analysis to study how language users create meaning to people through the mechanism of social interaction. It also includes within its scope, an intersectional analysis of language, culture and society; this approach also employs a theoretical and methodological framework to combine the methodology of linguistics with other fields of anthropology and sociology to debate on social and cultural interaction. This approach also has wide practical use and application in diverse fields such as language planning, second language acquisition, quantitative sociolinguistics, cross-cultural communication, and socio-historical linguistics, besides several others.

➢ *The Ethnography of Communication*

The ethnography of communication, also formerly known as ethnography of speaking, refers to the analysis of communication within the wider context of the social and cultural practices and beliefs held by the members of a particular culture or language community. The term "Ethnography of speaking" is generally used to refer to discourse analysis through the ethnographic approach where conversational inferences are used to arrive at conclusions. Per this technique, speech events are also analyzed formally. We had defined the term ethnography in a previous paper. Ways of speaking and structuring of sentences depend not only on grammar, but the formal or informal training of the speaker, as well as his socioeconomic background. This field of study was originally developed by the American linguist Dell Hymes in a series of papers written by him over several years but chiefly in the1960s and 1970s. This idea also draws heavy inspiration from the field of ethnography which is widely used in anthropology and social science studies. Ethnography of communication is more diverse and encompassing because it considers both the communicative form, which may be oral or written language, and its function played by it within a culture. It also studies explicit and implicit understanding of code, implied and added meaning, and how these are acquired by members participating in a culture in diverse natural or secondary contexts. These aspects are then used to throw more light on the linguistic community in general, and their similarities or differences with other communities. In the field of sociolinguistics, a code is a term that is used to describe a language or a variation of a language in relation to culture or to society.

➢ *Linguistic Competence*

Linguistic competence is related to communicative capacity, and the effective use of language through the expression, understanding and interpretation of concepts, thoughts, feelings, facts, and opinions in order to perform oral and written communications reliably and effectively. This ability is also related to the knowledge of a language including its syntax and grammar, and how to use it both in informal and formal settings. This knowledge may be acquired consciously or subconsciously, and in a natural and non-natural linguistic setting. This concept must be distinguished from linguistic performance, which includes all other factors that allow one to use a native or a non-native language proficiently, or with utmost flair and felicity. Linguistic competence and linguistic proficiency

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/IJISRT24JUN020

include several aspects such as 1. Systematic potential (the extent to which linguistic competence is not yet manifested or realized) 2. Appropriateness (to what extent is communication is suitable and pertinent in a given context) 3. Occurrence (the extent to which communication is performed or executed), and 4. Feasibility (the extent to which communication is possible). This is just a basic categorization, indeed, there could be more categories. We also then have the principle of linguistic cohesion with refers to the internal and external validity of a text. The two principal kinds of lexical cohesion are: reiteration and collocation. Reiteration means saying something repeatedly or several times. Collocation is a term used for words that appear to move very closely together, or in the company of one another in a given discourse.

- *Linguistic Performance*

In linguistics, linguistic competence must be distinguished from linguistic performance, which encompasses a wide range of factors that allow one to use one's language both proficiently and effectively. The term was used coined and first used by Noam Chomsky in 1960 to describe "the actual use of language in concrete situations". Linguistic performance is therefore associated with the real-time processing required to produce or comprehend language unlike competence with is only an abstract capacity (it is associated with both linguistic production and comprehension), and in linguistics, both linguistic competence and linguistic performance are most often studied separately. In the field of linguistics, functionalists – a school of thought that began in right earnest in 1920's, and the 1930's- also tie the use of language to the role played by it in a social or a cultural context. Phonology, as an important branch of linguistics, also has a crucial and pivotal role to play in discourse analysis. The aspect of phonology that is most commonly invoked is intonation, and the study of phonemes and their articulation. [1]

- *Speech Act Theory*

The "Speech act theory" refers to the idea and notion that speech not only presents information, but is a fulcrum for further action, and this theory was first proposed and formulated by the British philosopher John L Austin, who first introduced the concept in his book, "How to do things with words" which was published in 1962. He also developed the theory of performative utterances and his theory of locutionary (performance of an utterance), illocutionary (communicative effect of an utterance), perlocutionary (effect of the utterance of an interlocutor), and metalocutary acts. Another American philosopher John Searle further developed upon, and presented this theory much more systematically and comprehensively in the 1960's and 1970's. This theory also seeks to investigate and probe the causation and the inter-relation between speech, thought and action. Actions can also be of many different types, and these can include a wide range of acts such as requesting, complaining, promising, answering, warning, refusing, inviting, apologizing, arguing, confabulating, ordering, requesting, and congratulating. Language can also sometimes be used to command and persuade and goad people into actions, or request someone to do something, controlling their behavior. According to Halliday's, there are seven functions of language which are: instrumental, personal, representational, interactional, regulatory, imaginative, and heuristic.

- *Pragmatics*

In 1938, Charles Morris first distinguished pragmatics as an independent subfield lying well within the field of semiotics (the study of signs and symbols), and semantics which formally studies and interprets meaning. Pragmatics emerged as its own subfield in the 1950s after the pioneering work of J.L. Austin and Paul Grice. According to Dutch-born Danish professor of linguistics Jacob L. Mey, pragmatics is "the study of the use of language in human communication as determined by the conditions of society".(Mey 2001) The field of pragmatics in linguistics also primarily evolved as a reaction to structuralist linguistics developed by the famous Swiss linguist Ferdinand de Saussure, and several others. It had also spawned many derivatives such as historical pragmatics by the 1970s which studies pragmatics in a historical context. By this point in time, two different and distinct schools had emerged within pragmatics, namely the Anglo-American school of pragmatic thought and the European continental pragmatic thought, and the latter is also sometimes referred to as the perspective view. Linguists who specialize in pragmatics are referred to as "pragmaticians". The International Pragmatics Association was founded in 1986, and represents the field in conferences and workshops organized and held by it. It also publishes a journal called pragmatics. The subfield of Gricean pragmatics was created by the British linguist Paul Grice, and he also published his own theory of meaning in 1948.

In sum, pragmatics is widely used to refer to the study of how context contributes to meaning. It also formally studies the usage of language in relation to different types of settings, and performs an evaluation of how human language is used during the course of social interactions. It also studies the relationship between the interpreter and the interpreted. The field of pragmatics analyses a diverse set of issues such as implicature - something the speaker implies or suggests through utterance, even if it may not be literally expressed -, speech acts, relative distance, the cooperative principle, relevance and conversation, rhetorical structure, as well as nonverbal communication. It also has branched out into, and overlapped with several related fields of study, and its boundaries may at times be hard to define. The ability of a speaker to understand another speaker's intended meaning is termed pragmatic competence. Theories of pragmatics are also tightly bound with, and related to, theories of semantics, a field which studies diverse aspects of meaning, and syntax which examines sentence structures, principles, and relationships. [2] [3]

1 Chomsky, Noam. (1965). Aspects of the Theory of Syntax. Cambridge, MA: MIT Press

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/IJISRT24JUN020

➢ *Conversation Analysis*

Conversation analysis is an approach to discourse analysis as proposed by a group of scholars known as ethno methodologists. These ethno methodologists seek to discover the methods people use to participate in and comprehend interactions, and how they put forth their words and sentences in a rational, cogent and a coherent manner. This approach and techniques primarily focuses on conversation, which is seen to be a genre of discourse. They also analyzed these sentences in relation to meaning, of course, in a natural setting. Conversation analysis also of course has its roots in sociology, yet it differs from other branches of sociology because rather it seeks to discover the methods by which members of a society produce a sense of social order.

➢ *Variation Analysis*

In the field of linguistics, variation theory was pioneered by the American linguist William Labov in the late 1960s. This theory devotes its attention to the fact that virtually all languages possess a wide range of resources and lexical capacity to produce a given linguistic expression. Variationists attempt to identify patterns in the distribution of alternative ways of saying the same thing, and identify the social and linguistic factors that are responsible for variation. The study of language variation has many wide ranging potential implications, and also guides language development activities, and the development of language models. (Schiffrin 1994).

➢ *Discourse Rank Scale*

The term rank scale is commonly attributed to the British linguist Michael Halliday in connection with systemic functional linguistics. The term rank here is the order of progression on a ladder in reference to a unit of speech, or grammatical construction. We can therefore have something at the base or the bottom (for example, morpheme) and something else at the apex or the top – for example, the sentence or a paragraph. According to this theory, systems are a key organizing feature of grammar, and each system has a "rankscale". It therefore, originates "at a particular rank: phrase, clause, sentence, group of sentences, paragraphs, and their associated complexes". We also have specialists at every level, for example, we have sentence linguists who are specialized in deconstructing sentences.

➢ *Internal and External References*

Reference in linguistics studies the relations between language and extra-linguistic reality. It deals with the process of retrieving information for referential meaning. Reference may also be defined as a relationship between an expression and what it stands for in the outside world. There are two different types of co-reference relations, namely endophoric and exophoric references. The interpretation of endophoric reference lies within the context of a text, and cohesive ties are formed only within the context of that text. This is synonymous with "looking inside the text". Endophoric references can be further divided into anaphoric references (looking backward) and cataphoric references (looking forward). Exophoric reference, on the other hand, refers to a reference where the interpretation lies outside the text. This is synonymous with "looking outside" the text. We also then have the concept of ellipsis. Ellipsis is the omission of elements which may not be required from the context of the text. There are three major types of ellipses which include nominal ellipsis,(omission of nominal element such as a noun) verbal ellipsis (omission of verbal element) and clausal ellipsis, with an emphasis on clausal element.

➢ *Critical Discourse Analysis*

Critical discourse analysis also known as CDA in short, is an interdisciplinary approach to the study of discourse according to which, language is viewed as a form of social practice. Practitioners of critical discourse analysis may also focus on investigating how societal power relations are established and reinforced through language use. This field may also study the way social power abuse, social dominance and social inequality are played out, reproduced and resisted by oral and written discourse in different social, cultural and political contexts. It therefore is a valid extension of other fields of discourse analysis where language is merely correlated with its social and cultural contexts. Critical discourse analysis also adopts innovative, multidisciplinary approaches, to tackle a number of important social issues. It draws on many of the methodological tools of more traditional and firmly established fields such as critical linguistics, text linguistics and sociolinguistics. This field of study also highlights and seeks to address issues of power asymmetries, manipulation, exploitation, and structural inequities in domains such as education, media, and politics. [4] [5]

➢ *Deconstructionism*

The term "Deconstructionism" as it is generally understood today, is a loosely-defined set of parallel, interrelated and overlapping approaches to understand the relationship between text and meaning. The concept of deconstruction was introduced by the famous French philosopher Jacques Derrida in the 1970's. Derrida also borrowed many of his ideas from the other philosophers such as Ferdinand de Saussure, Roland Barthes, and Claude Levi-Strauss. The word 'Deconstruction' may have originated from Martin Heidegger's concept of

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2 Sperber, Dan; Wilson, Deirdre (2005). "Pragmatics". In Jackson, F.; Smith, M. (eds.). Oxford Handbook of Contemporary Philosophy. Oxford University Press. pp. 468–501

3 Silverstein, Michael. 1976. "Shifters, Linguistic Categories, and Cultural Description", in Meaning and Anthropology, Basso and Selby, eds. New York: Harper & Row

4 Hyme,D.(1974a).'TowardsEthnographyofCommunication. 'InFoundationin sociolinguistics:AnEthnographicApproach. Philadelphia:Universityof PennsylvaniaPress

5 Jakobson,R.(1960).'ClosingStatement:LinguisticsandPoetics.'InSebeok,T.(Ed.) StyleinLanguage.Cambridge,MA: MITPress

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/IJISRT24JUN020

'Destruktion'. The entire philosophy of deconstruction attempts to show that any text does not comprise an irrefutable system, but contains a large number of irreconcilable and contradictory meanings that can be traced and related to an unequal power structure. Texts may therefore have more than one interpretation, and texts can also be approached subjectively from axioms of power. Post-colonial approaches also critique Eurocentric view of knowledge, language, and culture and also seek to amplify and project emerging voices in science. Many post-colonial thinkers and writer such as Edward Said, Arjun Appadurai, and Gayatri Spivak, were drawn and attracted to deconstructionism, and many of them based their own theories upon it. [6] [7] [8] [9]

- *Hermeneutical Techniques*

Hermeneutics as a broad discipline or field of study refers to the theory and methodology of interpretation, particularly in the context of the interpretation of biblical and other religious and philosophical texts. This field therefore, includes the art of understanding of such texts, their exegesis, and the communication of their results to other specialists in the field, or in other related fields. Hermeneutics and hermeneutical techniques have been broadly applied in the humanities, especially in the fields of law, history and theology. The origin of the word hermeneutics can be traced to the Greek words verb "hermeneuein" and the noun "hermeneia" which both mean to "translate", or "to interpret". This term was introduced into philosophy through Aristotle's work "Peri Hermeneias". Among the earliest systematic theories of interpretation was developed by the Alexandrian School of Stoics. Philo of Alexandria also employed a similar technique to interpret the myths of the Bible. In the middle ages, Origen, Augustine and Thomas Aquinas used hermeneutic activity to understanding the different levels of meaning of the scriptures and to gain a deeper self-understanding. Even though Plato is also thought to have used this technique widely in ancient times, the word and the technique representing it became much more commonly and widely used only in the seventeenth century during and after the reformation renaissance, and the enlightenment.

In its early and formative years, the study of hermeneutics was applied to the interpretation, or exegesis, of scripture, particularly in a Christian or a Biblical context. Sometimes, literal Interpretations, moral Interpretations, allegorical Interpretations, and anagogical interpretations were also used, though these are not directly related to our purported and intended uses of this technique. It was only in later years, that this approach was extended to other religions, applications and general uses. It is sometimes used in the context of Islam, though rarely in the study of Hindu and other religious texts. The idea of hermeneutic application means applying the techniques of hermeneutics in extended situations. The term hermeneutic praxis is a much narrower term and refers to a researcher employing hermeneutic theories to interpret written or spoken language. There are four commonly understood steps in the hermeneutical process, and these are 1. Understanding the historical and cultural context 2. Understanding the literary context 3. Making observations, and 4. Drawing inferences and general conclusions.

According to some specialists in the field, the three main hermeneutical processes are preparation, investigation, and application. Hermeneutics may also be distinctly subdivided into activities of interpretation along with general or scholar-defined rules of standards, and the philosophy of understanding. The hermeneutic circle refers to the process of understanding a text hermeneutically. It refers to the idea that one's understanding of the text as a whole is established circularly through a reference to the individual parts and one's understanding of each individual part by reference to the whole. These two represent a circle, and the researcher moves back and forth between the part and the whole (or the context and the text) multiple times through iterative contextualization and re-contextualization. Many other standard techniques such as parsing, and other highly specialized techniques such as the historical-grammatical method, and the historical-critical method have also been employed. Needless to say, a detailed discussion on all these matter is outside the scope of this paper. Refer to standard literature or hermeneutics for a more detailed discussion. [10] [11] [12] [13]

- *Our Approach to Discourse Analysis*

Our approach to discourse analysis is to analyze scientific papers, and scientific studies objectively and dispassionately using the principle of dispassionate objectivity, and the principle of justified opinion. This can be either in the form of a textual analysis i.e., the analysis of a scientific or a scholarly work, a dissertation, a thesis, a monograph, or a scientific or a research study. It can also be applied, even if less commonly so, to the analysis of oral statements and oral conversations, - in sum, any form of scientific discourse - and context analysis. In the case of

[6] Gayatri Chakravorty Spivak, "Can the Subaltern Speak?'in Gary Nelson and Lawrence Grossberg (eds.) Marxism and the Interpretation of Culture. London: Macmillan, 1998.

[7] Homi Bhabha The Location of ~uliure, London: Routledge, 1994. .

[8] Bill Ashcroft, Gareth Griffiths and Helen Tiffins (eds) The Empire Writes Back. London: Routledge, 1989.

[9] Culler, Jon,".an. On Deconstruction. London: Routledge and Kegan Paul, 1987

[10] Aristotle, On Interpretation, Harold P. Cooke (trans.), in Aristotle, vol. 1 (Loeb Classical Library), pp. 111–179. London: William Heinemann, 1938.

[11] Clingerman, F. and B. Treanor, M. Drenthen, D. Ustler (2013), Interpreting Nature: The Emerging Field of Environmental Hermeneutics, New York: Fordham University Press

[12] Olesen, Henning Salling, ed. (2013): "Cultural Analysis and In-Depth Hermeneutics." Historical Social Research, Focus, 38, no. 2, pp. 7–157

[13] Przyłębski, Andrzej. Ethics in the Light of Hermeneutical Philosophy, LIT Verlag, Zurich 2017.

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/IJISRT24JUN020

context analysis, the researcher's background, institutional affiliation, and his ideological background are also studied to pre-identify and preempt possible biases. These will provide a further backdrop against which studies can be carried out or executed. This approach and technique must be executed and carried out dispassionately (dispassionate objectivity, and dispassionate neutrality) and without emotion, any form of anger, or hominem attacks, etc. This of course, requires objectivity in mindset. A working knowledge (if not a thorough knowledge) of the topic of research or study must also be possessed, and the analysis performed and carried out on this basis. This approach and technique must also be carried out repeatedly and inductively on a large number of diverse texts, in order to find out systemic biases and inbuilt prejudices.

It can also be used to identify cardinal errors in judgment and execution, and pseudoscientific concepts and arguments of different sorts and types, - besides unsubstantiated and subpar science- all from a wholly non-biased and a non-ideological perspective. It can also be used to identify different types of fallacies in science such as sophistry, solipsistic arguments, polemical arguments, equivocation fallacy, confirmation bias, gas lighting, ad hominem attacks, red herring arguments, and weasel talk and weasel words. We also suggest and propose that in the twenty-first century, more and more research is required to identify and isolate such techniques, and set them apart from good techniques. This must become an intensive, mainstream activity carried out in different fields of the sciences, and in all parts of the world. Inductive approaches are also required using the case study method, all through a valid and a bona fide methodology. A large number of research papers need to be scrutinized and assessed using this technique, and this needs to be an ongoing process. We recommend less tolerance to all pseudo-scientific concepts and paradigms in mainstream science, though progress can perhaps be achieved only gradually and slowly. We must also subscribe to the aforesaid principle or the doctrine of dispassionate neutrality; all contradictory evidence must not only be taken into consideration, but arguments must be put forward dispassionately, and without ado and drama. Arguments must also carry no unqualified opinions, and unresolved issues must be flagged off, and so stated. A proper report, and a list of issues needs to be also generated at the end of any formal and any meaningful study.

III. PSEUDO SCIENCE

The term pseudoscience is derived from the Greek word and cognate "pseudo" which stands for "false", and the English word "science", which is in turn derived from the Latin word "scientia", which means "knowledge". The term was first believed to have been used in the year 1796 by the English historian and antiquary James Pettit Andrews in connection with the pseudo-scientific field of alchemy. However, the concept of pseudoscience as we understand it today, appears to have become more widespread only during the mid-nineteenth century. The term has since been widely used in relation and opposition to science, as it refers to or is represented by bona fide and legitimate science. In extreme cases, scientific misconduct can border on fraud. Scientific fraud, an act of deception or misrepresentation of one's own work, and violates high ethical standards expected of scientists, researchers, and scholars. The Piltdown man hoax of the early twentieth century was a paleontological fraud in which bone fragments were presented by amateur archaeologist Charles Dawson, as a missing link between apes and humans. The fraud was exposed only in 1953. The 'pseudoscientific' group in question normally fallaciously asserts that its beliefs, postulates, practices, theories, hypotheses, etc., are 'scientific', and have been tested thoroughly while in fact, this is not the case. Contradictory, exaggerated, untestable, or unfalsifiable claims are also often made by proponents of pseudoscience, and there is more often than not, no systematic approach to hypothesis generation. A non-rigorous or deficient approach to investigation is also adopted. Some amount of deception, or an intention to deceive, is also associated with pseudoscientific claims. Sometimes, references are made to the supernatural, or appeals are made to authority. Pseudo-science may also rely heavily on anecdotes, with evidence from personal experiences and testimonials. In some cases, high sounding jargon, or mumbo jumbo is also used. Sometimes, evidence is cherry picked – as an example, we can cite RSS and Hindutva theories that the Indus Valley Civilization was Vedic, etc- and selective obfuscation, or selective amnesia is practiced. These are all promulgated with a desire to boost sectarian pride, or in some cases, to cascade ideologies. Even atheists and other groups may be guilty of this.

Such pseudo-scientific approaches also uses leaps of logic, and exaggerated claims are also often made, and logical fallacies committed. Conspiracy claims are also commonly made in pseudoscience, and by pseudoscience adherents. The idea of pseudoscience, is related to, but somewhat different from junk science, hoax science, and non-science, all of which are bogus, and highly deceptive. Biases are also common in science. While there are unhealthy, the jury is still out whether these constitute pseudo-science or not. We will argue that this definitely does constitute pseudoscience, and this kind of bad science, or less than high quality science, must be nipped in the bud. We must move science to an altogether higher trajectory in the twenty first century. We had also introduced a concept called non-cancelling contradictory evidence earlier this year, and had defined it fairly comprehensively as well. As a valuable metric and a heuristic too, QEPIS or Quantification of the effects of poor or Ideologically-driven scholarship (i.e. Downstream and adverse effects of poor, ideologically-driven scholarship or the continued persistence of outdated, outmoded and antiquated approaches) may be calculated from time to time including its bearing on other sciences and on society. Group think must also be naturally avoided, and also all forms of ideology and rigid compartmentalization in science. All these should help us in our mission greatly to not only up the ante, but also to democratize science. [14] [15] [16]

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[14] Parker Jones, O., Alfaro-Almagro, F., & Jbabdi, S. (2018). *An empirical, 21st century evaluation of phrenology*. Cortex. Volume 106. pp. 26–35.

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/IJISRT24JUN020

- *Types of Fallacies in Science*

We also present below some most commonly observed or occurring fallacies in science. We must also keep identifying new types of fallacies, at regular or irregular intervals, and discourse analysis can help us greatly. Examples of new fallacies could include, "appeal to ethnic pride", "arguments against race or ethnicity", "arguments against religion or nationality", "refusal to review without assigning any reason," "exaggerated line of defense", "exaggerated line of attack", etc. We can also specify various criteria to state when judgment can be suspended. For example, bias and prejudice can be reasonably expected when there is a great deal of chaos or confusion prevailing, or when there is insufficient data or information at hand to propose robust or rock solid frameworks and paradigms. This is commonly found in many novel or controversial areas of study. All these efforts have a great potential to take science to altogether higher level and trajectory. Existing fallacies in science could include fallacies of authority, (for example, creating a imaginary straw man, and attacking the imaginary straw man), making irrelevant conclusion or non sequiturs, wholly ad hominem attacks (attacking the scholar rather than the argument, or otherwise putting down people; example: "You know absolutely nothing", or "You are from a primitive, backward country, therefore, you must be an ignoramus"), appeals to authority, the faulty authority argument, seeking to imply that correlation is causation, begging the question fallacy, hasty generalization, circular logic, and fallacies of emotion such as appeal to tradition, appeal to ethnic, cultural, or personal pride, appeals to pity, appeals to popular opinion, etc. This is only a small list, and there are indeed many more fallacies in science that have already been identified.

IV. CONCLUSION

We had begun this paper by presenting a broad overview and a brief history of the now highly mature and variegated field of discourse analysis in linguistics, by drawing on many eminent and reputable scholars and many schools of thought. We had also presented the various common present uses and downstream applications of the field of discourse analysis, by referring to a wide range of work already carried out in the field by other specilaists, and had also explored various existing and possible future specialist and non-specialist extensions of this approach. We then had also interfaced this with different aspects of hermeneutical study and analysis. We had then also proposed an entirely new application and extension of the field of discourse analysis, one that can be used to peruse a diverse spectrum of scientific literature with the intention of distinguishing between science and pseudo-science in scientific and scholarly research papers and publications, and in internal and third party reviews of scientific work and scientific literature as well. This approach and methodology we argue and strongly believe, could be applied and orchestrated by critically perusing texts and documents to identify both vested interests and logical flaws and fallacies as represented by standard and commonly identified logical fallacies in science. This approach, when then applied over a large volume and corpus of texts and documents, can be used productively, beneficially, and gainfully to identify and document new types of logical fallacies as well. Therefore we will be essentially and effectively be killing two birds with one stone. This will naturally be to the immense overall benefit of science and scholarly activity as a whole, and will serve the cause of a scientific temper very well. This will also resultantly take science to a much higher level, by inducing what we can call an upward spiral or an upward trajectory. This can then, present immense benefits not only to science, but to society as a whole.

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