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Research Output and Effective Teaching: A Scholarly Discourse on Lecturer Productivity in Tertiary Institutions

Osemwegie Osayomwanbor[1], Atanda Abiodun[2], Osemwegie Mojisola[3]
[1]*Research scholar at the Department of Educational Management, University of Ibadan*
[2]*Associate Professor at the Department of Educational Management, University of Ibadan*
[3]*Lecturer at the Department of Cultural and Creative Arts, adeyemi Federal Univerity, Ondo*

Abstract: ***This paper examines key aspects of lecturer productivity in higher education, including its determinants, evaluation methods, and implications for academic excellence. Productivity is defined as the efficient use of resources to achieve desired outcomes, serving as a basis for assessing lecturers' contributions in teaching, research, and administration. We analyze research output—its quality, quantity, and impact—as a critical component of academic productivity that advances knowledge and meets institutional goals. Effective teaching is portrayed as involving subject mastery, strong communication skills, and innovative strategies to enhance student engagement. The connection between research and teaching is emphasized, noting that research productivity improves instructional quality and drives societal change. We assess evaluation methods like bibliometric analysis, peer reviews, and student feedback for their reliability and relevance. Challenges such as biases in research databases and limitations in evaluation frameworks, particularly in Nigeria, are also discussed.***
Key words: Research Output, Effective Teaching, Lecturer Productivity

I. LECTURER PRODUCTIVITY

The term productivity was probably first used by a French mathematician in an article in 1766. In 1883, another French man, Littre defined productivity as the faculty to produce (Mishtag, 2023). From this period, the concept of productivity has taken various definitions from different scholars in different fields of study.

The connotation given to productivity by different scholars has imprinted different meanings in the minds of researchers. In ecology, productivity refers to the rate of formation of biomass in the ecosystem. It can also be referred to as the energy accumulated in the plants by photosynthesis. The economists attached another meaning to the concept of productivity. They view productivity as the degree of efficiency in producing goods and services. Based on this view, a lot of emphasis is placed on productivity since it is one of the driving forces behind any economy.

In industrial engineering, productivity is defined as the relation of output (i.e. produced goods) to input (i.e. consumed resources) in the manufacturing transformation process. According to experts as quoted by Agustini et al., (2014), the notion of productivity is not only" doing something right" to achieve maximum performance, but "the right thing" to achieve maximum effectiveness, namely as what people can produce with less effort and as employee hourly outputs by considering quality as well as improving functional and organizational performance, including quality.

Productivity in the education sector can be taken as a measure of the success of operations of activities that will lead to the realization of sector goals and targets in the economy as it applies to other forms of business or company organization (Adu, 2015), and the effectiveness of higher education institutions must be measured based on research productivity these institutions, the ability to generate new knowledge in the form of publications using their active resources as a result of the institution (Aithal, 2016). Productivity can be interpreted as the result of work or work performance and how to do it (Nurwiatin, Matin and Karnati, 2019).

Scientific research views productivity from another angle. It is conceptualized as the relationship between output and input, between results and sacrifices (Aronoff and Kaplan, 1995; De Been, Var Der Voordt and Haynes, 2016). Meanwhile, in simpler terms, productivity is generally described as the ratio of output to some or all the resources used to produce the outputs. Kanawoty (1992) made the definition of productivity simpler by describing it as the ratio of output over input. Output and input ratio is a common term used in the definition of production in most current literature.

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Generally, Productivity is viewed as the effective and efficient use of all resources which include time, people, knowledge, information, finance, equipment, energy and materials to transform raw materials into finished goods. For Inyang (1995), productivity is considered the output and input ratio within a given time frame with special attention to quality and the efficient use of resources. Using the same term but from another perspective, the National Productivity Centre defines productivity as doing the right things the right way, getting more output within less input, getting more outputs with the same input, punctuality, and promptness, elimination of wastes in all forms, justifying your pay, improvement in all aspects of life, producing more and more of better quality (NAEAP 2000). Nevertheless, the concept of productivity can apply to any field or organisation aiming at maximising productivity.

The perception of authors on the word 'lecturer' is changing as the requirements of the profession in higher education is taking a new level. However, most authors define lecturers according to their perception of the roles required in higher institutions to become lecturers. Globally, lecturing work has historically involved teaching, research, and community service. But under each of these headings i.e. a multitude of tasks that range from administration to revenue raising (Erik, 2014). To clarify the term lecturer, Andnana (2020) interpreted lecturers as human assets and human capital who are professional educators in higher institutions and are employed by universities or higher education institutions to carry out teaching, research, and administrative tasks by the subject specialists they have.

While this definition conceives a lecturer as a professional educator with a specific role, at the same time a subject specialist in higher education institutions, Mohanta (2010) prints lecturers as knowledge workers whose work uses mental faculty and involves the use of information, creativity, and decision-making. Davenport (2005), considered the working pattern of knowledge workers. They visualise lecturers as workers who prefer closed/ cellular offices because it allows them to enjoy the uninterrupted concentration required by the nature of their work which open-plan office design does not cater for. In summary, the authors concede lecturers as human capital professional knowledge workers, subject specialists, decision-makers, and creative faculty workers whose work involves teaching, research, and administration. Even though, Brew et al (2016) posit that the works of a lecturer is both academic and non-academic as it entails teaching, research, administrative and community service.

Although the majority of authors from different nations unanimously agree on the roles of lecturers, nevertheless there is a lack of agreement about what lecturers' productivity means (Nzoka, 2015). Tangen (2005) explained the reasons for this conceptual disagreement to include a lack of studious definition of productivity, simultaneous use of different definitions, misuse of proper definitions, confusion between verbal and mathematical definitions and decrease in the value of usable definitions due to low data quality. To understand the meaning of productivity, one must first be able to separate verbal definitions from mathematical definitions (i.e. productivity measures) which are two separate things. A verbal definition is useful since it can be a norm for an organisation's goal. They can also be used when specifying the organisation's strategic objectives (Bjorkman, 1991; Tangen, 2005). Mathematical definitions of productivity can be used as performance measures whose major aim is to improve (not to explain) productivity. Since it can be tough to translate a verbal definition to a mathematical one, it must be remembered that mathematical definitions do not always reflect all the basic features that represent the concept of productivity (Tangen, 2005).

Lecturer productivity measures the performance and work of lecturers (Andriani, Purwana, Susita, 2020). Lecturers' productivity can be said to be a useful result of the lecturers' efforts to attain educational goals in the university setting. This definition seems not to fully capture the real meaning of lecturer productivity. In simple terms, it refers to how effective and efficient lecturers are in carrying out their teaching, research, and administrative responsibilities. This includes evaluating the quality and quantity of their publications and the impact of their contributions to the academic community.

II. RESEARCH OUTPUT

The word 'research' originated from the French, word 'recerchier' meaning to search and search again. Research means repeating a search for something and implicitly assumes that the earlier search was not exhaustive and complete in the sense that there is still scope for improvement (Kabir 2018). Similarly, the Advanced Learner's Dictionary of Current English lays down the meaning of research as a careful investigation or inquiry, especially through a search for new facts in any branch of knowledge. Shanka and Adebola (2021) posit that regardless of how the term research is applied in academic literature and everyday life, this term is still vague, especially for beginners in the field of research. To assist the layman, Kabir (2018) conceives research as a search for knowledge. Technically, Kabir (2018:2) comprehensively defines research as a scientific approach to answering a research question, solving a problem, or generating new knowledge through a systematic and orderly collection, organization, and analysis of information with an ultimate goal of making the research useful in decision making. Kabir (2018:3) concludes that systematic research in any field of inquiry involves three basic operations which are data collection, data analysis and report writing.

However, Shanka and Adebola (2021) view research as involving more than three basic operations. They believe that research should involve defining and redefining problems, formulating hypotheses or proposed solutions, collecting, organizing, and evaluating data including deductions and reaching conclusions, and thoroughly examining the results to reveal whether they fit the formulating hypothesis. Muredzi (2019) seems to agree with the submission of Shanka and Adebola's concept of research. He views research as an investigative process of finding reliable solution to a problem through systematic selection, analysis, and interpretation of data relating to the problem. Similarly, Adeleke and Emunenu (2023) argued that research involves identification of problems, gathering new data, finding solution to a problem through carefully designed procedures and logical analysis.

Research in many studies is attested as one of the trifocal responsibilities of lecturers in higher education. To support this claim, Pope Francis in his encyclical letter on Ecclesiastical Universities and Faculties, known as Veritatis Gaudium', wrote that research is the primary duty of Catholic universities to communicate doctrine to our contemporaries in various countries and cultures (Pope Francis, 2017). The main responsibility of lecturers has long been a scholarly debated among researchers since the 1980s. In this academic discourse, Perkins (1973) argues that the major responsibilities of lectures in the modern university are teaching (transmission of knowledge), research (advancement of knowledge), and community service (application of knowledge). However, Brand (2000) and Lertputtank (2009) acknowledge that within much of the academic a value hierarchy exists in which research and scholarship are at the top of the pyramid, followed by teaching and then community service. In this lecturer productivity's value hierarchy, Cargile and Bublitz (1986) claim that research is deemed to be twice as important as teaching and five times more important than community service.

The roles of higher education in the 19th and 21st centuries are very demanding (Muhammad and Azhar, 2011). In the 21st century, teaching and research are considered equally important for lecturers. Though university professors are many times considered researchers, nevertheless, they must give equal attention to research and teaching as part of their duties, because participation in research directly improves the quality of teaching (Muhammad & Azhar, 2011). Comparing the two major roles of lecturer in higher institutions, the recognition and advancement of academic staff largely depend on the quantity and quality of their research productions which are communicated in the form of journal articles, books, technical reports and other types of publications (Okiki, 2016)

Research output in academia is a human activity rooted in creativity and problem-solving. It involves the rigorous application of intellectual resources to investigate phenomena and arrive at testable, independent, and relevant outcomes. These outcomes are useful for academic research, social transformation, and industrial applications (Isuku and Bello, 2018). Research output is generally viewed as the measure of academic achievement viewed in terms of the quantity or quality of publications over a given period (Ladipo et al, 2022). While this concept perceives research output in terms of quality or quantity of publication, the South African government's research funding framework defined research output as "textual output." Within textual output, three publication output types are formally recognised: journals, books, and proceedings (Borsch, 2011). Contrary to textual output concept, Isuku and Bello (2018: 207) argued that research output is the quantity of academic research reflected in publication output (textual output) and student supervision over a specified period. Thus, research output seems not to be a subject of publications only but also other academic activities that involve production and dissemination of new knowledge. In many journals, "research productivity" and "research output" are often used interchangeably, but they have distinct meanings. Research output focuses on the quantity and types of scholarly products, research productivity emphasises the efficiency and effectiveness of producing these outputs (Abramo and D'Angelo, 2014). Okonedo et al (2015) view research output as the whole of research conducted by academics in universities in their vocation over a predetermined period. Tsafe, Chiya and Amma (2016) conclude that this period can be 3 years which rests largely on the quality and quantity of scholarly publications such as documents published through a peer-reviewed process and acknowledged as recorded sources such as books, book chapters, journal articles, conferences papers and proceedings, creatives works and visual arts among others. Thus, one of the ways to determine research output is to assess the quantity of publications which researchers communicate through primary or other sources over 3 years.

III. EVALUATING LECTURER'S RESEARCH OUTPUT

In 1926, Alfred T. Lotka was the first scholar to use the number of publications to measure productivity in his milestone work known as Lotka's law or research productivity (Abramo and D'Angelo, 2013). Unfortunately, from an economic standpoint, Lotka's law makes little sense. According to Abramo and D'Angelo (2013:9), research output is accustomed to the number of publications per research, distinguishing it from impact, which is measured by citations. In bibliometrics, we have seen the evolution of language where the term "productivity" measures refers to those based on publication counts while "impact" measures are those based on citation counts.

Technically, the bibliometricians adopt impact as the number of citations for the units' publication. For this reason, bibliometrics standardizes the citation of each publication concerning a scaling factor stemming from the distribution of citations for all publications of the same year and the same subject category. Different scaling factors have been suggested and adopted to field normalize citations (average, median, z-score of normalized distributions etc.) (Abramo and D'Angelo, 2014:4). Among the different scaling factors suggested and adopted to field normalise citations, few scholars have proposed to normalize citations by the number of bibliographic references of the citing paper (Repe and Kurtz, 2012).

While obtaining citation data is difficult to find and is limited to a citation database, several studies have been conducted that have validated the use of citations as an evaluation method (Altmann, Abbasi and Hwang, 2012). Nevertheless, there are few databases available. The few available research indexing databases can be categorised into two based on their policy on the assessment of information sources they index. The first category of research indexing databases curates all the sources that are available to them without any mechanism of assessment, examples include Google Scholar, Open Alex, and CrossRef. The second category of research indexing databases, such as Web of Science, MED line, Scopus, and EMBASE have mechanisms for assessing sources before they are curated and are therefore, usually more trusted and authoritative (Asubiaro and Onaolapo, 2023).

Asubiaro and Onaolapo (2023:4) posit that Web of Science and Scopus are the most authoritative global research indexing databases. They explain that Web of Science and Scopus are critical components of the current global research ecosystem, providing data for global university rankings and bibliometric analysis for global research assessments. Despite the claim that Web of Science and Scopus are the most authoritative global research indexing databases, Tennant (2020) asserts that both platforms are not truly global. The reasons have been attested to by several studies that they are systemically and structurally based on research produced in non-Western countries, non-English-language journals, and research from the arts, humanities, and social sciences (Asubiaro, 2022, Tennant 2020; Vera-Baceta et al, 2019).

Besides the systematical and structural bias against research in Africa, some of the journals from Nigeria do not meet international publishing standards, (Asubiaro and Onaolapo, 2023:12). Thus, Nigerian journals are better represented in CrossRef because managers in Nigeria could easily get their journals indexed in CrossRef as it only requires registration for D01, whereas Web of Science and Scopus demands certain standards including investments in journal publishing website and online submission system.

In scientific literature, four criteria have been used for measuring research output which are impact factor/ citescore, citation number, journal collection, and the number of publications (Oruc, 2021). While quality is represented in the elements of Impact Factor/ Citescore, number of citations, and quality of the journal collection, quantity is represented by the number of publications (Oruc, 2021:2). Evaluating the results of productive researchers can be challenging. One researcher might be a co-author on all the papers that a research group has produced, while another researcher may prefer to write a paper alone. One approach is not necessarily more productive than the other. One critical factor that is considered in measuring research output is that the research performance of one research is compared to that of another researcher within the same research field (Machead and Urquiola, 2021, Oruc, 2021:3).

IV. EFFECTIVE TEACHING

Teaching activities in higher education are multifaceted and intellectually demanding tasks that require a lecturer to possess a diverse set of skills that can be acquired, improved and extended over time (Brown and Atkins, 2002). These skills include the ability to explain complex concepts in ways that are easily understood, providing clear and effective guidance, testing students' knowledge, marking assignments, and providing constructive feedback. In some disciplines or professional fields, teaching activities may also involve organising and facilitating lab classes, field trips, internships, and other kinds of work placements, which provide students with the opportunity to gain practical experience in their chosen field. Additionally, teachers may encourage students to work collaboratively in groups, seek feedback from peers, and view themselves as members of a professional community (Goodyear, 2016). Teaching activities are characterised by specialised knowledge and expertise that are essential for effective teaching. As such, teaching is a professional activity that requires adherence to certain standards and expectations, including the ability to provide high-quality instruction, foster a supportive learning environment, and maintain accountability for student outcomes (Polland, 2009; Nwokeocha, 2017).

Effective teaching involves teachers utilizing their skills and knowledge in the classroom, being intentional with their teaching methods, familiarizing themselves with instructional materials, motivating students, fostering a positive learning environment, and supporting students in achieving academic excellence (Isah and Ajamobe, 2016). Similarly, Dunne and Wagg (2005) assert that effective teaching entails guiding young children in learning how to read and write, understanding the world around them, grasping and applying fundamental mathematical and scientific concepts, developing their intelligence and imagination, and learning to live and work harmoniously with others.

An effective teacher must possess a deep understanding of the subjects being taught and have the ability to manage a classroom, communicate clearly, ask insightful questions, and monitor and assess student learning.There is often confusion in educational literature regarding the terms "effective teaching" and "teaching effectiveness." To clarify the distinction, Gupta and Verma (2021) suggest that teaching effectiveness encompasses the behavioral, affective, and cognitive attributes of a teacher, while effective teaching is contingent upon the success of the school's teachers. Teaching effectiveness refers to the measurable results of the teaching process, specifically how well teaching meets its goals and influences student learning and growth. This concept focuses on the outcomes of teaching rather than the techniques or personal qualities of the educator (Kane and Staiger, 2012). It is assessed through student performance or improvements in learning outcomes, relying on the ability to present lessons in a manner that students can understand and remember. Typically, evaluation is conducted using external assessments, test scores, or student feedback (Hattie, 2009). Effective teaching encompasses the practices, methods, and traits that lead to successful learning experiences for students (Stronge, 2018). While it emphasizes teaching strategies and classroom management, it also highlights the teacher's capacity to engage students, convey ideas, and foster a positive learning environment Stronge, 2018: 4).

V. CHARACTERISTICS OF EFFECTIVE TEACHING

Scholars hold varying perspectives on the characteristics of effective teaching in academia. While some authors share similar views, there is no unanimous agreement on these traits. Day et al (2008) argue that effective teaching encompasses a wide range of practices, including knowledge delivery, exam preparation, facilitating learning, promoting positive attitudes, guiding good conduct, adaptability, sustaining professional identity, and contextual awareness. On the other hand, Isola (2019) highlights the importance of effective interaction between teachers and students, diverse techniques and skills, conditioning indoctrination, effective communication, achieving educational objectives, learning experiences, behavioral change, suggestive teaching, respect for students, well-planned teaching and evaluation methods, stimulating students' critical thinking, promoting emotional stability, and cooperative activities. While there are similarities in the terminology used by both authors, the key areas of agreement include well-planned evaluation practices, effective knowledge delivery, sufficient knowledge facilitation, and positive behavioral change. Important qualities in effective teaching include empathy, flexibility, and mastery of the subject matter (Marzano et al., 2003).

According to Maulana, Kington, and Ko (2023), the concept of effective teaching extends beyond traditional arguments regarding its characteristics. The authors propose that effective teaching encompasses elements that transcend classroom activities, including professional development, family engagement, and the implementation of innovative teaching methods. On this note, Harder and Crosby identified twelve qualities, which can be grouped into six categories of an effective teaching such as the information provider, role model, facilitator, assessor, planner, and resource developer (Alrowais, 2015). In tertiary institutions in Nigeria, Agbionu, Anyalor and Nwali (2018) concur that effective teaching entails preparing and delivery of lectures, supervision of students in industrial training, supervision of final year project, making of assessment and grading of scripts.

VI. EVALUATION OF LECTURER'S EFFECTIVE TEACHING

There is an ongoing debate among scholars about the best ways to evaluate the effectiveness of teaching in higher education. Various methods such as self-evaluation, manager-based evaluation, peer evaluation, and student-based evaluation have been proposed. In a study, Do, et al (2020) cautioned that while fairness and transparency are essential for lecturer evaluation, the process could lead to competition among lecturers in a university. They argued that manager-based and student-based evaluations are direct and objective ways to assess the quality and capability of lecturers in higher education. However, 90% of studies used student evaluations with the remainder being self and peer evaluations (Cadez, Dimouski, Groff, 2017). More recent studies are also consistent with prior findings (Galbraith and Merrill, 2012; Malcolm 2014).

In some Nigerian universities, lecturers are evaluated based on the Annual Performance Evaluation Report (APER), which is completed by the evaluated personnel and their head of department. However, this evaluation, mainly focused on promotion, does not thoroughly assess individual staff progress and performance (Igbojekwe and Ugo-Okoro, 2015). Student evaluations are not widely accepted in Nigerian Colleges of Education (COEs) as they are considered biased and inappropriate for assessing a lecturer's effectiveness. In COEs, teaching encompasses more than just classroom activities; it also includes supervising teaching practices and projects. Although the National Commission for Colleges of Education (NCCE) has developed an instrument called the 'Instrument for Students Evaluation of Lecturers (ISEL),' which is included in its 2021 curriculum implementation framework for the Nigerian Certificate in Education (NCE), research indicates that evaluations by Heads of Department remain the primary method used to assess teaching in COEs. This reliance on Heads of Department may be because a lecturer's teaching responsibilities extend beyond classroom activities to supervising teaching practices and projects, areas that are beyond the expertise of students.

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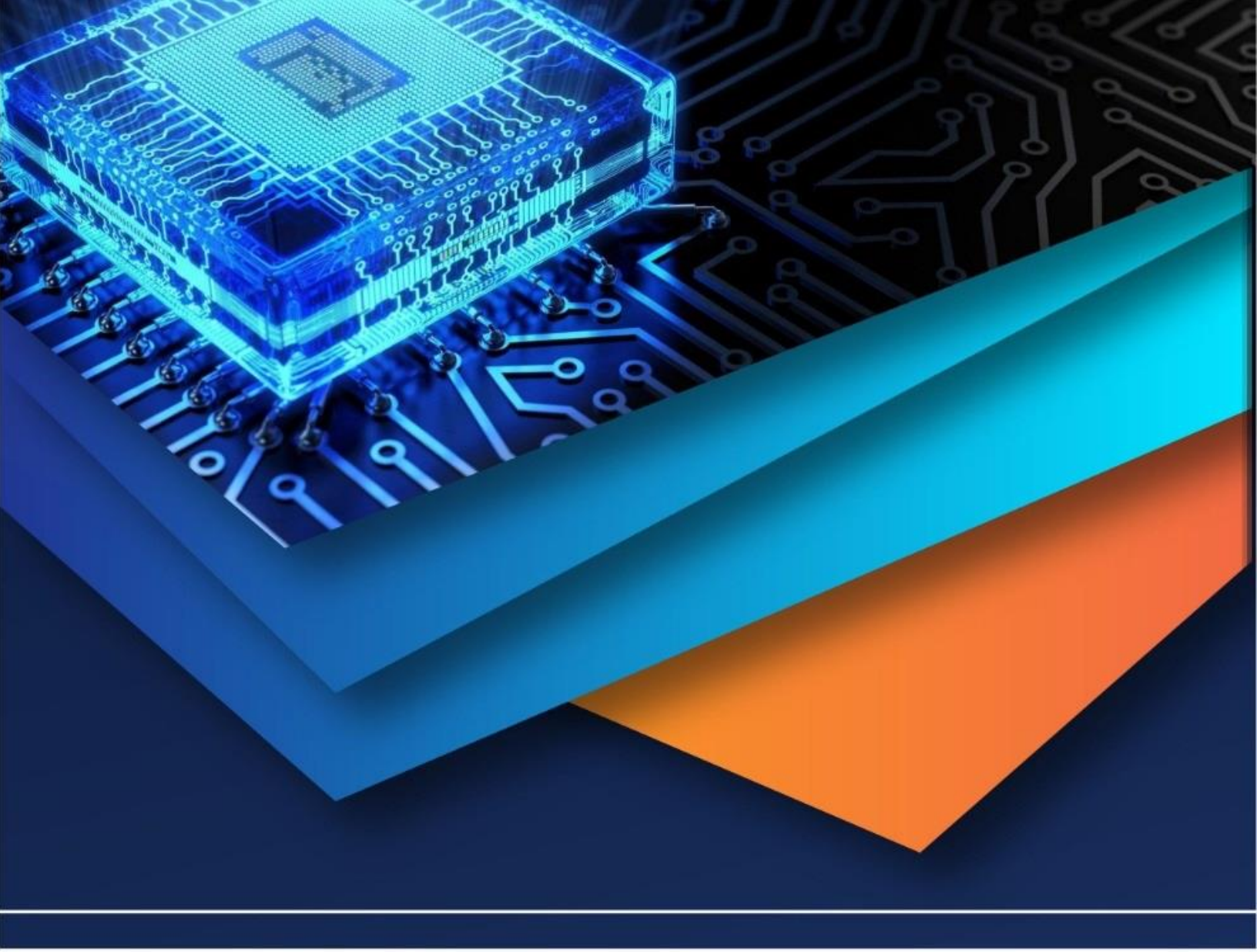

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