

ARTÍCULO DE REFLEXIÓN

**Integrating Artificial Intelligence into Scholarly Communications
for Enhanced Human Cognitive Abilities: The War for Philosophy?**

Integración de la inteligencia artificial en las comunicaciones académicas
para mejorar las capacidades cognitivas humanas: ¿La guerra por la filosofía?

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Abstract

The paper explores integrating AI into scholarly communication for enhanced human cognitive abilities. The conception of human-machine communication (HMC) approach that regards AI-based technologies not as interactive objects, but communicative subjects, throws issues that are more philosophical in scholarly communication. It is a known fact that, there is increased interaction between humans and machines especially consolidated by COVID-19 pandemic, which heightened the development of Individual Adaptive Learning System thereby necessarily requiring inputs from NI to strengthen AI. This positioned university at the juxtaposition for ensuring the production of highly talented individuals who can continue to think beyond the thinkable intelligently and enabling AI experts to carry on building algorithms that can further the development of technology to the next level. To perform such a task, research output is paramount in connecting university and publishing industry. The

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paper critically examines important components and tries to do justice for emanating of critical questions from researchers (NI) thus feeding the development of technology (AI).

Keywords: AI, scholarly communication, universities, open data and materials, human cognitive abilities

Resumen

Este artículo explora la integración de la IA en la comunicación académica para mejorar las capacidades cognitivas humanas. La concepción de la comunicación hombre-máquina (CMM), que considera las tecnologías basadas en la IA no como objetos interactivos, sino como sujetos comunicativos, plantea cuestiones más filosóficas en la comunicación académica. Es un hecho conocido que existe una mayor interacción entre los humanos y las máquinas, especialmente consolidada por la pandemia COVID-19, que intensificó el desarrollo del Sistema de Aprendizaje Adaptativo Individual, por lo que necesariamente se requieren aportaciones de las IN para fortalecer la IA. Esto posicionó a la universidad en la yuxtaposición de asegurar la producción de individuos altamente talentosos que puedan continuar pensando más allá de lo pensable inteligentemente y permitir a los expertos en IA continuar construyendo algoritmos que puedan llevar el desarrollo de la tecnología al siguiente nivel. Para llevar a cabo tal tarea, la producción investigadora es primordial para conectar la universidad y la industria editorial. Este artículo examina de forma crítica componentes importantes e intenta hacer justicia a la emanación de preguntas críticas de los investigadores (NI), alimentando así el desarrollo de la tecnología (IA).

Palabras clave: IA, comunicación académica, universidades, datos y materiales abiertos, capacidades cognitivas humanas

Introduction

The main goal of technology generally, and AI specifically, is to “to make modifications in the world [in order] to meet human needs” (US National Research Council cited in Human & Watkins, 2023). That is why AI is polysemous depending on the user, message (or data), context, rationale, degree, discipline, etc. employing its applicability (Guzman & Lewis, 2020). This polysemy might correlate with the fact that, AI has diffused and penetrated the nooks and crannies of human endeavors transforming industries such as networking domain (Chemouil et al., 2019), healthcare, transportation, retail and finance, and education is not an exception (Guan et al., 2020). This is to the extent that, the significance of technology can never be completely exhausted in a single study (Kabudi et al., 2021). To agree with this fact, Gabriel, (2019) referenced Andrew Ng, a professor at Stanford and founder of Coursera, to have said that “I have a hard time thinking of an industry that I don’t think AI will transform in the next several years”. To follow the suit, there is a tremendous interdisciplinary trend-taking place between communication networks and AI/Machine Learning (ML) research communities for optimizing network architecture, control, and management to maximize automation in network operations. Alternatively, researchers in AI/ML are tirelessly working closely with networking researchers to develop new AI/ML network frameworks either through descriptive, predictive, or prescriptive AI (Chemouil et al., 2019). In the same vein, it is unanimously a collective pronouncement that, adoption of AI by publishers is an inevitable decision taken for many reasons. To begin with, global scholarly output has tripled in the last two decades. This implies that, as there is an increase in the number of articles, journals, and publishers, the value or quality of the content decreases (Gabriel, 2019). To eke on this issue, every year, global research spends about \$2 trillion, which tripled the spending in 2000 and still researchers are complaining about the lack of effective tools (Gabriel, 2019). In education sector, AI has “evolved from idealized laboratory scenario to real-life learning contexts” with many companies developing different Individual Adaptive Learning System, Aided Teaching System, and Institute Administration Systems thereby allowing personalized learning, classroom environment management, and student enrollment, inquiries, etc. respectively (Guan et al., 2020).

Interestingly, the scholarly publishing and information industries are becoming smart publishers by embracing AI into the entire fabric of their core businesses for entering the new markets or sourcing new content for ensuring new product development. In other words, publishers are employing AI to cut costs in their editorial processes using Natural Language Processing (NLP) to provide semantic enrichment or content recommendation for users (Gabriel, 2019). To be precise, from 2008 to 2017, the market size of AI-based education was \$1047 billion (Mou, 2019 cited in Guan et al., 2020). The high in market size of AI in education is due to inclination to personalized learning that witnessed \$4 billion in 2022 and expected to rise at 10% increase from 2023-2032 to reach \$30 billion (Global Market Insight, 2023). This sets companies specializing in AI-based education to compete in integrating AI-based education systems at macro- or micro-education contexts (Guan et al., 2020). Furthermore, most technologies used today raised ethical and political debates that generate policy efforts to control the consequences they cause. This stance challenged contemporary norms and conceptual systems, which are of importance to philosophy, thus raising the fundamental needs to shape societal response (i.e. laws, policies, etc.). This is, in addition to the furor these technologies have, that may result at the end of human control of the planet earth (Müller, 2021).

A number of authors believe that there has to be a distinction between research and teaching for increasing academic excellence to the extent, some academic institutions separate their staff as exclusively research- or teacher-oriented workforce. In philosophy, this demarcation is arbitrary, artificial, and damaging. This, in part, is because, philosophy, being an umbrella that unifies all other disciplines, deals with “good reasoning” and “uncovering good arguments” (Athanasoulis, 2012, p. 1-3). In this sense, philosophical research and philosophical teaching are identical in their approach fuelled by debates, exchange of ideas thereby constructing critical and original arguments (Athanasoulis, 2012). As researchers dig into uncovering reality, there is always room for deviating from what used to be facts, thereby resulting in a significant change in the methods of enquiry (Bowman & Spence, 2020; Kuhn, 1962). This is to the extent that, most noble science awards are due to the improvement in methodological rather than theoretical contributions, which themselves depend on

methodologies (Greenwald, 2012 cited in Bowman & Spence, 2020). Fascinatingly, research logarithmically increases in all dimensions and is becoming an inevitably indispensable and critical tool required for individual, organizational, societal, international or global development and survival.

This is true, as UNESCO, (2021) indicated that, from 2014 to 2018, the researcher pool grew three times (13.9%) than the global population (4.6%). This means that, 8.854 million full-time equivalent (FTE) researchers by 2018. To be precise, researcher density has increased by 20% from 2014-2018. Similarly, in terms of research expenditure, global research spending rose by 19.2% dominating the growth of global economy resulting in a corresponding increase in research intensity from 1.73% to 1.79% of GDP. In 25 countries, research intensity expanded by 0.15% of GDP or even more. Furthermore, considering the research publications, there was 21% increase in scholarly publishing in 2019 than it was in 2015. To eke on this trend, publications tilted more towards AI, robotics, energy, and materials science by 33% (UNESCO, 2021). This implies that, research is a complex process that harbors many ingredients with humans and tools integrated in such a way they immersed as a single entity requiring informed participation of scholars. This agrees with Bartling and Friesike, (2014, p. V-VI) who noted that, “research as a sensitive and complex process that has many facets with a million participants, hierarchies, personal networks, and structures needs informed participants”.

In the same vein, the technology is affecting every sphere of research cycle and scholars must adapt and respond at the same pace. This might have emanated from the fact that, technology has gone into researchers and researchers are going into it in an interwoven scenario difficult to separate themselves from each other, thereby making it one of the biggest events in human history (Leonhard, 2014). Connected through billions of devices, with miles of fiber optic and cellular signals requiring humans to show up human authentic, real, raw selves, it means that, humanity will be lost through these devices (Comm, 2014). This development evolves due to the valuable contribution to human knowledge and quality of research is a feature that resonates within the minds of scholarly community for time immemorial. Supported

principally through funding research specifically and education generally, which has far-reaching profits than can ever be possibly imagined. For instance, Haskins, (1923) observed that, \$10, 000 donated to the Brown University by Mr. and Mrs. Jesse L. Rosenberger of Chicago remembering Mrs. Rosenberger's father, Charles K. Colver has intrinsically something to reveal to us about its associated paybacks. The letter accompanying the gift has this

It is desired that, so far as possible, for these lectures only subjects of particular importance and lecturers eminent in scholarship or of other marked qualifications shall be chosen. It is desired that the lectures shall be distinctive and valuable contributions to human knowledge, known for their quality rather than their number. Income or portions of income, not used for lectures, may be used for the publication of the lectures deemed desirable to be so published (Haskins, 1923, p. vii)

The scientific culture witnessed a remarkable revolution in the last 300 years and is currently experiencing another yet important revolution that in the next 20 years would equal to the change practiced in the last 200 years. Perhaps this is the reason why Bartling and Friesike, (2014) have observed that, Internet and WWW were first designed for research purposes and society deviated from this intended use thereby affecting the way of communicating, interacting, traveling, and all other human endeavors. In other words, “novel online research tools pop up constantly, and they are slowly but surely finding their way into research culture” (Bartling & Friesike, 2014, p. V-VI). Remarkably, never once did education become stationary, stagnant, skeptic, or immune to receiving transformative ingredients for perfecting its practices thus affecting learners and society positively. This has captured the attention of Huff, (2003) cited by Cantoni and Yuchtman, (2012) who claims that “the European university was an institution that was uniquely suited to promoting technical change, and that the rise of universities can be seen as an important institutional turning point in the history of European science”. Since medieval ages, there was a recognition that, the institutions have direct relations with correcting the trade imperfections inherent and encouraging economic activity in European cities (Cantoni & Yuchtman, 2012).

That is, since the medieval ages, “universities were much more part of the world and marketplace” and insisted that their pursuit of learning was entirely immune from the business of the world (Willinsky, 2018, p. 7). To deviate from this presupposition, Loorbach and Wittmayer, (2023) observed that, there is recognition that, universities have adopted 20th century model that largely depends on academic disciplines, objectivity, and linear knowledge transfer that paves the ways for the academics to compete and educate students for preparing them for professions. This model is not adequate and suitable for sustainable future and called for “transdisciplinary, collaborative, and action-oriented academic work that explicitly aims to support societal transitions” (Loorbach & Wittmayer, 2023, p. 1). Perhaps this is the reason that led to the declaration of International Association of Universities (IAU) in 1950, where it stated categorically that

Conscious of their high responsibility as guardians of the intellectual life;

Conscious of the fundamental principles for which every university should stand, namely: the right to pursue knowledge for its own sake and to follow wherever the search for truth may lead; the tolerance of divergent opinion and freedom from political interference;

Conscious of their obligation as social institutions to promote, through teaching and research, the principles of freedom and justice, of human dignity and solidarity; to develop mutually material and moral aid on an international level;

The universities of the world, through their representatives assembled in conference at Nice, hereby decide to create an international association of universities (IAU 1950 cited in van’t Land et al., 2021).

However, to be able to serve as a guardian of intellectual life, social institution thereby allowing pursuance of knowledge, there is always a room for a shift in using technologies for enhancing student productivity. This is a normal process in academia as captured by Kuhn, (1962), whenever a puzzle emanates, or circular argument arises in a normal science, a shift to the newer more promising paradigm is inevitable. To commensurate with the above facts, in a book on “the coming wave”, Suleyman and Bhaksha, (2023) demonstrated that, waves or

floods, in every culture, are historic, transformative, and recurrent and technologies are not an exception. Waves of technologies seem to begin with difficulty for the populace to accept easily but at the same time, as the technology goes on, they become adopted, easier, and cheaper to use, thereby propagating wide and far (Suleyman & Bhaksha, 2023). Perhaps the complexion reached by humans is attributable to their dominance brought about by “evolutionary changes in human psyche and social behavior” (Alexander, 1990, p. 4 cited in Spink & Cole, 2007, p. 257). In effect, as humans continue to evolve and adapt to ever-changing environments, so does the progression of technological advancement to make him ecologically dominant. To agree with this claim, Spink and Cole, (2007, p. 257) noted that, “information behavior is a socio-cognitive ability that is related to and enables other socio-cognitive abilities such as human ecological dominance, and social competition/cooperation”. There is a link to the development of tools that can become complicated than ever imagined by humans as the competition/cooperation increases.

To support this view, by the end of the Middle Ages, there were at least 80 universities in Europe, among which, some short-lived for some reason and still others are existing. The Universities of Oxford, Cambridge, Vienna, Harvard, Bologna, Paris, etc. have many things to offer to the contemporary educational system when it comes to acceptance, adoption, and use of technologies because they witnessed a series of transformations through the ages virtually from nothing to something. In other words, to avoid jejune opinions or put a scholarly claim into a prejudiced presupposition, the work of Haskins, (1923) titled “the rise of universities” offers a helping hand in this regard. To begin with, even though the specific dates, founding fathers, etc. of earlier universities are without definite records rather “just grew, arising slowly and silently”, it is important to note that, 7 liberal arts taught at the above-mentioned universities were mainly grammar, rhetoric, logic (trivium), arithmetic, astronomy, geometry, and music (quadrivium).

In 1100 and 1200, the Western Europe witnessed a remarkable influx of new knowledge through Italy, Sicily and Spain thereby creating learned professions giving rise to a definition of a university as a “society of masters and scholars”. Universities, as an intellectual center,

in the Middle Ages saw another expansion of curriculum from primitive to more advanced form an equivalence of the intelligence of that era through renaissance of the 12th century to the contemporary society. For instance, logic became intellectual habit, pervaded all subjects taught and gave character and tone to the medieval mind, thereby penetrating law, medicine, philosophy, theology, and even natural sciences. The fact that great professors produce good students is as old as can be traced to the development of universities in the Middle Ages. For students, unlike professors, in the medieval ages, they are “necessary evils or the main reason for the university’s existence” who are “individually less conspicuous but generally must be seen in the mass”. The mass changed with space and time, to the extent what was obtainable in the previous century may not necessarily be the same in the forthcoming centuries. Notably, students were more communicative through manuals, letters, and poetry (Haskins, 1923, p. 79-130). There have been massive developments from century to another century, and these developments aggregated into foundations upon which the contemporary universities operate.

To match with the above facts, it can be argued that most of the transformations undergone by education are governed by anticipation, reformulation, and augmentation. To agree with this claim, a handbook of anticipation edited by Poli (2020) has many things to offer. The book has 77 entries on various issues that have direct relations with anticipation regarding networks, AI, animal, future, robotics, law, care planning, disaster management, risk reduction, games and simulations, to mention but a few. These ideas came up as anticipation is evolving due to its relevance in research arena linked with future studies, perspectives, and orientation. To be precise, anticipation is used as a unifying framework to integrate human and social sciences and anneal all possibility of fragmenting them thereby setting aside dominant past-orientation to new future-orientation (Poli, 2020). The hunger for information continues, and the social media are well-fed up with fake/false information. This questions the integrity to stay human in digital age as it requires many inputs from different perspectives and that, technology and social media are amoral neither good nor bad but depends upon humans to decide how to use them (Comm, 2014). This challenges next-generation education, which is on the new economic paradigm axis, nested into the singularity timeline where human intelligence is tied with the integration of machine intelligence in the future (Leonhard, 2014).

This might correlate with the fact that, learning and engagement of students has attracted the attention of scholars for time immemorial. In this sense, Junco et al., (2010) observed that, social media, been a platform that increases collaboration, community building, participation, and sharing of information, continues to engage students to be active learners and made universities to welcome newer technologies for engaging students. This opens a welcoming window through which students can interact with one another and the internet like never before (Adakawa, 2022). This is highly deepened due to the experience of COVID-19 lockdown that restricted people from physical interaction, thereby resorting to doing everything online (Adakawa, 2022). The planet earth is still healing from the consequences of the COVID-19 pandemic, among which is a fake or false information. It has become a commonplace that, fabricated information is spreading like an inferno on social media that requires morality in the internet as it has been existing among humans. The trustworthiness of information seen on the social media is often questioned for its authenticity in our society, as much information on the web are part of conspiracy theories, fake, false or misinformation, among others (Adakawa & Harinarayana, 2022). Different programs, interventions, and approaches have been proposed to guide the policymaking process on how to integrate ethics into AI to allow ethical interface between the users (learners) and machine. Examples of such approaches include applied philosophy (Canca, 2020), bring ethics back to equation and pursue a good technology (Gambelin, 2022), avoid fake information (Comm, 2014), to mention but a few.

However, despite these programs, interventions, and approaches to address the problem of ethics as regard to living in digital world, the issues are still emanating. The consequences of not addressing these problems result in psychological, environmental, social, etc. problems. Unless the problem of AI ethics in education is looked at from virtue philosophy, the problems of ethics will continue to evolve. That is, AI developers are governed by different deontology doctrines regardless of consequences of users of the technology (learners) are governed by consequential ethics, especially if observed through normative ethics perspective. In other words, the philosophies guiding supposedly different worlds entirely vary, and the essence of this paper is to try to bring them closer for a mutual benefit of either worlds one resides in. As

captured by von der Pfordten, (2012) who observed that, normative ethics must have five elements, which include normative individualism (individual-centric), individual's concerns and interests, actions geared towards norms and values, balancing of these concerns, and relativity of self and others about meta-principles. In this respect, the current paper tries to look at the integration of AI in education from the perspective of goals set by institutions to enhance human cognitive abilities and realize such a transformation possible.

1. Background

The emergence of universities since antiquity to present and possibly future has many things to inform the contemporary world. Universities of yesterday, despite most of them are still existing, the true picture of the reasons why they were established remained and buried with those stakeholders. Contemporarily, the current scholars are trying to sketch the missions and visions of such historic intellectuals whose shadows made it possible for the continuation of knowledge creation, distribution, and usage to the ends it is today. It is possible to argue that they had something that has to do with advancing knowledge through criticizing the then available theories, principles, mechanisms, etc., to perfect practice. Many researchers have questioned the adequacy of the 20th century system of education fed into 21st century that is not functional (Loorbach & Wittmayer, 2023). For universities to be equal to the contemporary technological advancements, they must consolidate their existing capabilities and evolve approaches, principles, and measures to meet the demand of new age of users (learners, researchers, and communities).

One of the ways through which this challenge can be ameliorated is by training students to be active thinkers so that intelligent questions can always be raised. This is due to the recognition that, from the singularity timeline, questions are becoming more important in perfecting the natural intelligence (NI), which AI depends on and provides answers to (Leonhard, 2014). To achieve this, the conception of AI as a world of its own requirements human to remind him other worlds that outnumbered him in terms of proliferation (such as microbial world), intelligence (such as species within animal kingdom), and many other attributes. Still, humans

derive seeming uncountable benefits in addition to negative consequences of such worlds. To put AI in the whole equation of the future requires a careful constructing of ideas and assessment of the past and present scenarios that can remove all doubts or at least some small portions of it and nest it into the fabric of possibilities that could happen. To achieve this, it is important to consider AI as an emerging field of study whose spectrum is still unraveling itself bit by bit. This implies that, the curriculum needs to change from producing a workforce that can manage industries solely to becoming individuals with intelligence to ask critical questions. Bringing philosophy back to the equation implies the learners must adapt to asking critical questions that allow AI to continue.

AI has penetrated every aspect of today's transactions. In a more seeming analogue, what happened during the medieval ages were great philosophers such as Aristotle, Plato, Socrates, etc. had championed in asking questions than providing answers, the contemporary students should be trained to emulate them in that regard. It is from the contributions of those great scholars who defined what natural science is, what social science is, what computer science is, to mention but a few. That is, their knowledge gave directions to what is in chemistry, biology, mathematics, physics, etc. to the extent contemporary authors such as Rosenberg, (2008) presume that, whatever a discipline fails to understand, they refer it to philosophy to provide good answers to or give logically or sufficiently necessary conditions for such a phenomenon. In this sense, for AI to flourish like other disciplines, doctoral students who take part in most of the nagging issues that have to do with discovering realities need to have defined goals. Setting specific than diffused goals can motivate and increase performance among individuals. Compared to vague, easy goals (e.g., "Do your best"), specific, challenging goals boost performance. In a review of four decades of goal-setting research, Locke and Latham (2006) claim, "so long as a person is committed to the goal, has the requisite ability to attain it, and does not have conflicting goals; there is a positive, linear relationship between goal difficulty and task performance." In effect, doctoral study should be tied with the goal of asking intelligent questions that can allow the progression of AI and NI proportionately.

2. Statement of the Problem

It is a known fact that, scientific inquiry is an evolving process that details how to make empirical observations about a given phenomenon and analyze those observations to improve or refine practices thereby facilitating explanations, predictions, and control of the phenomenon of interest (Bowman & Spence, 2020). Open materials (method section) and data (result section) are practices that allow authors to share research materials or data freely without any qualifications. The methods section provides sampling frames, procedures, stimulus materials, measures of key variables, to mention but a few. Because of the space constraints in most journals and maintenance difficulties experienced by institutional repositories, third parties provide access to research materials via GitHub (GitHub.com), Open Science Framework (osf.io), to the extent some have DOI for ensuring proper citation of the authors who provide such materials. In addition, research materials provide replication of research (test of stability or conceptual replications) (Bowman & Spence, 2020).

As it appears from the onset of this paper, it does not intend to be exclusively exhaustive, rather contribute to the continuous growth of AI discussion in various issues that have to do with scholarly communication. In line with this fact, research has shown that, many of the previous researches cannot be replicated and in health sector, for instance, production of drugs is costly as a single drug can cost up to \$2.6 billion and the success rate is 1/20. This makes medical error 3rd to the leading cause of death, the others been heart disease and cancer (Gabriel, 2019). This necessitates using technologies, especially AI that can aid in the replication of accurate research findings. Since research has shown that, COVID-19 pandemic has assisted in the consolidation of technology into humans and a significant number of researchers are continually engaged in self-learning, the current paper is an attempt to shed more light on how AI can effectively integrate into scholarly communications for enhanced human cognitive abilities.

To achieve the objectives of this article, the paper tries to discuss issues according to the following subheadings

- . Why is AI a Necessity in the Contemporary Education Research?
- . Understanding AI in Scholarly Communications
- . AI in Open Software, Source Code, and Data
- . AI in Peer Review Process
- . AI and Individual Adaptive Learning Systems
- . AI in Enhancing Human Cognitive Abilities
- . Contributions of the Current Paper on the Major Theme of the Conference

3. Why is AI a Necessity in the Contemporary Education Research?

Studies about AI have grown so fast, wide, and largely diffused in all directions that to track them is a challenge, let alone accounting for them in a single study, which remains impossible (Oke, 2008). To add to this dilemma, the number of journals, chapters, books, etc. dedicated to AI is enormous and increases at an alarming rate. Such information resources contain replications of already investigated studies to understand the pattern of their behavior or growth and advance the frontiers of seemingly unexplored phenomena that make them to propagate in undiminished manner. To agree with this fact, many researchers noted that, studies on AI revolved around 16 domain-specific areas. These areas include “reasoning, programming, artificial life, belief revision, data mining, distributed AI, expert systems, genetic algorithms, systems, knowledge representation, machine learning, natural language understanding, neural networks, theorem proving, constraint satisfaction, and theory of computation” (Peng & Zhang, 2007; Zhou et al., 2007; Wang et al., 2007 cited in Oke, 2008). This implies that, the scope of AI is expansive thus becomes a necessity in most of human activities. To add to this debate, this is especially the case considering a crowdsourcing platform that requires multitasking with accuracy and precision. In this way, as exemplified in Amazon Mechanical Turk by Weld et al., (n.d) taking into considerations the applications

for performing tasks such as product categorization, photo-tagging, audio transcription and translation, etc., they require complex self-managing workflows.

The growth in computer architecture that transformed the face of science and engineering has also changed the relationships between people and organizations to the extent of studying the intelligent behavior of living and engineered systems (Singh et al., 2013). AI deals with the study and design of an intelligent agent that perceives its environment and takes actions, thereby maximizing its chances of success. In other words, AI is an agent that holds two seeming different ideas in mind simultaneously and still able to execute them appropriately and precisely at the same time. It learns from the past, reasons for taking appropriate decision, and possesses inference power and quick response (Singh et al., 2013). These developments might have originated from the fact that human needs are endless and to meet them, needs-aware intelligent systems are necessary. That is, “re-thinking needs for, though, by, and with AI can be a very useful means towards the development of realistic approaches for sustainable Human-aware, Accountable, Lawful, and Ethical (HALE) AI systems” (Human & Watkins, 2023, p. 811). This means that, the primary aim of any technology, including AI, is to serve human needs. This agrees with Lee, (2014) cited in Human and Watkins, (2023, p. 812) that, “AI will learn to serve human needs” and they presume that, the problem with needs is its limitless and formless nature. That is, there is no standard agreed definition of what constitutes needs itself, let alone having a consensus on the needs of individuals, organizations, or societies. Except that, more AI applications are emerging, becoming more important for peoples’ lives, which may not necessarily wait for needs scholars and practitioners to sit on fences. Despite intelligent agents have already begun to change life in many human endeavors, there is inadequate mechanism of integrating awareness of needs into their design, implementation or evaluation. Defining needs as an intrinsic necessity for the well-being of a system, needs-aware AI must have cognitive and social (contextual and collective) dimensions of human-aware AI (Human & Watkins, 2021).

To sum it all, a submission by Adakawa and Harinarayana, (2022) suggests the fact that, AI is a necessity in education research for the following reasons:

. Intellectual Property Rights (IPR): IP is a measure employed by many indices as a determiner of economic development used in categorizing developed and developing countries (Tewari & Bhardwaj, 2021 cited in Adakawa & Harinarayana, 2022). According to this standard, European countries depend largely on IP.

. Innovations in scholarly communication: It is a known fact that, scholarly communication is never a static endeavor, rather a dynamic entity that requires transformational ideas to survive. The contentious issue resides within sustainability, accessibility, responsibility as in whose accountability to ensure logarithmic progression—librarians, publishers, academic institutions, or authors (Laakso, Matthias, & Jahn, 2021 cited in Adakawa & Harinarayana, 2022).

. From the perspective of triple helix theory, for an innovation to be a reality, there must be a triad of university-industry-government. In this sense, for a government to function in coordinating this triad effectively, it must get involved in designing curriculum or AI-based spaces especially for doctoral students to engage in critical thinking, reading, and reflections. This will serve as a contributory segment of education to economic growth of nations, regions, sectors, and globe alike.

. In addition, there is an enormous increase in reviews annually. How can the scholarly community contribute an increase in the qualitative research output? How to maximize employing AI-based applications that can foster an increase in the rapid review process annually? At present, every year, there are about 13.7 million reviews taking place and how to increase it before 2050 to either double or triple to 27.4 or 41.1 million per annum? The fact that, there is still a fresh debate among scholars regarding AI performing reviews, it is better to distinguish those research outputs that can best be performed by researchers and those that AI can. In between the two, there lies the need to combine the two components of human-computer aided amalgam

4. Understanding AI in Scholarly Communications

AI is continually becoming ubiquitous in news and popular culture. For it to contribute to scientific communication, it must be “grounded in the values of trust and integrity fundamental to scholarly communications” (STM, 2021, p. 3). To begin with, AI is a machine-based system that operates on a seemingly large-scale having varying levels of autonomy thereby “make[ing] predictions, recommendations, or decisions influencing real or virtual environments” relevant only “where large volumes of data and information are processed” thus “offer[ing] many potential benefits for citizens, the public good and the economy at large”. It is human-centric, trying to improve in ensuring fundamental rights and values (STM, 2021). That is why, software applications, platforms, and infrastructures continue to affect research in large-scale networking systems at alarming rate, which makes it to be unpredictable in all ramifications or regarded as huge transformation due to virtualization and cloud computing (Chemouil et al., 2019). To support this transformation, there is a need for newer technologies such as Software-Defined Networking (SDN), Network Function Virtualization (NFV), among others, which accelerated the need to enhance improved network automation thereby increasing the complexity of the agile infrastructures (Chemouil et al., 2019). AI has diversified in penetrating scientific disciplines through computer vision, NLP, and speech recognition due to its data-driven nature, which enables understanding the complexity of communication and networking environment and adjust protocols without human intervention. In other words, AI techniques for network management, operations, and automation are in such a way to address networking problems through altering designs. This is possible via:

- . Cut of costs of prototyping through cloud computing in an academic environment
- . Big-data paradigm has enabled researchers in accessing researches easier than when it was under skewed companies
- . Emergence of programmable system technologies that allow realignment of system design and implementation simultaneously (Chemouil et al., 2019).

On the one hand, AI and communications have different trajectories as they belong to different paradigms of communication theory. While the former relies heavily on how to mimic human intelligence including communication-using machine, the latter recognized communication as a human process facilitated by technology. The gap narrows extensively through AI-based technologies serving as communicators, especially via Internet of things (IoT) (Guzman & Lewis, 2020). The previous conception of communication media that assists in exchange for information from people to one another, AI technologies exchange information with humans. It therefore automates communication and facilitates communication. To be specific, from Human-Machine-Communication (HCM) approach that deals with “the creation of meaning among humans and machines”, it focuses on the interactions of technologies with humans as communicative subjects not merely interactive objects. In this way, AI serves to understand human language not only a machine language where it can function as a conversational agent (i.e. voice-based assistant) and automated writing software supported by NLP and NLG respectively (Guzman & Lewis, 2020). This suggests that, using AI in a human-centric direction with focus on ethics, it can be applied not only in testing hypotheses in data-driven context rather generating newer theories with novel connections thereby assisting in providing insights into unknown causes (STM, 2021). According to STM, (2021), publishers have been at the forefront in serving academic scholars and scientists since the 16th century by strengthening the ties between researchers, their research, and the globe. With the advancement in technology, AI continually deepens and widens this partnership. Based on this context, publishers are involved in three broad areas, namely

Publishers serve as the providers of information and data on which AI runs. In this sense, they support the true, high-quality input in required digital formats and training data used by AI developers and systems, thereby producing efficient, trustworthy, and ethical outputs. In this direction, publishers serve as the gateway to validate, normalize, and tag content, and deliver it in robust, interoperable, and in a globally standard format.

Publishers engage in using AI either developed in-house or provided by the third parties, thus supporting workflows and services for authors, editors, and reviewers.

Publishers use AI in external-facing tools and services for classifying and recommending relevant content to readers and authors (STM, 2021).

Using NLP to generate voice-based assistance, NLG to produce automated-writing programs, and dynamically of technologies in understanding the context, message fed into them, and respond accordingly, is a step forward in ensuring the life-like communication of AI-based technologies with humans (Guzman & Lewis, 2021). The fact that, humans understood that, it was other humans (programmers) that have created machines, when it comes to exchange of messages, they don't communicate with programmers rather the machines resulting in the perception of robots as communicative partners different from people but social nonetheless (Sundar & Nass, 2000; Edwards et al., 2016 cited in Guzman & Lewis, 2021). This duality of blurring ontological divide between humans and machines poses a theoretical problem to communication researchers. This is partly because, from an anthropocentric conception of communication, it is absolutely and uniquely a human trait relegating technologies as a mere medium. While some scholars are still within the anthropocentric paradigm, other communication researchers prescribed to AI as a meaning-making or communicative subject paradigm within HMC (Guzman & Lewis, 2021).

From the work of Hohenstein et al., (2023), it follows that, every day, algorithmic response suggestions (smart responses) generate billions of messages accounting for 12% of all messages sent through emails in 2017 representing 6.7 billion emails every day. This changes the way humans perceive one another in a pro- and anti-social way, and thus affects language and social relationships. Similarly, using AI ensures communication to be faster, employing positive emotional language that allows conversation partners to evaluate one another. However, it increases negative emotions if people discover that their conversation partners are using smart or algorithmic responses (Hohenstein et al., 2023). In a subjectivity task such as jokes or humors, researchers found varying results as regard to using AI in telling stories. For instance, Bower and Steyvers, (2021) referenced Tay et al., (2016), who noted that, respondents perceived funnier stories when told by humans than by robots, especially if they

are non-disparaging ones. Similarly, respondents perceived less appropriateness when robots are used to deliver humors in conflict-mediation (Stoll et al., 2018 cited in Bower & Steyvers, 2021). From another perspective, some scholars, such as Koivisto and Grassini, (2023) have tried to experimentally test the creativity of AI and humans. While their study found that, despite creativity is a multifaceted phenomenon, concentrating on performance in most used task i.e. Alternate Uses Task (AUT), they found that, AI chatbots have outperformed humans, the best humans, however, can compete with them. These researchers used Guilford divergent (spontaneous) and convergent (controlled) thinking theory, associative theory, and controlled attention theory to arrive at the above conclusion (Koivisto & Grassini, 2023). Additionally, some researchers investigated the likelihood of committing errors and biases because of inheriting them from using AI-based operations in pre- and post-usage (Vicente & Matute, 2023).

5. AI in Open Software, Source Code, and Data

The free software (FS) movement, which is the precursor to the open source (OS) movement, was founded on the philosophy of software freedom, copyright, copyleft, etc. The former laid a strong foundation if viewed from technological, legal, and ideological perspectives for the latter to thrive and progress, which well along the line generated heated debates on the differences or similarities of ideological and socio-psychological motivations between the two movements (Vainio & Vadén, 2007). His manifesto is full of insights as he anticipated things, which later became true. His arguments such as “control over the use of one’s ideas really constitutes control over other people’s lives, and it is usually to make their lives difficult” (Vainio & Vadén, 2007, p. 3) brought the idea of a community. A community, according to him, can be a hacker community, a computer-using community, society, and humanity, which implies from the small arise the big complexity. The idea of the free software can be traced to the Massachusetts Institute of Technology (MIT) young male electronics called hackers who were interested in things i.e. anything computing and defined by values of freedom, intelligence, technical skills, computing above all else. These features led them to embody the spirit of freedom of software according to the 6 rules

- . Access to computers—and anything, which might teach you something about the way the world works—should be unlimited and total. Always yield to the hands-on imperative!
- . All information should be free
- . Mistrust authority—promote decentralization
- . Hackers should be judged by their hacking, not bogus criteria such as degrees, age, race, or position
- . You can create art and beauty on a computer
- . Computers can change your life for the better (Levy, 1984, pp. 40–4 cited in Vainio & Vadén, 2007, p. 2)

From the surface, it appears that, Stallman is not against the capitalist economy, rather trying to open a forum between programmers and users. In this sense, perhaps he believes that there would come a time when the number of programs would be large and their repetitiveness becomes irrelevant. For instance, Istepanian et al. (2017) cited in Habran et al., (2018) observed that, in 2017 alone, there were about 1200 different applications for use for patients who developed symptoms of asthma. Instead of using these applications in large number for a specific group of users, there must be coordination among developers and users and what each part needs from the other. To be precise, Stallman declared four (4) freedoms of software, which are

- . Freedom 0: The freedom to run the program, for any purpose
- . Freedom 1: The freedom to study how the program works, and adapt it to your needs; access to the source code is a precondition for this
- . Freedom 2: The freedom to redistribute copies so you can help your neighbor
- . Freedom 3: The freedom to improve the program, and release your improvements to the public, so that the whole community benefits; access to the source code is a precondition for this (Stallman, 2002, p. 41 cited in Vainio & Vadén, 2007, p. 4)

Even though the free software movement began before open source, the former is a subset of the latter. This is to the extent that, Stallman, (2009) described the two as: Open Source is a

development methodology whereas free software is a social movement. To be precise, Vainio & Vadén, (2007) opined that, the difference between OS and FS is in their political economy inclination as business-friendly open source and ideological/political free software respectively. The ideology and principles used in free software (FS) and Open-Source Initiative (OSI) differ. The proponent of OS, Eric S. Raymond remarkably made a proclamation that, his motivations were purely tactical rather than principles and likewise the differences between the two movements. In effect, “the open-source movement is largely composed not of people who reject Stallman’s ideals, but rather of people who reject his rhetoric” (Raymond, 1999 cited in Vainio & Vadén, 2007, p. 7). In other words, “every good work of software starts by scratching a developer’s personal itch” (Raymond, 1999 cited in Vainio & Vadén, 2007, p.7), which contradicted FS manifesto of free operating system.

The importance of data is continually increasing as it affects almost all facets of human endeavors from transport, health, agriculture, to even weather forecasts. This is true as the UK economy gained about £241 billion from data in 2020, which implies its capacity to make or break businesses (Global Database, 2020). To begin with, open data “refers to any information that has been made available for anyone to access, alter, and share”, which can be public source (e.g. government data), business (e.g. company intelligence), can be used for commercial or non-commercial purposes without any legal or technical barriers. The importance of open data can never be overestimated, but can be narrowed down to the following:

- . Transparency: there is increase in openness of government information e.g. Data.gov.uk containing about 40,000 datasets, which harbors government spending, crime statistics, etc.
- . Economic importance: in the UK, the companies that invest in open data account for £92 billion with employability of 500,000 people
- . Societal importance: open data opens opportunities for companies and organizations for enhancing innovations and creating new projects such as transport, healthcare, etc., that can impact community positively (Global Database, 2020)

Despite time constraint, literature is scanty specifically on relationships between AI and FS, OS, and Open Data. It can be argued that, based on the little review done above, these movements have and still are paving the way for the development of programs, protocols, libraries, etc. used in the growth of AI, thereby attaining its status today and beyond. This implies that, opening software and source codes as well as data means opening technological advancements. This is especially true considering the freedoms attached to them that enable the individual to run, modify, and share the software or code according to the pressing needs now. As the need changes, the circumstances surrounding them do so in similar proportions. How can these modifications assist in doctoral journey? As a known fact, doctoral students are motivated by desire, curiosity, passion, etc. to know what is happening, to dig in deeply to unravel the intricacies and mysteries associated with the realities they are investigating, to find meaning on what a why things going the way they do, etc. This spirit is attached with curiosity to use wisdom to ask intelligent questions thereby linking this generation with hackers of 1950s in their interest in intelligence, technical skills, among others; it will lead to the advancement of AI in raising important questions.

6. AI in Peer Review Process

Review is a complex process that involves many intricate and secret activities that remain difficult to study (Mrowinski et al., 2017) but its peripherals or resultants such as citations; Altmetrics, etc. are easy to investigate. This is largely due to the editorial process that is always behind the scene of the third parties for ensuring standardization and adherence strictly to the ethical guidelines and editorial policies. Recently, the scholarly communication process continually witnesses remarkably unprecedented increase in the submission and incessant request to reviewers to perform peer review of manuscripts. This is true as manuscript submission increases by 6.1% yearly since 2013 (Publons, 2018 cited in Checco et al., 2021). To be precise, in their review paper, Adakawa and Harinarayana, (2022) cited Severin et al., (2021) who noted that, every year, about 13.7 million reviews take place consuming averagely 5 hours of reviewer's time. The number of hours spent on the review worries the scholarly community, particularly if spread across the entire process and the time allocated to each

manuscript. That is why, every year, about 15 million hours are spent on reviewing manuscripts previously rejected and then submitted to other journals for publications. This implies the need to ensure the quality of research output before making it a permanent, registered scholarly output (Checco et al., 2021). In terms of making the quality of research output viable, much software that use screening tools already employ AI, ML, NLP for “plagiarism prevention, requirement compliance checks, and reviewer manuscript matching and scoring” (Checco et al., 2021, p. 2). Some of these tools are Statcheck (statistics reporting), Penelope.ai (references and manuscript structure), UNSILO (summarizing concepts in a manuscript), among others (Checco et al., 2021). The main concern of the reviewers is to ensure “authenticity, appropriateness, soundness, precision, and clarity of research” (Adakawa & Harinarayana, 2022, p. 4) before publishing.

One important aspect of the reviewing process is that the reviewers to engage in other research activities, funded research, community projects, to mention but a few. This implies that, most often than not, they are constrained to do the reviewing for others and conduct research for their own promotions in their various endeavors. Fortunately, AI has been recognized as support to the review process. The implication is that, in trying to save the time of the reviewers in more tedious parts of the review process that require less intellectual input or domain expertise and guard against biases in decision-making (i.e. language, gender, institutions), a significant component of quality assurance might be missing (Checco et al., 2021, p. 2). In addition, peer review, an understudied and under-reported process, is the only filter or a capstone in the scientific world that ensures precision of research output before released to the public, however, it is a frustrating journey for both authors, reviewers, and editors. For authors, they get frustrated for the delay inherent in the process and editors become irritated to round up individual reviews received and take the final decision (Mrowinski et al., 2017). From the work of Mrowinski et al., (2017), it follows that, editors use artificial review threads for inviting reviewers. The algorithm has invitation phase, inquiry phase, no response, and confirmation phase.

On the other hand, as a known fact that quality in the review process is confidential and the definition of the word quality is ambiguous, through thoroughness and helpfulness, researchers in used ML to study 10, 000 peer review reports in medical journals. The researchers found variability among high and low-impact journals. While the former spent considerable amount of time discussing methods used in papers with little or no suggestions on improving reviews, the latter do the otherwise (Severin et al., 2022). The term quality is relative and elusive, as it refers to something different than stakeholders in the research cycle. For instance, for authors, they need timely advice on improving their manuscripts. Whereas for editors, they need suggestions with reasons on whether to publish a submitted manuscript. They randomly selected 10000 reviews from medical, life science journals, and manually assigned 2000 sentences to materials and methods, presentation, results and discussion. Then they trained ML to predict categories of 187,000 sentences. Because of non-uniformity among the high and low-impact journals, they arrived at a conclusion that, “the journal impact factor is a bad predictor for the quality of review of an individual manuscript” (Severin et al., 2022).

7. AI and Individual Adaptive Learning Systems

AI has four (4) distinct history or life cycles as captured by Jakkola et al., (2019) cited in Azmi, (2020). These cycles are:

- . 1st cycle (Programming cycle [1940-1960]) characterized by digital computers, brain model, AI in code
- . 2nd cycle (Expert system [1970]) characterized by Mycin, Hypertext, proplog, etc.
- . 3rd cycle (AI architecture [1980-2000]) characterized by non-linear statistics research, Neural Network, SQM, FGCS, WWW, HTML, among others
- . 4th cycle (Self-learning [2010-2020]) characterized by Deep learning, machine intelligence, among others

From the above trend, there is a correlation between AI and adaptive learning systems. To begin with, Donald Taylor conducted a survey in 2020 comprising 2,000 respondents to rank

the most popular topics in workplace learning. From the investigation, since 2017, adaptive learning has been ranked at the top only to be taken over by learning analytics in 2020. Furthermore, in a report by EDUCAUSE Horizon (2020) cited in Capuano and Caballé, (2020), it included “adaptive learning among the six emerging technologies and practices for higher education” (Capuano & Caballé, 2020, p. 96). This is true as it is considered one of the most profound initiatives to improve student learning. The essential elements in adaptive learning (AL) system is the capacity to learn from the previous big data coming from 3 components, namely, learner model (user profiling), content model (domain model), and adaptive model (narrative and instructional models) (Azmi, 2020). Perhaps this is why it is linked with AI in many respects, especially considering its origin in the 1970s where it encountered many transitions from semantic networks and expert systems to computer-based training systems to mimic aspects of human teaching (Capuano & Caballé, 2020). It was until the 2000s that policymakers began to pay maximum attention to and fund initiatives encouraging personalized learning following the rise of online education for individuals to achieve their personal educational goals (Capuano & Caballé, 2020). Thus, “adaptive learning refers to technologies that dynamically adjust to the level or type of course content based on an individual’s abilities or skill attainment, in ways that accelerate a learner’s performance with both automated and instructor interventions” (Capuano & Caballé, 2020, p. 96).

To commensurate with the above facts, Krechetov & Romanenko, (2020) noted that, adaptive learning has gained prominence, especially in American and European universities using adaptive learning platforms such as Knewton or Cerego. The courseware provided by such platforms serve learning tools to support traditional classrooms. These platforms are good at providing cost-effective solution to complex AI and big data analytics challenges, which are trending and created a promising platform in the market of educational software. It has been designed for adult, corporate education, specifically foreign language services (Krechetov & Romanenko, 2020). The importance of technology in higher education institutions (HEI) cannot be contained in a single study. For instance, virtual reality overturned the face of classrooms thereby ushering in the technology-enhanced teaching and learning systems that allow students to acquire knowledge and develop skills through the assistance given by

lecturers, tutors, learning support tools, technological resources, etc. (Gros, 2016 cited in Kabudi et al., 2021). To be precise, it was only during the pandemic that the indispensability of such became not only important but mandatory for the running of education in most institutions. This where students and lecturers demonstrated key roles in the process of learning these technologies. The most prominent learning systems include Blackboard, Moodle, Web CT and Canvas (Ushakov, 2017 cited in Kabudi et al., 2021). They are significant in several ways, such as “availability and accessibility to course materials, cost savings, collaboration among students and lecturers, improved performance, feedback from users and effective communication” (Criollo-C et al., 2018 cited in Kabudi et al., 2021). Many researchers indicated the increased interactions between machines and humans, especially due to the lockdown experienced during the pandemic.

8. AI in Enhancing Human Cognitive Abilities

Right from childhood to adulthood, there is always a series of theory formulation and prediction that resonates within the human mind. For instance, children as remarkable learners can construct “intuitive theories that support prediction, explanation, intervention, and discovery”, which lays the foundation for scientific inquiry (Siegel et al., 2021). That is, humans are very at making assumptions when confronted with unknown phenomenon that compels them to dig further to unravel the mysteries inherent in such a phenomenon until they find a satisfactory or an approximate answer. Fortunately, curiosity-driven learning is the key or capstone to human cognition, which enables him to set intrinsic goals to be self-organizing thereby deciding what and when to learn (Ten et al., 2021). These researchers were able to discern that, “while humans rely on competence information to avoid easy tasks, models that include a learning-progress component provide the best fit to task selection data” (Ten et al., 2021, p. 1). Interestingly, curiosity, a wick in the candle, stimulates learning, which, in return, is stimulated by prediction. It is associated with better memory for finding the correct answer (Brod & Breitwieser, 2019).

From an evolutionary perspective, there is a correlation between socio-cognitive ability and human evolution. Humans become ecologically dominant due to their intra and intergroup competition and cooperation that allowed them to develop different socio-cognitive abilities (). Information behavior is a unique feature of human characteristics that distinguishes human brains from other mammals. There is a marked difference between the human brain of today and pre-human form because of a great leap-type neurological transformation. This allowed humans to survive while Neanderthals could not. Alternatively, the difference emerged due to increased brain size, as the contemporary human brain has sevenfold compared to apes. Socio-cognitive ability and intelligence serve as a social tool (which changed physical attributes) to improve intra-group cooperation in competition with other groups (Spink & Cole, 2007). Predominantly, what motivates human cognitive abilities are not absolutely problems due to environmental challenges but social problems, thereby allowing one another to select others good at social manipulation (Alexander 1990 cited in Spink & Cole, 2007).

One of the ways to improve human cognitive abilities is to redefine the rationale for pursuing Doctoral Studies. For instance, Guo (2014) viewed doctoral studies as the only way to spend 4 to 8 years paid to work on something that the market does not directly value in the short term. Brailsford (2010), believed that the motives and aspirations cited by the participants validate several of the categories identified in the limited existing literature, such as improving career prospects, personal development, and intrinsic interest in their discipline. Moreover, the data support the contention that candidates enter the doctorate with multiple motives. From this history sample, however, there were no overt motives relating to the participants' sense of their own identity and pressing social justice concerns or 'research as politics'. The data reveal that third parties (friends, colleagues, family members, and academics) when consulted before enrollment did play a generally encouraging role in the decision to start a doctorate. Similarly, Mujtaba, Scharff, Cavico and Mujtaba (nd) observed that, earning a doctorate degree is one of the highest honors in one's journey of academic progress; yet very few candidates achieve this rank. Part of the reason for some of the challenges in achieving such a rank can be the time requirement, the rigorous and focused research process, passing the comprehensive examinations, a publication requirement, and successfully finishing the

journal of the dissertation. Of course, the dissertation journey can be an unpredictable and an uncertain trip as it involves many uncertainties. Clement and DeRosa (nd) had the viewpoint from job opportunities and thus stated that, doctoral study may be the required preparation to become a superintendent or central office administrator. Governmental positions in state boards of education may require doctoral degrees.

Goal setting is one of the most replicated and influential paradigms in the management literature (Ordóñez et al., 2009). Goal setting has been promoted as a halcyon pill for improving individual motivation and performance in organizations, as “goal directness characterizes the actions of all living organisms” (Latham & Locke, 1991, p. 212). To be precise, humans possess a higher form of consciousness, the ability to reason, conceptualize goals, set long-range purposes. Purposeful actions among humans are volitional that allows them to choose what is beneficial, how to achieve it, means of achieving it, and act towards that goal (Latham & Locke, 1991). Across hundreds of experiments, dozens of tasks and thousands of participants across four continents, the results are clear (Locke et al., 1990). As captured by Locke and Latham (2006), who claimed that “so long as a person is committed to the goal, has the requisite ability to attain it, and does not have conflicting goals; there is a positive, linear relationship between goal difficulty and task performance.” For doctoral students to be engaged in research thereby raising important questions that can assist in developing AI progressively, a defined goal is mandatory. Instead, to being users of the technology solely, doctoral students should be trained on how to ask critical questions that can allow AI developers or programmers to continue developing important algorithms that can impact society positively.

9. Contributions of the Current Paper on the Major Theme of the Conference

It is a common belief among researchers that, most often than not, pragmatic problems do not require practical solutions. To tally with the major theme of this conference as regard to ethical considerations while using AI, attention of scholars and stakeholders should focus on publishers: their philosophies, principles, theories, etc. as why they publish what they publish.

This question is important and critical because, STM, (2021) highlighted the roles played by publishers in linking and providing research, protocols, codes, databases, procedures, etc. to users.

Based on this figure, the philosophy behind publishers should be explored by researchers as why they publish what they publish despite ethical breach. In other words, attention of stakeholders should be directed at bringing modalities through which publishers would convene a conference on how to ensure software used in education is ethically clean and that, the contents should be merged thereby knowing what and why the contents are uploaded for general consumption. This is because, restricting ethics to learners will do more harm than good and significant players are left, thereby focusing on weaker users.

Conclusion

Universities are like a large reservoir of water that provides its contents to all those get access to it. Each person goes with a pail to fetch water depending upon their research inclination, curiosity, professionalism, etc. they are good at, and that, the water fetched will be used for different purposes. As captured by William Butler Yeats, “education is not the filling of a pail, but the lighting of a fire” implies that, different people will apply the water based on their learning capacity and curiosity to use it for pressing need now. Furthermore, technology will continue to impact education in a few ways for the contemporary and future education landscape. However, it is such that, critical questions that can equip AI developers have to continue flowing in an undiminished manner for the technology to continue thriving in a positive direction. To ensure this, production of research output is critical to allow the curious minds continue asking critical questions for the AI to prosper and progress.

Since medieval ages, professors are known to stick to permanent interests of the public. This implies that, philosophy is at loggerhead with intelligent questions. Critical observation into the philosophers of the Middle Ages particularly Aristotle, Plato, Socrates, to mention but a few, had demonstrated enthusiasm and worked tirelessly to ensure the progression of

education to the ends it is today. One of the few hopes remaining contemporarily is to use doctoral students as an engine of propelling the flow of ideas that will continue to provide directions for developing appropriate algorithms for the present and future generations to benefit and hand over the education to the next generations successfully. Developing AI-based space just like makerspaces and hackerspaces in cyberspace will pave the way for bringing convening intelligent intellectual gatherings that can feed the AI-based technology progressively.

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