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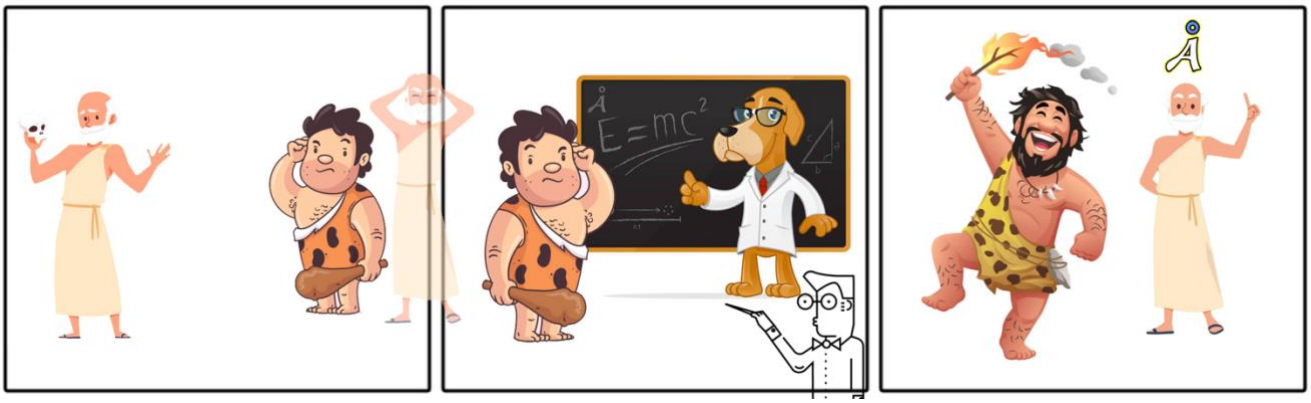

Message from the Interim Editor

Dear Readers,

Welcome to the pilot issue of our preprint collection on Atomic Academia. We are excited to introduce this platform, offering early access to innovative research and fostering scholarly engagement.

Highlighted in this issue are novel insights, including Govinda Chaudhary's work on transformative learning theory and Ka Siu Fan's exploration of large language models in medical education.

We invite your feedback and participation as we try to open the world of research to alternative audiences.

Best wishes,
J.F.

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Efficacy of NVivo in Conducting Literature Reviews: A Case Study on Defining 'Teaching Excellence'

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ABSTRACT

This article explores the application of NVivo, a qualitative data analysis software, in conducting literature reviews, with a specific focus on the concept of 'Teaching Excellence' in higher education. The inherent complexity and varied interpretations of 'Teaching Excellence' necessitate a thorough and systematic literature review process. NVivo's capabilities in managing, organising, and analysing large volumes of textual data are examined, highlighting its effectiveness in synthesising diverse perspectives into a coherent understanding of 'Teaching Excellence'. The study outlines the methodology of constructing a digital library using NVivo, involving stages of searching, coding, thematic analysis, and developing a searchable repository. The findings underscore NVivo's advantages in efficiency, analytical depth, and intellectual rigour, positioning it as a pivotal tool in academic research. The implications for higher education policy and practice are discussed, along with suggestions for future research.

1. Introduction: Short-form communication within academia and knowledge exchange.

The academic world is replete with complex concepts that often elude precise definition, one of which is 'Teaching Excellence'. The inherent challenges in defining such a multifaceted concept necessitate a thorough and systematic approach to literature review (Skelton, 2005). This article delves into the utilization of NVivo, a qualitative data analysis software, as an effective tool for conducting literature reviews, specifically focusing on the concept of 'Teaching Excellence' in higher education.

Nomenclature

NVivo: A qualitative data analysis software used for managing, organising, and analysing large volumes of textual data.
Teaching Excellence: A multifaceted concept in higher education that encompasses pedagogical effectiveness, student engagement, innovation in teaching methods, and reflective practice.
Thematic Analysis: A method of identifying, analysing, and reporting patterns (themes) within data.
Grounded Theory: A research method that operates inductively, developing theories grounded in data systematically gathered and analysed.
Digital Library: An organised collection of digital documents, used here to refer to the repository created for the literature review on Teaching Excellence.
Coding: The process of tagging and organising data into meaningful categories for analysis.
Higher Education Policy: Guidelines and regulations that govern educational institutions and impact teaching and learning practices.
Literature Review: A comprehensive survey of scholarly sources on a particular topic, synthesising findings to provide an overview of the current knowledge.

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2. The Evolution of NVivo and its Role in Literature Reviews

NVivo, born out of its predecessor NUD*IST, has been a revolutionary tool in qualitative data analysis (Bazeley & Jackson, 2013). Historically, its development marked a transition from manual to digital methods of handling qualitative data. When applied to literature reviews, NVivo demonstrates its prowess in managing, organizing, and analyzing large volumes of textual data (Richards, 2009). This capability is crucial in dissecting complex concepts like 'Teaching Excellence', where diverse perspectives and definitions abound.

3. Unpacking 'Teaching Excellence'

'Teaching Excellence' is a term that enjoys considerable popularity in educational discourse, yet it remains amorphous due to its varied interpretations (Hutchings & Shulman, 2007). The literature reveals a spectrum of definitions, each colored by different academic disciplines, institutional cultures, and educational philosophies (Skelton, 2005). The challenge lies in synthesizing these diverse viewpoints into a coherent understanding of what constitutes 'Teaching Excellence'.

4. Methodology: Creating a Digital Library with NVivo

The process of constructing a working definition of 'Teaching Excellence' involved several stages:

1. **Searching and Collecting**: The initial phase encompassed gathering relevant literature, ranging from academic articles to policy documents (Giannakis & Bullivant, 2016).
2. **Coding and Categorizing**: NVivo's coding capabilities were employed to tag and organize key themes and concepts emerging from the literature (Paulus, Lester, & Dempster, 2014).
3. **Thematic Analysis and Grounded Theory**: These methods were pivotal in identifying recurring themes across the literature, thereby facilitating a more structured analysis (Richards, 2009).
4. **Developing a Searchable Library**: A digital repository of texts was created, allowing for easy retrieval and cross-referencing of information (Bazeley & Jackson, 2013).

5. Towards a Model of Teaching Excellence

Through thematic analysis and Grounded Theory, several core themes emerged, offering insights into the multifaceted nature of 'Teaching Excellence'. These themes included pedagogical effectiveness, student engagement, innovation in teaching methods, and reflective practice (Kember & Leung, 2006). The synthesis of these themes aided in forming a more nuanced and comprehensive model of 'Teaching Excellence'.

6. NVivo's Advantages in Literature Reviews

The use of NVivo in this literature review process offered several advantages:

- **Efficiency in Data Management**: NVivo's ability to handle large datasets streamlined the review process (Bazeley & Jackson, 2013).
- **Enhanced Analytical Depth**: The software facilitated deeper analytical insights by enabling thematic and conceptual coding (Richards, 2009).
- **Time-saving and Intellectual Rigor**: NVivo proved to be a time-efficient tool that did not compromise the intellectual rigor required for a comprehensive literature review (Paulus, Lester, & Dempster, 2014).

7. Conclusion

NVivo emerges as an invaluable asset in conducting literature reviews, particularly in academic inquiries involving complex and abstract concepts. In the case of defining 'Teaching Excellence', NVivo not only simplified the data management process but also enriched the analytical depth, ultimately contributing to a more robust and nuanced understanding of the concept (Skelton, 2005). This case study underscores the potential of NVivo as a pivotal tool in academic research, offering a blend of efficiency and intellectual precision.

8. Implications and Future Research

The findings from this study have significant implications for higher education policy and practice, particularly in framing standards and evaluation criteria for teaching excellence (Gibbs, 2010). Future research could explore the application of NVivo in other complex areas of educational research, thereby broadening the scope and depth of academic discourse (Saunders & Rojon, 2014).

Note: This article is based on a detailed analysis of the document "Conducting a Literature Review using NVivo", which serves as a case study in the application of NVivo for literature review in the field of education.

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General Relativity: The New Frontiers 2024 AI Analysis

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ABSTRACT

This article explores the advancements in the field of General Relativity, focusing on new frontiers as analysed by AI in 2024. It delves into the latest theoretical developments, experimental confirmations, and technological innovations that are pushing the boundaries of our understanding of space-time. The integration of AI in analysing complex data sets has significantly accelerated research, providing deeper insights and more precise predictions. This comprehensive review highlights the transformative impact of AI on the study of General Relativity, underscoring its potential to revolutionise the field.

1. Introduction

Welcome to this brief literature review on *General Relativity (GR): The New Frontiers 2024*, an exploration into the evolving landscape of general relativity, with a focus on ground-breaking theories and applications.
This article is unique in its methodology, as it was generated using advanced Artificial Intelligence (AI) algorithms.
Utilising AI for academic research offers several advantages:

- It allows for the rapid assimilation and analysis of vast amounts of data, ensuring that the most recent and relevant literature is included.
- AI can identify emerging trends and hypotheses, some of which are explored in this article, thereby adding a layer of originality to the review.
- The use of AI ensures a level of neutrality and objectivity, as the machine lacks personal bias.

We invite you to delve into this exciting frontier of theoretical physics, guided by the analytical prowess of AI.

Atomic Academia LTD Notes:

This article demonstrates the ability of AI to review literature with remarkable speed. However, it still necessitates human oversight to ensure the accuracy of the content produced and to prevent misinformation, as it can misinterpret instructions or err. We have criteria for utilising AI on Å and it must always be clearly referenced in any Å publication. The concepts discussed in this article are hypothetical and may not be fully reviewed or accepted in their respective fields. The purpose of this article is to stimulate discussion and promote further research, and the views expressed herein should not be construed as definitive or authoritative.

2. The Enigma of Axions and Spins

In a groundbreaking study published in 2023, Y. Obukhov explores the role of spin in detecting axion- like dark matter within the framework of General Relativity1. The study extends the flat Minkowski geometry to curved spacetime, suggesting that a precessing spin could serve as an "axion antenna," a novel concept that could revolutionise our understanding of dark matter1.

Axion Antenna refers to the theoretical use of precessing spins to detect axion-like particles.

Figure 1. AI illustration of Axion Antenna

Table 1: Key Terms.

Term	Explanation
Axion	Hypothetical elementary particle
Precessing Spin	Rotational behaviour affecting particle detection

Analysis

Obukhov's study investigates the interplay between particle spin and various forces, including electromagnetic and gravitational, within the context of General Relativity. The paper breaks new ground by extending these principles to curved spacetime and introducing the novel concept of a "precessing spin" as an "axion antenna" for detecting axion-like dark matter. Methodologically sound, the paper enriches the ongoing dialogue in axion physics but would gain further credibility through empirical validation. The inclusion of gravitational effects in the study also adds a layer of complexity and practical implications.

To strengthen the validity of this theory, advanced telescopes and sensors could be used to detect the potential impact of axion-like particles on observable cosmic events, such as galactic rotation curves or fluctuations in the cosmic microwave background radiation.

Y. Obukhov said:
"The enigma of dark matter may be closer to being unraveled."

1. Obukhov YN. Spin as a probe of Axion Physics in general relativity. International Journal of Modern Physics A. 2023; doi:10.1142/s0217751x23420022

3. Holographic Dark Energy and Quintessence

G.C. Samanta's 2013 paper explores holographic dark energy within the framework of General Relativity. Utilizing Einstein's field equations, the study focuses on a Bianchi type-V universe, examining its implications for dark energy dynamics. The findings not only align with current cosmological data but also offer parallels with quintessence models.
Holographic Dark Energy is a concept that suggests the energy driving the universe's expansion is related to the surface area of the universe, rather than its volume. This idea comes from the principle of holography, which proposes that information within a space can be fully described by data on its boundary.

Table 2: Research Methods

Method	Application
Einstein's Field Equations	Core framework for the study. These equations relate the geometry of spacetime, represented by the metric tensor, to the distribution of matter and energy, represented by the stress-energy tensor. In the context of an anisotropic universe like the Bianchi type-V model, these equations become more complex but also more revealing.
Bianchi Type-V Universe	The Bianchi type-V universe is a specific class of cosmological models that describe anisotropic, or directionally dependent, spacetimes. In these models, the metric tensor, which describes the geometry of spacetime, has a form that allows for different scale factors in different spatial directions. This anisotropy is a departure from the more commonly used isotropic models like the Friedmann-Lemaître-Robertson-Walker (FLRW) metric, which assumes the universe is the same in all directions.

In the context of G.C. Samanta's paper, the Bianchi type-V universe serves as the mathematical framework for exploring the dynamics of holographic dark energy. By employing Einstein's field equations within this anisotropic setting, the study aims to understand how dark energy behaves under conditions that are less idealized than those in isotropic models. This method allows for a more nuanced exploration of dark energy's role in the evolution of the universe and provides additional avenues for testing the viability of holographic dark energy models.

Analysis

Through solving Einstein's field equations, the paper provides exact solutions that describe the universe's evolution under the influence of holographic dark energy. The use of statefinder diagnostic pairs is a notable methodological strength, as it allows for a more nuanced understanding of the universe's dynamical properties. The paper's primary benefit lies in its potential to enrich the existing theoretical frameworks on dark energy, particularly in non-standard cosmological models. However, its complexity and heavy reliance on mathematical formulations may limit its accessibility to a broader scientific audience. Moreover, the study does not offer empirical evidence or comparative analysis with other dark energy models, which would have strengthened its applicability and credibility.

To provide empirical evidence for Samanta's paper, observational data from cosmic surveys, supernova studies, and gravitational lensing could be compared with the paper's theoretical predictions.

"A new frontier in cosmology." - Anonymous

4. Modified General Relativity

Gary Nash's 2023 paper on Modified General Relativity (MGR) introduces a connection-independent symmetric tensor representing the energy-momentum of the gravitational field3. This modification not only solves the nonlocalisation issue of gravitational energy but also provides a geometric description of dark matter3.

Modified General Relativity aims to provide a geometric description of dark matter, offering a potential solution to one of physics' greatest mysteries.

Analysis

A novel framework termed Modified General Relativity (MGR) is proposed as a natural extension to General Relativity (GR), employing a unique geometric approach to represent dark matter. Utilising a smooth regular line element vector field (X, -X) in Lorentzian spacetimes, MGR crafts a connection-independent symmetric tensor to depict the energy- momentum of the gravitational field, aiming to address the nonlocalization of gravitational energy inherent in GR. A notable finding is the geometric representation of dark matter in MGR, illustrated through a case study of galaxy NGC 3198, where the calculated mass of the invisible matter halo matched the results from GR using a dark matter profile, albeit with a geometric representation in MGR. This paper's exploration may offer a fresh lens to understand dark matter and addresses certain theoretical issues in gravitational physics. However, a thorough examination of the paper is required to gauge the mathematical robustness and empirical validity of MGR, and to understand its broader impact on the scientific community and its potential to unveil new insights into the enigmatic nature of dark matter.

5. Conclusion

The most recent studies in General Relativity offer groundbreaking perspectives. This review serves as a valuable snapshot of the current state of research in general relativity, analysed and presented through the use of AI. However, it also highlights the need for human oversight and further empirical research to validate these emerging theories. These advancements could potentially reshape our understanding of the universe.

Gary Nash said:
“We stand on the brink of a new understanding of the cosmos.”

Recommendations for Further Research

1. Empirical studies to validate the theoretical claims made in the papers discussed, particularly in the areas of Axion Antenna and Holographic Dark Energy.
2. Comparative analyses between the different theories presented, to understand their relative merits and limitations.
3. Exploration of the ethical considerations and potential biases in using AI for academic research.

6. Methodology

Research Objective
The primary objective was to provide an updated and engaging review of new frontiers in the field of General Relativity, focusing on three key areas: Axion Antenna, Holographic Dark Energy, and Modified General Relativity.

Data Sources

1. **Academic Journals**: Peer-reviewed articles from reputable journals in physics and cosmology.
2. **ArXiv Preprints**: Pre-publication papers that have yet to be peer-reviewed but offer cutting-edge insights.
3. **Conference Papers**: Papers presented at scientific conferences related to the field of General Relativity.

Search Strategy

1. **Keyword Search**: Utilized specific keywords such as "Axion Antenna,", "Holographic Dark Energy," and "Modified General Relativity" to filter relevant articles.
2. **Time Frame**: Focused on publications from the last three years to ensure the most current research.
3. **Peer-Reviewed**: Prioritized articles that have undergone peer review for credibility.

Data Extraction

1. **Abstracts**: Read the abstracts of the filtered articles to gauge relevance.
2. **Full-Text Review**: Selected articles underwent a full-text review to extract key findings, methodologies, and conclusions.

Data Analysis

1. **Thematic Analysis**: Identified common themes and findings across the selected articles.
2. **Critical Evaluation**: Assessed the validity and reliability of the research methods used in the articles.

Content Structure

1. **Page 1**: Summarized key findings in a narrative format to engage the reader.
2. **Page 2**: Detailed the research methods and data sources.
3. **Page 3**: Provided a concise analysis of the results and a clear conclusion.
   [**Note from editor**: The AI failed to organise the content according to the specified methodology; instead, it presented three alternative theories on each page including some keywords from the structural command in its search.]

Additional Elements

1. **Tables**: Used to summarize key points and theories (not included in the word count).
2. **Spoiler Tags**: Utilized to hide detailed explanations or technical jargon, offering a cleaner read.
3. **Direct Quotes**: Included at the end of each page for style and to emphasize key points.

7. Bibliography

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5. Figures 1-4 generated by Bing Image Creator, powered by DALL-E 3. www.bing.com/images/create? (Oct 21, 2023)

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Recognising clinical signs and symptoms on Black, Asian and Minority Ethnic (BAME) skin types

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ABSTRACT

This article addresses the critical need for recognising clinical signs and symptoms on Black, Asian, and Minority Ethnic (BAME) skin types to ensure equitable healthcare. The study highlights the disparities in medical education and clinical practice, which predominantly use light-skinned models, potentially leading to misdiagnoses in BAME populations. By presenting common medical conditions on diverse skin tones, the article aims to improve diagnostic accuracy and healthcare outcomes for BAME communities.

1. Background

There is a growing body of literature emphasising the importance of medical schools addressing issues related to equality and diversity. This is crucial to ensure that future healthcare professionals are well-equipped to effectively care for the diverse population in the UK and overseas. The COVID-19 pandemic has shed light on the fact that marginalised and specifically BAME (Black, Asian and Minority Ethnic) communities often experience poorer health outcomes. If we fail to integrate diversity into medical education, which involves decolonising the curriculum and helping students identify signs and symptoms in individuals with darker skin tones, it could lead to delayed diagnoses or misdiagnoses.1

At the time of writing (April 2024), the NHS e-learning for health (e-LFH) still predominantly presents light-skinned models exclusively. For simplicity, light-skinned in this context refers to less than or equal to Fitzpatrick III. This article aims to show common signs and symptoms for a variety of general medical conditions on a diverse range skin types in an effort to achieve equality in disease and disorder recognition.

1. Gishen, F., & Lokugamage, A. (2019). Diversifying the medical curriculum. *BMJ (Clinical research ed.)*, *364*, l300. https://doi.org/10.1136/bmj.l300

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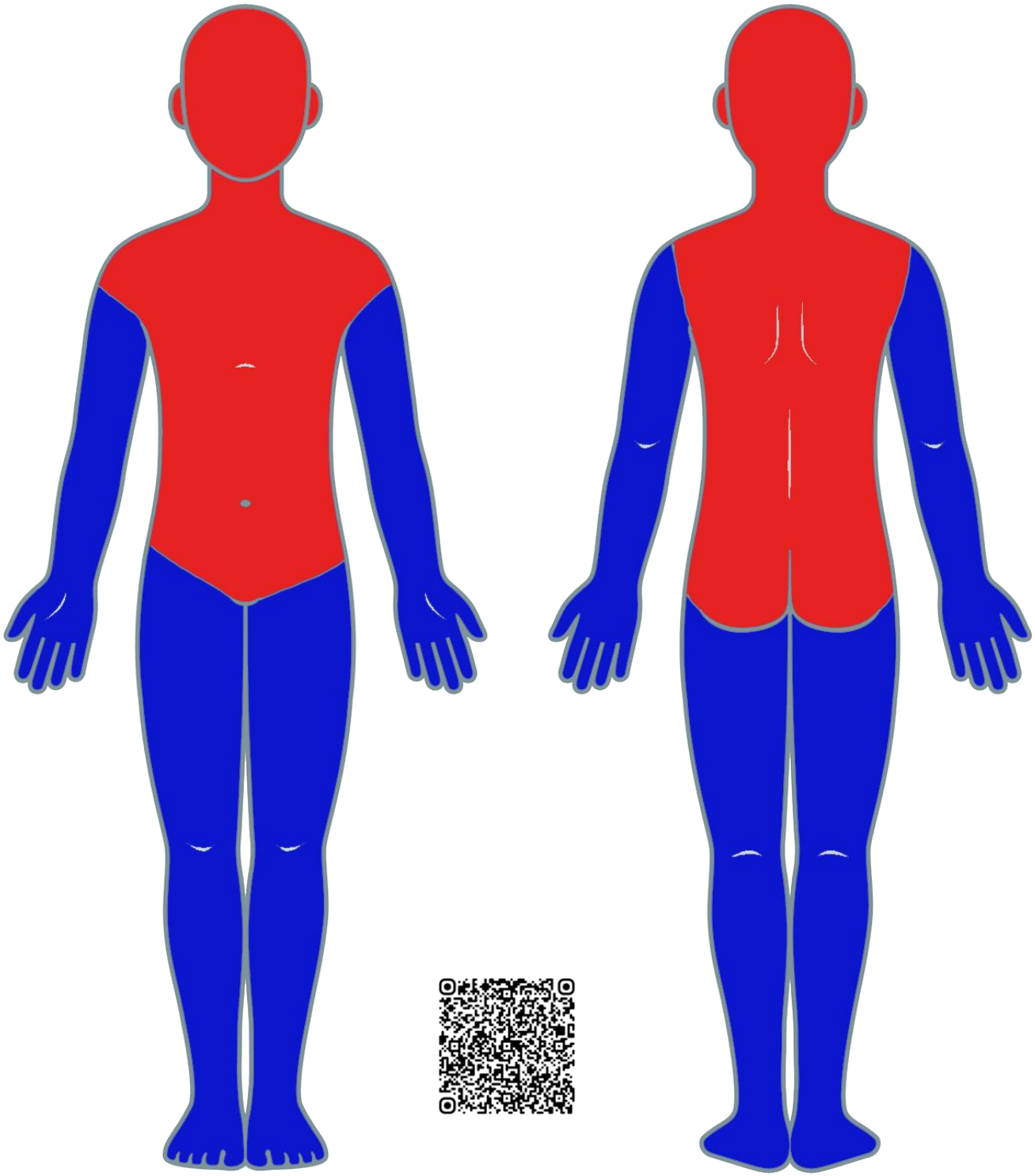

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Implications of Large Language Models in Medical Education

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ABSTRACT

This article examines the implications of Large Language Models (LLMs) such as ChatGPT in medical education. It highlights the potential of LLMs to transform medical education by assisting in knowledge retrieval, clinical decision support, and patient education. The study reviews the performance of LLMs in medical exams, demonstrating their ability to achieve near-passing scores, comparable to medical students. Despite their promise, the article addresses the limitations and challenges of LLMs, including potential inaccuracies and the need for continuous updates.

1. Advances in Large Language Models (LLMs) and Artificial Intelligence (AI)

The recent advances in Large Language Models (LLMs) and artificial intelligence (AI), such as ChatGPT and Bard, have garnered significant interest across many fields. These LLMs are trained on vast datasets of texts, including medical and academic content. This allows them to generate human-like responses and informative answers. Within healthcare, medicine, and education, many peer-reviewed studies on their applications have already been published. Some studies explore their applicability in digesting and writing academic content, while others examine their utility as study aids that help break down complex concepts. Although generally accurate, LLMs are still prone to AI hallucinations and may occasionally produce inaccuracies.

2. Applications in Medical Question-Answering and Education

LLMs have already been shown to adequately address medical question-answering tasks in patient education.[1] Many are now exploring their broader applications in medical education. ChatGPT has shown promise in responding to questions beyond specific medical domains, including knowledge retrieval, clinical decision support, and patient triage.[2,3]

Recent research using multiple-choice questions from the United States Medical Licensing Exam (USMLE) suggests that ChatGPT can approximate the performance of a third-year medical student. Although these were multiple-choice exams, the USMLE remains a gold standard in the United States and many other countries globally. The newer and more powerful GPT-4 has also demonstrated excellence in answering exam questions. Similarly, other models like BARD have shown similar performances across surgical membership exams.[4]

While their performances were promising in both undergraduate and postgraduate exams, the role, implication, and impact of LLMs in medical education and clinical practice should be examined too.

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3. Benefits for Medical Students and Clinicians

These applications of LLMs can be of great assistance to future clinicians. Their ability to digest complex medical information can be invaluable to students struggling to understand certain topics. Similarly, their application in providing differential diagnoses based on presenting signs and symptoms can offer students much-needed interactive learning while developing their knowledge foundation. While LLMs' datasets are not necessarily up-to-date or comprehensive of all medical knowledge, they appear to have been trained on enough data to be useful in the current curriculum, including physiology and diseases required.

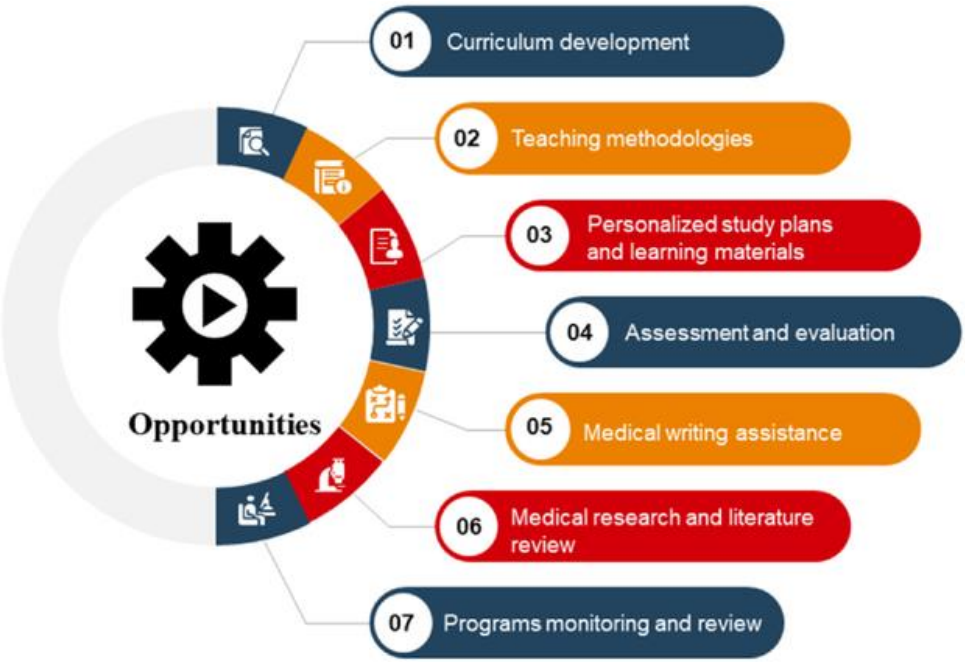

Figure 1 – LLM Opportunities[6]

4. Interactive Learning and Real-Time Reasoning

LLMs' dialogue-based approach allows for follow-up questions to simulate and train medics on real-time reasoning expected of them in real scenarios. This can be achieved through interactive practice cases, where LLMs can role-play a simulated patient or examiner to provide an interactive learning environment. This method aligns with how clinical examinations are taught, conducted, and tested, except in a digital format. It should facilitate active learning and engagement with clinical scenarios.[2] The ability to change case information and parameters in real-time allows even more flexibility than was previously possible in simulated patient cases.

5. Integration into Medical Education and Exam Settings

Moreover, the integration of LLMs into medical education could have broader implications in exam settings. They are capable of generating exam questions and providing supplementary explanations.[5] This would greatly reduce the burden on medical educators by making exam design more efficient and streamlined, though some form of oversight is still required to ensure all generated content is free of misinformation.

Similarly, LLMs often fall short in areas requiring critical thinking, and therefore, the questions posed may often be factual-based rather than the typical exam question that requires a high-level synthesis of different concepts.

6. Limitations and Challenges

It is essential to acknowledge the limitations of current LLMs in the context of medical examinations. While LLMs demonstrate promising performance, they are not specifically designed to answer medical questions. This limitation may be more apparent in situations requiring long-form answers, where depth is necessary to demonstrate justified clinical decision-making. Additionally, the evolving nature of medical curricula and examination formats poses challenges for LLMs to keep pace with changing requirements. Finally, their reliance on training data means that the inclusion of poor training material would inevitably alter their performance.

7. Conclusion

Despite limitations, LLMs are promising tools for medical education. The ability of LLMs to pass medical and surgical exams is a significant milestone in the integration of AI technologies into medical education and assessment. Their performance would be further enhanced with additional 'training' by including medical research articles and textbooks.

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Challenges and Opportunities in Applying Transformative Learning Theory (A Critical Reflection): A Collaborative Autoethnography

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Collaboration
Autoethnography

ABSTRACT

This collaborative paper explores the practice and culture of transformative learning theory (TLT) within teaching and learning processes. Authored by four contributors, the paper offers a multi-dimensional and narrative exploration of individual experiences and struggles with transformation. It delves into the stages of transformation based on Mezirow's ten-step process, ranging from disorienting dilemmas to reintegration into society. Authors as scholars of MPhil in STEAM education tried to emphasize the value of valuing individuals' lived experiences and using transformative learning approaches to shift perspectives from disempowering beliefs to empowering new ones. The authors highlight the importance of adopting transformative teaching and learning approaches to address crises and promote change. The purpose of the paper is to reflect the author's practices for transformation, drawing from lived experiences and theoretical underpinnings. The theoretical foundations of TLT are explored in terms of self-reflection and transformation. The concept of changing frames of reference is discussed, emphasizing the role of knowledge shift and new information assimilation. The paper shares reflections from various professionals, each recounting their transformative journeys. The challenges associated with -applying TLT are acknowledged, including its individualistic focus and limited attention to sociocultural and emotional dimensions. The methodological challenges of TLT application are outlined, and concerns are raised about the theory's premise and framework. Finally, the paper underscores the significance of TLT as a framework for fostering critical thinking and professional development. It emphasizes the process of shifting perspectives, challenging existing beliefs, and embracing change. Despite challenges, TLT remains a valuable tool for understanding adult learning and enhancing educational practices in various contexts.

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1. Introduction

Transformative Learning Theory (TLT) is a dynamic framework that has gained prominence in the field of education and adult learning. Developed by Jack Mezirow, TLT focuses on the process of profound cognitive and emotional change that individuals undergo as they critically examine their assumptions, beliefs, and perspectives. This theory is rooted in constructivist principles, emphasizing that learners interpret and reinterpret their experiences to construct new meanings and understanding. Fundamentally, the learning theories posit that all learning involves external interaction with the environment and internal psychological processes, connecting new impulses with prior learning outcomes (Illeris, 2004).

At its core, TLT recognizes that true learning involves more than the acquisition of information; it involves a fundamental shift in one's frame of reference. This theory acknowledges that adults bring a lifetime of experiences, beliefs, and values to the learning process. Transformative learning is “a deep, structural shift in basic premises of thought, feelings, and actions” (Transformative Learning Centre, 2004; Kitchenham, 2008). However, when these existing frames of reference encounter disorienting dilemmas; and situations that challenge our preconceived notions, transformation becomes possible.

The transformative learning process comprises several stages. The journey begins with a disorienting dilemma, an experience that challenges our existing beliefs. This initiates self-examination, prompting individuals to critically assess their assumptions and recognize shared experiences. Exploring new ways of acting and planning a course of action follows suit. Acquiring knowledge and skills is a vital step, as it equips learners with the tools needed for transformation. Provisionally trying out new roles, building competence, and eventually reintegrating into society mark the later stages.

The crux of TLT lies in the shift from unquestioned assumptions to critically examined beliefs. This paradigm shift is often catalyzed by a significant event or experience that disrupts our established worldview. Kuhn’s (1962) *paradigm*, Freire’s (1970) *conscientization*, and Habermas’s (1971, 1984) *domains of learning* (Mezirow, 1978a, 1991a, 2000). The key ideas of these theorists influenced Mezirow’s transformative learning theory, encompassing significant concepts such as disorienting dilemmas, meaning schemes, meaning perspectives, perspective transformation, frame of reference, levels of learning processes, habits of mind, and critical self-reflection. The process is neither linear nor uniform, as individual reactions to disorienting dilemmas vary. However, the central theme is the recognition that transformative learning is an ongoing journey, a continuous cycle of critical reflection and growth.

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The TLT has profound implications for education and professional development. It advocates for educators to create environments that encourage critical reflection and open dialogue. Teachers become facilitators of learning, guiding students to question their assumptions and explore alternative perspectives. TLT promotes student-centered approaches, where learners actively engage in their education, and knowledge is constructed through discourse and inquiry.

Furthermore, TLT extends beyond traditional classrooms. It has found application in diverse fields, including healthcare, leadership development, and social change initiatives. For instance, medical professionals can use TLT principles to reflect on their practices, challenge biases, and enhance patient care. In leadership development, TLT fosters self-awareness, enabling leaders to adapt and evolve in response to changing contexts.

This paper is prepared with the collaboration of four authors to complete their group assignment and is designed with referential self-reflection to develop the perception of transformation. This paper explores the notions and the culture of practicing Transformative Learning Theory in the teaching and learning process. In addition, this paper also offers the multi-dimensional, multi-perspective, and narrative with individual lived experiences and struggle of being transformed. This paper triggers the existing and transformed ontological claims based on diverse experiences. The axiological perspective of this paper is to value the individual's lived experiences of their struggles of being transformed and practicing transformative learning approaches. Therefore, the epistemological view of this paper is generating knowledge by changing the frame of reference from disempowering beliefs and practices into empowering new perspectives.

Based on our lived experiences, we often attempt to correct ourselves through critical discourse. Meanwhile, every attempt may not yield to transform into the best version of us; for this, key elements are here to be followed as Mezirow proposed specific steps. During the process of being transformed, Mezirow described a steps process:

> *Disorientating dilemma. Self-Examination. Critical assessment of assumption. Recognizing the 'shared' nature of experiences. Exploring options for new ways of acting. Planning a course of action. Acquiring knowledge and skills. Provisional trying of the new role. Building competence. Reintegration into society.*

In short, we can experience four stages of transformation in a cyclic form: new experiences, critical discourse and assumptions, experimentation and challenge perspectives, and reflection and assimilating the lived experiences for transformative learning (Nerstrom, 2014).

2. Transformative Teaching and Learning Approach

Transformative learning leads to the direction of education and educational pedagogies for local and global sustainability of activities and is a growing and essential field in the sustainability world. With the background of crises and change, a variety of practices will be discussed, and the term transformative learning has been gaining considerable attention (Schnitzler, 2020; Akhilesh, 2017; Göpel, 2016; Gruszka, 2016; Hüther, 2017; Romano, 2017, 2018; Scharmer, 2016; Wals & Corcoran, 2012).

The Transformative Teaching and Learning Approach fosters education for local and global sustainability by encouraging critical reflection and change. It challenges conventional methods, emphasizing empowerment and shifting perspectives. This approach, vital in times of crisis, has gained significant attention. It advocates for dynamic, student-centered environments, enabling learners to engage actively, challenge assumptions, and reconstruct knowledge. Transformative Teaching and Learning align with evolving educational paradigms, contributing to a more holistic and adaptable learning experience.

Purpose of the Paper

The purpose of this paper is to reflect on practices for transformation.

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4. Literature review

This section contains the referential perspective and implications of the transformative learning theory. Here, the specific discourse concerned with the transformation theory and its praxis, developed by Mezirow and followed by different scholars, are articulated with relevant examples.

Self-reflection for the Transformation

Transformative Learning Theory is based on 'constructivism and emphasizes how learners continuously interpret and reinterpret their sensory experiences', as it is integral to the process of meaning-making and, consequently, learning (Mezirow, 1994, p. 222). Therefore, being a reflective practitioner must be transformed into the adapted approach and find oneself in a better position.

We can reinterpret our past experiences in different modes of reflection for the respective purposes; Technical reflection for matching our performances to the external guidelines, In-and On-action reflection for basing decisions on unique situations, and Critical reflection for social, moral, and political dimensions of schooling (Carlo, et al., 2009). In our daily professional life, to find a better way of tackling problems, we often reflect on past experiences for those critical events and pose critical questions to the self and/or through pundits. With resilience assimilating the new perspectives of identical/similar events, bringing those new perspectives into the practices ensures the transformation.

For example, one teacher used to apply negative reinforcement of punishment for the low performance of students. One day a teacher learned about students' family backgrounds through his/her colleague. Then after, he/she changed the perspective of looking/acting on those students and never treated them as previously ahead.

Changing the Frame of Reference

Transformative learning approaches mainly focus on adult education, where we can adjust our learning and act of thinking with new information. Whenever the experience cannot be accommodated in our frame of reference, Mezirow triggered such experiences should be either rejected or the existing frame of reference should be transformed to assimilate it (Anand, 2020).

Based on Jack Mezirow's (1991, 1995, 1996) change process reference, learning approaches got a new track of transformative learning. Mezirow argues adults have acquired a coherent body of experiences, concepts, values, feelings, conditioned responses, and frame of reference that defines their life world (Mezirow and Associates, 1990). The frame of reference describes our status quo through which we think, show conditioned responses, and where our beliefs exist. Changing frame of reference refers to the knowledge shift or imposing new information and knowledge over existing knowledge. It can be termed transformative learning if we adjust to obtain new information.

Self-transformation through life events

Reflection, as a process of learning, encompasses four interconnected stages. It commonly commences with an event that exposes a disparity between the assumptions and perspectives that previously provided satisfactory explanations of the world and the actual occurrences in real life. This occurrence is referred to by Mezirow (1990, 2000) and other transformative learning theorists as a disorienting dilemma. Disorienting dilemmas often elicit a sense of distress or upheaval, such as the dissolution of marriage after adhering to societal norms of successful relationships or losing a job despite diligently following the appropriate codes of conduct. Typically, the initial response to such a dilemma involves self-blame for presumed failures or mistakes, rather than recognizing the broader structural factors linked to the situation. Because of this event, the adult becomes aware of assumptions accepted unquestioningly up to that stage in life and realizes that these assumptions need to be scrutinized for accuracy and validity.

But before they can be assessed or challenged, assumptions must be identified clearly. This represents the initial distinct undertaking of reflection. Assumptions are the understandings we hold about how the world works, or ought to work, that are embedded in language and represented in action. Separating an assumption from the language it is expressed is, at one level, impossible. As Habermas (1987) suggests in his lifeworld analysis, we often only sense when the assumption lurks at the fringe of consciousness because a crisis sets it in sharper relief than usual. When a new response is called for a situation, we have not experienced, we often become aware of the assumptions that have framed our conduct up to that point and their limitations.

5. Reflections

This section reflects how authors are hooked up with the transformative learning theory and offer multiple scenarios of the implication with tier respective professions and real-life events. Authors have reflected on their practices and emerging ideas of transformative learning, mainly focusing on the three types of reflection i.e., content, process, and premise with their related actions (Mezirow, 1995). As learners, authors can transform individual meaning schemes through the analysis of past actions (content reflection) or by exploring the origins of actions and their related factors (process reflection) within new meaning schemes. However, when adopting a broader perspective, their reflection takes on greater depth and complexity, encompassing the transformation of a series of interconnected meaning schemes.

Metamorphosis of Sudarsan: A Journey of Transformation

By profession, I am a science teacher who advocates for the constructivist/facilitative approach to teaching. As of now, I have numerous experiences in science education and find myself better than the previous. Here, finding oneself in a better world is what we normally call transformation which comes through comprehensive and critical processes. Transforming from executive teacher to facilitative teacher was not easy for me, I used to be so absolutist and employed the conventional way of teaching where the classroom control power was fully under me and the space for students' choices and voices was so rare. My transformation process began with the intervention of perception and practices from his professor and senior colleagues after joining the Master in Philosophy (MPhil) program at Kathmandu University School of Education.

My practices were often criticized and received feedback and the intervention proceeded slowly. At that moment, I seriously felt in a dilemma over his existing teaching practices like students are learning, rote-memorization, and performing well at exams according to the needs of institutions and guardians though criticizing for what? Continuing to address the perpetual intervened approach to teaching, I found it easy to deliver the content; in contrast

to lecturing the whole period, I started to assign students for the presentation and discussion. Then after I opened the space for students' *voices and choices of learning*, I encouraged students to be involved in the discussion, collaboration, and peer evaluation through content presentation or hands-on activities in the maker space.

These days, I am more of a facilitator and less of a lecturer in my classroom, and similarly to my students, first I take preliminary knowledge/ideas from students and then intervene in the case necessary to find a new way of knowing/ideas.

Priska's Transforming Perspectives

I have always heard from my elders that, "Education is required for the transformation of society". I always paid less attention to this saying as I always thought that such things were someone else's responsibility and would take the lead in transforming society through education. While responsibility is to focus on myself, complete my education as a "degree earning task" and work as a medical professional. Joining as a lecturer, clinician, and teacher, I accepted my additional responsibility beyond taking care of patients. I started to help my students understand the field of specialization better with more engagement in interactive learning. I enjoyed making my students participate in their learning, an approach that was not in practice when I was a student. I was always scolded for asking questions which prevented me from raising my voice. I always wanted my students to "not fear their teachers" and express their understanding of the subject without hesitation. This interest led me to join MPhil in STEAM education, to explore the possibilities of better teaching and learning approaches.

The theoretical underpinning of different approaches to teaching learning fascinated me as I could relate myself falling victim to the traditional teaching and learning approaches and their theoretical background. The theory that changed how I perceived teaching and learning was "transformative learning theory", a theory that could make a real difference in bringing about a change in society, the very proverb I was hearing in my childhood. "Even I can bring about change in my practice", was the feeling that arose in me as I journeyed through the course in MPhil. I slowly changed my teaching and learning methods. I was away from a behaviorist approach and had already embraced a constructivist approach however, I had minimal knowledge of how transformative learning theory can be implemented.

I realized the essence of *transformative learning lies in making the learners participate in their learning and inquire about their understanding critically to search for answers based on self-assumptions, values, and experiences*.

Putting Self in the Basket of Transformative Learning: Reflection of Govinda

Professionally, I have been engaging with the professionals of I/NGOs for more than a decade. I conceived that the different types of reflections are the means of transformative learning. Practically, we have been practicing reflection in many ways for the meaningful execution of the activities and as the means of transformation. For this we call a meeting for discussion, presenting our views, commenting on each other, and applying principles like; thesis, antithesis, and synthesis.

These all are forms of reflective practice to move towards somehow transformative learning. In another way, we can link transformative learning again with reflective practice as a 'way of questioning'. We ask questions about whatever we are doing to reach reality and contextuality. In these ways, we reflect by asking; What went or went well, what /did I/we learn? What is/was easy? How can we be transformed? What is/was the difficulty? What do I need to learn more about? How can we mitigate the challenges? How can I/We improve in the future? (Rushton & Suter, 2012).

Whatever the prior knowledge and skills applied in professional lives are now realized, they should be modified and move through the different lenses of transformative learning. The classes and courses of MPhil STEAM Education added some more views on how we can step up for the recognition of the locality and develop that mechanism which can connect the *local to global and global to local, enlarged the strengths to critique self, existing ideologies and brought differential eyes to see the world and perspectives*. Transformational learning seeks contextual scenarios and builds that capacity where people can cope and adjust whatever the situation but deal with long-term impact.

So far, Sarita's Reflection on the Concept of Transformation

I would like to reflect on my early educational experiences and how transformative learning theory has proven effective in my life. Initially, the concept of transformation was unfamiliar to me during my early education. It wasn't until I reached university and matured that I began to grasp the idea of metamorphosis. I came to understand that change is a gradual process that cannot remain stagnant. The term "transformation" itself is quite broad and lacks a clear structure or framework for determining the extent of change.

However, there have been instances where I have been able to showcase the potential for transformation within my Madhesi community, particularly in encouraging girls to prioritize higher education over early marriage. By prompting people to consider this perspective, I hope to inspire them to reevaluate their views.

The transformative learning theory has had a profound impact on my life. It has equipped me with the skills to engage in dialectical dialogue and critical thinking, concepts that are central to the theory. I became familiar with this notion during my MPhil program at Kathmandu University School of Education (KUSOED). As I progress, my perspective on the teaching and learning methods in nursing education has transformed. I am now motivated to shift my viewpoint and work diligently towards revolutionizing nursing education in my particular places.

Initially, my focus was primarily on traditional, teacher-centered, behaviorist, and prescriptive forms of instruction. However, my perspective has evolved, and *I now prioritize authentic, meaningful learning and adopt constructivist approaches*. Importantly, the transformative learning theory played a pivotal role in helping me transition and embrace a student-centered with an active engagement learning approach. I have come to value my role as a facilitator rather than merely a depositor.

6. Discussion and Implication

In this section, the authors share their lived experiences in applying transformative learning theory. They delve into the opportunities, and practical challenges associated with its implementation and explore its essential impact on the professional lives of individuals.

Opportunities While Discussing Transformative Learning Theory

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Engaging with transformative learning theory offered opportunities for profound personal and professional growth by shifting one layer to another thinking paradigm. A learner can critically reflect on their practices, fostering enhanced teaching methods and empowering learners as active participants in knowledge construction. This approach promoted critical thinking, social change, and global citizenship. It encouraged to equip individuals to address real-world challenges and contribute positively to the wider community. Also, it cultivates a culture of continuous learning and adaptation, ensuring relevance and effectiveness in various fields. Transformative learning theory thus provided a powerful framework to evolve, innovate, and become agents of positive change in our communities and beyond. However, immediately we felt the changes within us are personal growth and professional development, and empowerment through enhanced teaching and learning practices.

Personal Growth and Professional Development

It is difficult to define personal growth and professional development, however, taking into consideration transformative learning approaches, it brought us many changed approaches in our professions. Engagement with transformative learning theory presents learners with the chance for profound personal growth and professional development. By critically assessing their current practices and beliefs, individuals can pinpoint areas for improvement and adopt fresh perspectives and methods that enhance their efficacy in their respective roles. For instance, educators may transition from conventional, teacher-centric approaches to more participatory methods, fostering increased student engagement and exploration, critical thinking, and meaningful learning experiences from reflections. This evolution is continuous and can lead to heightened teaching effectiveness and improved learning outcomes. Additionally, learners in various professions can undergo a metamorphosis in their approach, empowering them to become more adaptable and innovative professionals.

Empowerment through Enhanced Teaching and Learning Practices

The key to bringing about change and creating flexible circumstances for any difficulties we face is empowerment. By giving learners, the tools to take control of their education, transformative learning makes them active contributors to the creation of new knowledge. Teachers can provide students the chance to express themselves, ask questions, and work together on projects by creating an inclusive atmosphere where everyone's opinions are appreciated. Students' sense of action and ownership is increased, and they also develop a deeper comprehension of complicated subjects as a result of this empowerment. Furthermore, transformative learning encourages critical thinking and introspection, pushing students to challenge preconceived notions and assumptions. As students develop into champions for social justice, equity, and inclusivity, this critical engagement has the potential to bring about profound social change. Additionally, transformative learning encourages critical thinking and introspection, pushing students to challenge preconceived notions and assumptions. As students develop into champions for social justice, equity, and inclusivity, this critical engagement has the potential to bring about profound social change. Furthermore, transformative learning prepares students to tackle real-world problems and promote good change globally by fostering global awareness and citizenship abilities. In the end, the transformative learning approach provides students with a path to ongoing development and adaptation, enabling them to act as change agents both inside and outside of their communities.

Challenges of Transformative Learning Theory

Although the cognitive processes of change are the emphasis of the transformational learning theory, applying this theory poses considerable methodological challenges. It goes beyond critical thinking and is complex, individualized, and intensely emotional. It should go without saying that the researcher's prior knowledge may have impacted his or her philosophical understanding. Kim & Merrim (2011) assert that transformative learning is dynamic. One's meaning-making system and function are continually created, rebuilt, and improved upon to bring about a sequence of changes in one's internal or external self. In addition, this framework neglects the social-cultural and affectioning aspects of the learning process which is highly individualistic and focused on cognitive development only (Jones, 2014).

Researchers further asserted that there is no formal arrangement of the theory and no clear understanding of the fundamental idea. There were other queries, such as: Who or what is the transformation target? What kind of form changes? These are the main arguments against this idea (Desapo, 2017). We also pressed our opinions on these questions under our comprehension. We believe uncertainty in the theory's premise, framework, and results could be its biggest flaw. We cannot presume a clear picture of transformation when we watch and read Jack Mezirow's theory of learning, which has been changed multiple times. It is now obvious that further study needs to be done on the flip side of the transformative learning theory.

Applying Transformative Learning Theory (TLT) can encounter several practical challenges. One of the main issues is the intensely personal and emotional nature of the transformation process, which can be difficult to facilitate in group settings. TLT often demands self-disclosure and vulnerability, which some learners may be hesitant to embrace. Moreover, assessing the success of transformative learning experiences can be subjective and complex. Implementing TLT requires skilled facilitators who can create safe environments and guide learners through critical reflection. Adapting TLT to different cultural contexts and educational settings also poses challenges, as cultural norms and institutional structures may influence the efficacy of the approach.

Practical Essence and Lived Example of Transformative Learning

Knowingly/unknowingly, we have been applying transformative learning approaches in our classes. However, there are many ways that we, as educators or teachers, can use transformative learning in classrooms, workshops, and training. For example, when students learn about religions, teachers can introduce literature and articles discussing different religions. We as a facilitator can present different religions according to their own beliefs because a class might have diverse students, and diverse students can express their ways of celebrating whatever they do in their community or the family. These all help the students or learners gain new perspectives and understanding.

We as a facilitator can also assign our pupils to interview various people regarding their views on a historical event or a day celebration. This enables learners to experience other viewpoints and opinions. Giving learners contrasting articles on a subject and asking them for their opinions and insights on the various components of each article is another way teachers can use transformative learning in the classroom. Learners can challenge their thinking, advance in their learning process, and broaden the concept of constructivism. Mezirow (1997) stated that Transformative learning entails a psycho-critical constructivist perspective on the learning process, emphasizing the way individuals construct knowledge by deconstructing and reconstructing their beliefs and assumptions to generate fresh understanding that resonates with their own experiences.

However, TLT is not without its challenges. Its emphasis on cognitive processes might overlook the socio-cultural and emotional aspects of learning. Critics argue that it can be overly individualistic and overlook the role of collective learning experiences. Additionally, the process of transformation can be unsettling, leading to resistance and discomfort among learners.

Considering the various dimensions of Transformative Learning Theory, it stands as a powerful framework that highlights the dynamic process of personal and professional growth. By challenging existing beliefs and encouraging critical reflection, TLT opens the door to profound transformations in individuals' perspectives and actions. While it presents challenges, its potential to reshape education and facilitate holistic development cannot be denied. As the world continues to evolve, TLT offers a pathway for individuals to navigate change, adapt, and thrive in complex environments.

7. Conclusion

The major notion to be developed for Transformative Learning Theory is to change the frame of references to the best fit as Mezirow's concerns, where one can disempower the hegemonic and misconceptions to assimilate the empowering new information and beliefs and lead to the practices ensure the transformation (Mezirow, 1997). In the teaching and learning process, this belief fosters critical thinking over the status quo once aware of disempowering beliefs and practices leading to assumptions and hypothesis-generating to find new ways of knowing through the lived experience upon test and re-test on experimentation. The classroom settings turn to constructivist and post-modernism designs where power-sharing, voices and choices, and active participation are uniform among teachers and students.

In daily professional and personal life, we are hooked up with this theory directly or indirectly to find ourselves in a better world. From the reflection section, it can be claimed that critical discourse, self-reflection, posing/probing queries to the existing beliefs and practices, and intervening in such practices by pundits are the key elements for the transformation. The central point from all the above reflections is escaping from the respective comfort zones; after the self-realization of carrying expired or unfit conceptions over the current frame of reference and finding themselves in a better world today.

However, Jones (2014) critiques the Transformative Learning Theory as being too individualistic and focusing too much on cognitive processes that do not account for the social-cultural context, and emotional and affection aspects during the learning process. In addition, the critical discoursing phase is a more struggling part where one can lose the temper or interest in transforming due to the over-glued in the comfort zone.

Despite these challenges, transformative learning theory remains an important framework for understanding adult learning, professional development, and finding the best ways of understanding and has been used to inform educational practice in a variety of contexts.

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Using Short-Form Communication in Academia (2024)

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ABSTRACT

Short-form communication is increasingly recognised as a pivotal tool in academia for conveying complex ideas succinctly and accessibly. This literature review synthesises key findings in 2024, focusing on the use of abstracts, executive summaries, and brief reports (1). Brief reports, typically under 2,000 words, facilitate rapid publication and immediate academic impact (2). Research by Alperin et al. (3) shows that engaging abstracts increase readership and citations, boosting the visibility of academic work. Short-form communication also engages non-specialist audiences, bridging the gap between complex research and practical application (4). Additionally, integrating short-form communication into curricula enhances students' critical reading and concise writing skills (5). Despite these advancements, challenges remain in maintaining academic rigour. Future research should develop best practices to preserve the depth of academic discourse. This review highlights the significant impact and ongoing evolution of short-form communication in academic settings and the need for greater dissemination insights.

1. Introduction: Short-form communication within academia and knowledge exchange.

Short-form communication continues to gain prominence in academia, providing a means to convey complex ideas succinctly and accessibly. This approach includes the use of abstracts, executive summaries, and brief reports to facilitate rapid dissemination and comprehension of research findings. Over the past year, significant research has been conducted on the effectiveness and applications of short-form communication across various academic fields. This review synthesises key findings in 2024, highlighting core concepts, methodologies, and implications for future academic practices.

Nomenclature

AI: Artificial Intelligence
LLM: Large Language Model
DOI: Digital Object Identifier
IEEE: Institute of Electrical and Electronics Engineers
JSTOR: Journal Storage
Scite.ai: An AI-powered platform for evaluating scientific articles
Scopus: A bibliographic database containing abstracts and citations for academic journal article
Atomic Academic: An LLM trained as a research assistant to utilise a short-form approach.

2. Key Concepts and Findings.

Efficiency in Knowledge Dissemination:
Abstracts and Executive Summaries: Recent studies highlight the benefits of structured abstracts in enhancing research accessibility. According to Shamsi et al. (1), structured abstracts improve readers' ability to quickly grasp research content, significantly enhancing the dissemination of knowledge in academic papers.
Brief Reports: Short-form reports, typically under 2,000 words, have seen increased utilization for presenting preliminary findings or concise overviews of extensive studies. These reports allow for rapid publication and immediate impact within the academic community (2).

Impact on Academic Engagement:
Increased Readership and Citations: Research by Alperin et al. (3) suggests that articles with succinct, engaging abstracts are more likely to be read and cited, indicating that short-form communication can significantly enhance the visibility and impact of academic work.
Engagement with Non-Specialist Audiences: Short-form communication also facilitates engagement with non-specialist audiences, including policymakers, practitioners, and the general public. Studies have shown that brief, clear summaries can bridge the gap between complex research and practical application (4).

Educational Applications:
Teaching and Learning: Short-form communication is increasingly being integrated into academic curricula. Educators are using brief, focused texts to teach critical reading and concise writing skills. According to a study by Wang and Zhan (5), students who practice writing short summaries demonstrate improved comprehension and retention of complex material.

1.1. Types of short-form

Table 1 summarises various short-form communication styles used in academia, highlighting their descriptions, benefits, challenges, and references. Abstracts and executive summaries enhance accessibility and comprehension but risk oversimplification. Brief reports facilitate rapid dissemination but may lack detail. Peer review models improve learning and recognition of preprints, balancing speed with quality. Short-form content boosts readership and citations, though ensuring accuracy remains a challenge.

Table 1 – A table showing example elements of short-form communication.

Aspect	Description	Benefits	Challenges	References
(Structured) Abstracts (2)	Brief summaries of research papers, typically 150-250 words.	Enhance accessibility, allow readers to quickly grasp main points.	Risk of oversimplification, may omit nuanced details.	Mankoff et al. (2024);
Executive Summaries	Concise overviews of longer documents, designed for quick understanding by non-specialist audiences.	Improve comprehension for broader audiences, bridge gap between research and practical application.	May lack depth, potential for misinterpretation.	Emerald Publishing (2024)
Brief Articles/Reports	Short articles, usually under 2,000 words, presenting preliminary findings or concise study overviews.	Facilitate rapid dissemination, allow timely sharing of research.	Limited space for detailed analysis, potential for incomplete representation of research.	IEEE Professional Communication Society (2024)
Teaching and Learning Applications	Using peer review models to enhance learning and recognition of preprints.	Speeds up publication and increases recognition of early-stage research.	Balancing speed with quality and thoroughness in peer review.	Wang and Zhan (2019)
Readership and Citations	Impact of short-form content on visibility and citation rates of academic work.	Increased readership, higher citation rates, greater impact.	Ensuring accuracy and completeness of summarised information.	Alperin et al. (2019)
Engagement with Non-Specialists	Short-form content tailored to policymakers, practitioners, and the general public.	Broader dissemination, practical application of research findings.	Simplifying without losing essential context, avoiding oversimplification.	Emerald Publishing (2024)

3. Methodology.

The article was generated using Atomic Academic, a ChatGPT-4 tuned LLM. The initial draft was edited with Scite.ai, followed by a manual review and reference check. Citation editing was required. The search covered publications from January 2019 to June 2024, using keywords like "short-form communication," "academic abstracts," "executive summaries," and "brief reports."

4. Discussion and Implications

The reviewed literature underscores the transformative potential of short-form communication in academia. Key advancements in the use of abstracts, executive summaries, and brief reports have shown that these formats significantly enhance the accessibility and impact of research findings. The increased readability and engagement associated with short-form communication suggest that it is a valuable tool for reaching broader audiences, including non-specialists. Educational applications of short-form communication are particularly noteworthy. Integrating these formats into academic curricula not only improves students' comprehension and writing skills but also prepares them for effective communication in professional settings. However, challenges remain in ensuring that short-form communication does not oversimplify complex ideas or compromise the depth of academic discourse. Future research should focus on developing guidelines and best practices for maintaining academic rigour in short-form communication.

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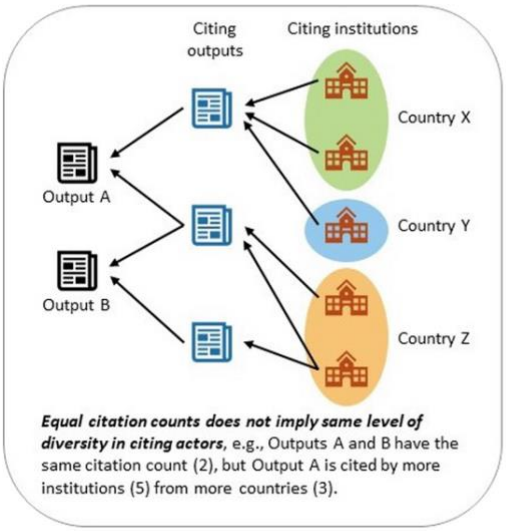
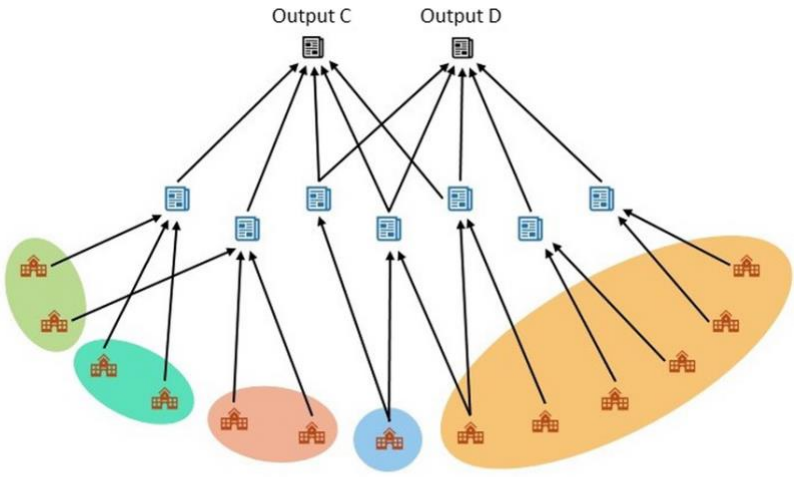
5. Illustration of citation metrics

A retrospective analysis of past citation data was conducted by Huang et al. (6) to assess the diversity of institutions and geographic locations of citations for each research output. Specifically, Figure 1 shows:

- **Output A and B**: Both have two citations. Output A is cited by institutions from two different countries, while Output B is cited only by institutions from one country, indicating lower diversity.
- **Output C and D**: Both have five citations. Output C is cited by more institutions from various countries compared to Output D, indicating higher diversity.





Output	# Citations	# Citing institutions	# Citing countries	Gini-Simpson*	Shannon*
C	5	9	5	0.79	1.59
D	5	7	2	0.55	0.53

* Calculated based on grouping all "citing output to citing institution" pairs by countries.

Figure. 1 - Illustrative examples show differences in citation counts, citing actors, and diversity. **(6)**

Figure 1 illustrates that citation diversity, as measured by these indices, differs from traditional citation counts. Two outputs can exhibit significant differences in the diversity of citing entities even if they have the same citation count. For example, an article cited by a broader array of institutions will have greater citation diversity, despite having an equal number of citations **(6)**.

6. Conclusion

The past year has seen substantial progress in the application of short-form communication in academia, marked by significant improvements in knowledge dissemination, academic engagement, educational practices and large language model - artificial intelligence. These advancements underscore the potential of short-form communication to revolutionise academic writing and teaching. Future research should address challenges related to maintaining academic rigour and explore further applications of short-form communication in various academic fields.

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Limitations

The methodology has limitations due to the ambiguous nature of paper selection. The use of AI tools like Scite.ai and Atomic Academic, while efficient, may introduce biases and miss nuanced studies. Extensive manual review was required, yet risks of oversight remain. Future reviews should include more human-curated methods to enhance robustness.

7. References

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