Experiences & Perspectives

Emergence of Confidence with Principles of Curiosity and Information Processing
Philosophy of Mind and Cognitive Neuroeducation Approach

Vikas Pathak[1,2,3*], Kundan Lal Verma[1,2,4]

[1] Unnati Foundation, Bangalore, India
[2] Ujjawal Research Group, India
[3] vikaspthk812@gmail.com
[4] klv.elect@gmail.com

*Correspondence
Vikas Pathak
vikaspthk812@gmail.com

Author contributions
Both authors contributed equally to this work.

Declaration of Competing Interest
The author reports no conflict of interest

Editor
Laia Lluch Molins (Universitat de Barcelona, España)

Reviewers
Ali Nouri
Dr. Rubén Carvajal
Alison Barbosa de Oliveira

Abstract

The growing field of educational neuroscience, also known as neuroeducation, brings together experts from diverse fields such as cognitive neuroscience, developmental cognitive neuroscience, educational psychology, educational technology, and educational theory. The aim of this collaboration is to investigate how psychological processes interact with the field of education. By combining fundamental findings in cognitive neuroscience with educational technology, these experts in neuroeducation aim to improve teaching methods to encourage curiosity and increase learners' self-assurance. The primary goal of neuroeducation is to create new theories and practical solutions that offer a novel perspective on learning in different areas. Enhancing learners' self-assurance is closely linked to the concepts of curiosity and how information is processed. When individuals are interested in a subject, they tend to look for more information and participate in learning activities that lead to a deeper understanding. This information processing enables individuals to examine and comprehend the information they come across, which can boost their confidence in their knowledge and skills. By embracing curiosity and improving their ability to process information, individuals can develop a strong sense of self-assurance that motivates them to tackle new challenges and pursue their objectives with determination. This review on curiosity has revealed an intriguing insight into its workings. Additionally, increased curiosity encourages individuals to seek out new information, highlighting the significant role of curiosity in the acquisition of knowledge. This finding has great potential for understanding human behavior and the learning process. The focus of this study is on enhancing learners' confidence by applying curiosity and information processing techniques to improve education and training across traditional and modern approaches. The combination of these principles is set to transform the learning experience, promoting a more engaging and effective method for acquiring knowledge and developing skills. This innovative approach has great potential to benefit students, teachers, and trainers, contributing to a more enriched and impactful educational environment.

Keywords: curiosity; confidence; information; education; leaders; trainers; learners

Resum

A l'àrea creixent de la neurociència educativa, també coneguda com a neuroeducació, treballen junts experts de diversos camps com la neurociència cognitiva, la neurociència cognitiva del desenvolupament, la psicologia de l'educació, la tecnologia educativa i la teoria de l'educació. Aquest esforç col·laboratiu pretén investigar com interactuen els processos psicològics amb l'àmbit de l'educació. Mitjançant la combinació de les troballes fonamentals de la neurociència cognitiva amb la tecnologia educativa, aquests experts en neuroeducació pretenen millorar els mètodes d'ensenyament per fomentar la curiositat i augmentar l'autoconfiança dels estudiants. L'objectiu principal de la neuroeducació és crear noves teories i solucions pràctiques que ofereixin una perspectiva nova de l'aprenentatge en diferents àrees. Millorar l'autoconfiança dels estudiants està estretament lligat als conceptes de curiositat i de com es processa la informació. Quan els individus estan interessats en un tema, tendeixen a buscar més informació i participar en activitats d'aprenentatge que condueixen a una comprensió més profunda. Aquest tractament de la informació permet a les persones examinar i comprendre la informació que troben, fet que pot augmentar la seva confiança en els seus coneixements i habilitats. En adoptar la curiositat i millorar la seva capacitat per processar la informació, les persones poden desenvolupar un fort sentiment d'autoconfiança que els motiva a afrontar nous reptes i perseguir els seus objectius amb determinació. Aquesta revisió sobre curiositat ha revelat una visió intrigant del seu funcionament. A més, l'augment de la curiositat anima les persones a buscar nova informació, destacant el paper important de la curiositat en l'adquisició de coneixements. Aquesta troballa té un gran potencial per entendre el comportament humà i el procés d'aprenentatge. L'objectiu d'aquest estudi és millorar la confiança dels estudiants mitjançant l'aplicació de la curiositat i les tècniques de processament de la informació per millorar l'educació i la formació a través d'enfocaments tradicionals i moderns. La combinació d'aquests principis està pensada per transformar l'experiència d'aprenentatge, promovent un mètode més atractiu i eficaç per adquirir coneixements i desenvolupar habilitats. Aquest enfocament innovador té un gran potencial per beneficiar estudiants, professors i formadors, contribuint a un entorn educatiu més enriquit i impactant.

Paraules clau: curiositat; confiança; informació; educació; líders; entrenadors; aprenents

Resumen

En la creciente área de la neurociencia educativa, también conocida como neuroeducación, trabajan juntos expertos de diversos campos como la neurociencia cognitiva, la neurociencia cognitiva del desarrollo, la psicología educativa, la tecnología educativa y la teoría de la educación. Este esfuerzo colaborativo busca investigar cómo los procesos psicológicos interactúan con el campo de la educación. Combinando hallazgos fundamentales en neurociencia cognitiva con tecnología educativa, estos expertos en neuroeducación pretenden mejorar los métodos de enseñanza para fomentar la curiosidad y aumentar la seguridad en sí mismos de los alumnos. El objetivo principal de la neuroeducación es crear nuevas teorías y soluciones prácticas que ofrezcan una perspectiva novedosa sobre el aprendizaje en diferentes áreas. Mejorar la seguridad en sí mismos de los alumnos está estrechamente relacionado con los conceptos de curiosidad y cómo

se procesa la información. Cuando las personas están interesadas en un tema, tienden a buscar más información y participar en actividades de aprendizaje que conducen a una comprensión más profunda. Este procesamiento de información permite a las personas examinar y comprender la información que encuentran, lo que puede aumentar su confianza en sus conocimientos y habilidades. Al aceptar la curiosidad y mejorar su capacidad para procesar información, las personas pueden desarrollar un fuerte sentido de seguridad en sí mismas que las motiva a afrontar nuevos desafíos y perseguir sus objetivos con determinación. Esta revisión sobre la curiosidad ha revelado una visión intrigante de su funcionamiento. Además, una mayor curiosidad anima a las personas a buscar nueva información, destacando el importante papel de la curiosidad en la adquisición de conocimientos. Este hallazgo tiene un gran potencial para comprender el comportamiento humano y el proceso de aprendizaje. El objetivo de este estudio es mejorar la confianza de los alumnos mediante la aplicación de técnicas de procesamiento de información y curiosidad para mejorar la educación y la formación a través de enfoques tradicionales y modernos. La combinación de estos principios está destinada a transformar la experiencia de aprendizaje, promoviendo un método más atractivo y eficaz para adquirir conocimientos y desarrollar habilidades. Este enfoque innovador tiene un gran potencial para beneficiar a estudiantes, profesores y formadores, contribuyendo a un entorno educativo más enriquecido e impactante.

Palabras clave: curiosidad; confianza; información; educación; líderes; entrenadores; estudiantes

Introduction

Curiosity, confidence and information processing are interconnected concepts that are crucial to understanding aspects of human cognition[39]. This study explores how these principles are integrated within the philosophy of mind and cognitive neuroeducation, with the aim of improving education and cognitive growth. Perspectives on how we define and study education have changed as our understanding of brain phenomena and cognitive processes has increased[23, 39, 40]. The criticisms for the educational definition provided by the institution arise, demonstrating that the educational system is considered the exception. It has become a complex case that demystifies an idea of change and necessity of a critical view of the vital phenomena that surround it[16, 19, 47].

Research delves into the intricate workings of cognition, encompassing perception, reaction, understanding, processing, memory, decision-making, and responses. It sheds light on crucial aspects of our cognitive processes, particularly our understanding and responsiveness in educational settings, fostering curiosity and confidence[15, 25, 35].

From this complex view of the regular educational system, in which many phenomena and philosophical aspects need to be understood and criticised, the idea arises that we bring forward a series of philosophical reflections and inverted discussions that come from cognitive neuroeducation; hence, we have it both ways. Our philosophical work-in-progress lightens up by the philosophy of mind perspective, and it takes its focus radius from five relevant principles, namely intelligence, education, the informational level of curiosity and confidence whose establishment and relationships are described in this study[18, 32].

We propose that the emergence of curiosity and thus confidence is rooted in tidings processing, which is maintained by local trust. We propose a set of criteria that distinguish between basic and complex emergence, which can be formally defined by information processing and information flow[6, 22]. We show that curiosity and confidence, as a striving for

information processing, allow for both basic and complex emergence. We demonstrate emergent curiosity and trust in an artificial neural network model, designed as elementary principles to showcase the possibility of self-organization[1, 39, 41].

A theoretical principle is that self-organization is feasible through a bottom-up approach allowed by entangled energy levels. We have examined the emergence of curiosity and confidence in a long short-term memory network and have shown that prospective studies can help to create pedagogical principles, hence revealing some perspectives of the philosophy of cognitive neuroeducation[17, 20]. In contemporary educational paradigms, the intersection of philosophy of mind and cognitive neuroeducation has become crucial for understanding the emergence of confidence. Confidence, a central and often underestimated facet of learning, is significantly influenced by the principles of curiosity and information processing[38, 46].

Confidence is crucial to personal growth and development. By using our skills and talents through continuous learning and practice, we can enhance our self-assurance. It is essential to cultivate a confident mindset by reframing negative thoughts into positive affirmations[10, 26]. Comparing ourselves to others can be beneficial if done in a constructive manner, focusing on self-improvement rather than self-criticism. Overcoming self-doubt is key to building confidence, as it allows us to approach challenges and new opportunities with a positive outlook. Remember that everyone has the potential to boost their confidence and achieve personal success[21, 33].

Self-confidence is an attitude towards your own skills and abilities. It means that you accept and trust yourself and feel in control of your life. You know your qualities and inferiority well and have a positive approach towards yourself. You set realistic expectations and goals, communicate with confidence and tolerate criticism. On the other hand, low self-esteem can make you feel insecure, passive or submissive, or you have trouble trusting others. You may feel inferior, unloved or sensitive to criticism. Confidence can depend on the situation. For example, you may feel very confident in some areas, such as talking to your relatives, but lack confidence in others, such as presenting yourself for an interview[13, 34].

This study explores the symbiotic relationship between these principles and the development of confidence from both philosophical and cognitive neuroeducational perspectives[42].

The Philosophy of Mind: Understanding Curiosity

Philosophy of mind delves into the complexities of human curiosity, a fundamental aspect of our cognitive processes. Curiosity drives us to explore, question, and seek knowledge about the world around us. It is a powerful force that propels scientific discoveries, artistic creations, and philosophical inquiries. Understanding curiosity is key to understanding human motivation and behaviour[2, 44].

Curiosity is deeply intertwined with our ability to learn and adapt. It fuels our desire to understand the unknown and pushes the boundaries of our knowledge. By investigating curiosity, we grasp to new perspective of knowledge and ideas. It is through curiosity that we challenge existing beliefs, spark innovation, and drive progress in various fields of study[31].

René Descartes, a prominent figure in the philosophy of mind, postulated that curiosity is an innate aspect of human nature that drives individuals to know the world around them. This self-motivation is consistent with the concept of epistemic curiosity, which drives the pursuit of knowledge for its own sake[30]. George Loewenstein's Information-Gap Theory further explains this notion, suggesting that curiosity arises when there is a perceived gap between what one knows and what one desires to know. Bridging this gap becomes a compelling endeavour that subsequently builds confidence as individuals acquire the sought-after knowledge[5, 11, 36].

Cognitive Neuroeducation: Curiosity and Information Processing

Research has shown that curiosity stimulates the brain's reward system, leading to increased levels of dopamine, which enhances memory and learning. By tapping into this natural curiosity, educators can create engaging learning experiences that promote better information retention and understanding. In addition, studies have demonstrated that curiosity-driven learning leads to deeper processing of information. When individuals are curious about a topic, they are more likely to explore and seek out additional information, leading to a more compre-

hensive understanding. Cognitive neuroeducation integrates insights from neuroscience, psychology, and education to design learning experiences that align with the brain's natural learning processes. Within this framework, curiosity is recognised as a critical component that enhances neural engagement and cognitive function. It activates specific neural pathways, particularly within the dopaminergic system, associated with reward and motivation. This active engagement with the material helps to create stronger neural connections in the brain, facilitating better long-term retention and application of knowledge[8, 28, 37].

Research in cognitive neuroscience reveals that curiosity improves memory retention and information processing. The anticipation of discovering new information stimulates the hippocampus, a region central to memory formation, thereby facilitating deeper encoding and retrieval of knowledge. In addition, the involvement of the prefrontal cortex during states of curious supports complex information processing and decision-making, contributing to more confident and competent reasoning abilities[12].

In the context of educational strategies, harnessing curiosity can significantly enhance learning outcomes. Inquiry-based learning, which encourages students to ask questions and seek answers through investigation, epitomises this approach. By fostering an environment where curiosity-driven exploration is prioritised, educators can stimulate cognitive processes that contribute to a more engaged and confident learner[27].

Confidence: The Synergetic Outcome

Confidence enables individuals to take risks, embrace challenges, and persevere in the face of adversity. Studies have shown that confident individuals are more likely to achieve their goals and excel in their endeavours. Confidence is also contagious. When individuals exude confidence, they inspire others around them to believe in their abilities and strive for greatness. This positive energy creates a synergetic outcome where collective confidence propels teams and organizations towards success[9].

Confidence, defined as the belief in one's ability to succeed, is a key outcome of the interplay between information processing and curiosity. When learners are curious, their engagement levels are heightened,

leading to deeper and more meaningful learning experiences. This engagement, coupled with effective information processing, culminates in a sense of mastery and self-efficacy[3].

Albert Bandura's Social Cognitive Theory states that self-efficacy – a key component of confidence – is developed through mastery experiences, social modelling, and feedback. Curiosity-driven learning environments provide ample opportunities for mastery experiences as learners are constantly challenged to explore and understand new concepts. Positive feedback from these experiences further reinforces confidence, creating a positive feedback loop in which increased confidence encourages further curiosity and exploration[4].

In addition, cognitive neuroeducational approaches that emphasise self-regulated learning empower students to take control of their learning journey. By setting personal goals, monitoring progress, and reflecting on outcomes, learners build a robust sense of agency and confidence. The integration of metacognitive strategies, such as self-assessment and adaptive learning techniques, further enhances this process, enabling learners to fine-tune their informational processing skills and cultivate the strongest sense of confidence. In conclusion, confidence is a powerful trait that can have a profound impact on both individuals and groups. By cultivating confidence in ourselves and encouraging it in others, we can create a harmonious environment where success becomes not just a possibility, but a reality[21, 43].

Practical Applications in Neuroeducation

Confidence and curiosity play a crucial role in neuroeducation. By fostering confidence in students, educators can create a positive learning environment where individuals are more willing to take risks and explore new ideas. This can lead to increased engagement and motivation in the classroom, ultimately improving the learning experience. Moreover, curiosity stimulates the brain's reward system, promoting active participation and a deeper understanding of the material being taught[14].

Neuroeducational research shows that when students feel confident in their abilities, they are more likely to persevere through challenges and setbacks. This resilience is important for academic success and personal growth. Additionally, curiosity drives

students to ask questions, seek out information's, and make connections among different concepts. Active engagement in the learning process not only improves retention but also encourages critical thinking skills[29, 48].

To harness the principles of curiosity and information processing for confidence-building, educators must adopt innovative and evidence-based practices. Here are some practical applications:

a) Inquiry-Based Learning: Implementing inquiry-based learning frameworks that motivates students to enquire questions, conduct research, and present findings fosters a curiosity-driven learning environment. This methodology promotes engagement and intrinsic motivation, crucial for confidence development.

b) Differentiated Instruction: Tailoring educational content and strategies to meet the diverse needs of learners ensures that each student's curiosity is adequately stimulated. Differentiated instruction can involve varying levels of complexity, interest-based topics, and personalised learning pathways, all of which contribute to more effective information processing and heightened confidence.

c) Technology-Enhanced Learning: The integration of technologies, such as interactive simulations, educational games, and virtual reality experiences, can significantly stimulate curiosity and support complex information processing. These tools provide immersive and adaptive learning experiences that cater to individual learning paces and styles, fostering a supportive environment for confidence growth.

d) Formative Assessments and Feedback: Regular formative assessments that provide constructive feedback are essential for reinforcing confidence. By identifying areas of improvement and celebrating achievements, educators can help students develop a growth mind-set and increase their self-efficacy.

e) Mindfulness and Metacognition: Encouraging mindfulness practices and metacognitive strategies in the classroom can enhance learners' awareness of their cognitive processes. Reflection exercises, journal writing, and goal-setting activities help students understand their learning strategies, recognise their progress, and develop a more confident approach to challenges[24, 45].

Discussion

Exploring the fields of mind philosophy and cognitive neuroeducation can indeed provide invaluable insights into building self-confidence through a sense of wonder and the way we process information. By understanding how the mind operates and processes data, we can enhance our mental capabilities and boost our self-belief. Mind philosophy delves into questions about the nature of the mind, awareness, and its functions. Through this exploration, we can gain a deeper understanding of our thought patterns and behaviors, which can help identify areas where our self-confidence may be lacking and guide us in improving them. Cognitive neuroeducation, on the other hand, combines concepts from cognitive psychology and neuroscience to enhance learning and cognitive development. By applying these methods, we can sharpen our ability to process information, , improve memory recall, and boost our problem-solving abilities, thereby fostering a stronger belief in our intellectual capabilities. By integrating these approaches, individuals can cultivate a mindset of curiosity and continuous learning. This mindset empowers them to tackle challenges with a growth-oriented attitude, viewing obstacles as opportunities for development and learning. As a result, individuals can muster the courage to embark on new ventures, explore uncharted territories, and expand their knowledge and skills. In essence, by immersing themselves in the study of mind philosophy and cognitive neuroeducation, individuals can unlock their full potential, enhance their self-confidence, and embark on a journey of self-improvement and personal growth.

Conclusions

In conclusion, the philosophy of mind sheds light on the complex nature of curiosity and its profound impact on human cognition. Embracing curiosity not only enriches our lives but also drives our growth and development. By understanding and nurturing our curiosity, we embark on a journey of continuous learning and exploration that shapes our understanding of the world and ourselves.

The exploration of curiosity, confidence, and creativity is essential in this section. These concepts are intricately connected yet have unique characteris-

tics that warrant thorough analysis. By clearly defining each term, the field of cognitive development can effectively investigate these phenomena through empirical research, ultimately fostering a deeper understanding and potential cross-disciplinary applications. The chapter explores into theoretical frameworks and recent discoveries, emphasising the crucial role of curiosity, imagination, and creativity in the field of early childhood education.

Curiosity and confidence are fundamental to fostering creativity, which is key to innovation and pushing boundaries. Curiosity drives knowledge acquisition, while confidence encourages exploration and idea generation. Eliminating curiosity or limiting confidence can stifle creative development. Creativity thrives in uncertainty, where wonder resides, and it thrives on the unknown. The intricate relationships between curiosity, confidence, and creativity warrant deeper exploration to fully understand their impact on knowledge generation and pushing boundaries.

References

1. Antink -Meyer A, Brown R. Teachers' curiosity about engineering, engineered objects and phenomena and their confidence for Teaching Elementary Engineering (fundamental). 2022 ASEE Annual Conference & Exposition Proceedings. doi:10.18260/1-2−41650

2. Artificial curiosity emerging human-like behaviour - A foundation for fully autonomous cognitive machines. Proceedings of the 5th International Joint Conference on Computational Intelligence. 2013; doi:10.5220/0004628604070419

3. Baba Rahim N. The interaction between teaching competencies and self-efficacy in fostering engagement amongst distance learners: A path analysis approach. Malaysian Journal of Learning and Instruction. 2022;19. doi:10.32890/mjli2022.19.1.2

4. Balachandran KP, Bhuvaneswari M. Investigation of carer experiences through self-efficacy grounded in the context of social cognitive theory. Principles and Clinical Interventions in Social Cognition. 2024 Mar 22;85−103. doi:10.4018/979-8-3693-1265-0.ch006

5. Bashapoor S, Mow Iaie M, Sarafrazi L. The role of cognitive fusion, distress tolerance and self-compassion in post traumatic growth of abused individuals in their childhood. Shenakht Journal of Psychology and Psychiatry. 2020 Jul 1;7(3):87−100. doi:10.52547/shenakht.7.3.87

6. Bejan T. On the historical emergence of basic human equality. How Can We Be Equals? 2024 May 23;35−64. doi:10.1093/oso/9780192871480.003.0002

7. Bernstein WM. Information processing, mental competence and psychotherapy. The Realisation of Concepts. 2018 May 11;137−52. doi:10.4324/9780429483004-11

8. Brooks G, Kohler S. Curiosity and reward after unsuccessful memory recall. 2024 Mar 6; doi:10.31234/osf.io/3wkct

9. Consoli S. 10. critical incidents in a teacher–researcher and student– participant relationship: What risks can we take? Vulnerabilities, Challenges and Risks in Applied Linguistics. 2021 Dec 31;147−61. doi:10.21832/9781788928243-011

10. Cook G. Into a place where Thoughts can bloom: A reflection on how raising awareness of our multiple intelligences can support learning and growth. International Practice Development Journal. 2023 May 24;13(1):1−4. doi:10.19043/ipdj.131.012

11. Craig AP. What is it that one knows when one knows 'psychology'? Theory & Psychology. 1999 Apr;9(2):197−227. doi:10.1177/095935439992005

12. Das A, Menon V. Asymmetric frequency-specific feedforward and feedback information flow between hippocampus and prefrontal cortex during verbal memory encoding and recall. The Journal of Neuroscience. 2021 Aug 25;41(40):8427−40. doi:10.1523/jneurosci.0802-21.2021

13. Eitel K. Self-leadership: You can only lead others to the degree you can lead yourself. BSAVA Congress Proceedings 2018. 2018 Apr 1;348−348. doi:10.22233/9781910443590.45.1

14. Fletcher J. Building confidence. Fostering Habits of Mind in Today's Students. 2023 Jun 27;123−39. doi:10.4324/9781003444862-17

15. Galetzka C. The story so far: How embodied cognition advances our understanding of meaning-making. Frontiers in Psychology. 2017 Jul 31;8. doi:10.3389/fpsyg.2017.01315

16. Gatimu MW. Undermining critical consciousness unconsciously: Restoring hope in the multicultural education idea. Journal of Educational Change. 2008 Aug 5;10(1):47−61. doi:10.1007/s10833-008-9087-5

17. Grothe M, Żukowski B. Short- and long-term social interactions from the game theoretical perspective: A cognitive approach. Cognition, Meaning and Action Lodz-Lund Studies in Cognitive Science. 2015;181−91. doi:10.18778/7969-759-5.12

18. Holm. "we must learn to love": Some reflections on the kinship of philosophical thinking and classical music from an educational perspective. Philosophy of Music Education Review. 2020;28(2):186. doi:10.2979/philmusieducrevi.28.2.05

19. Hong J, Cross Francis D. Unpacking complex phenomena through qualitative inquiry: The case of teacher identity research. Educational Psychologist. 2020 Jul 7;55(4):208−19. doi:10.1080/00461520.2020.1783265

20. In-depth cognitive processing: Maximizing the "long-term" in long-term memory. How We Think and Learn. 2017 Feb 13;72−95. doi:10.1017/9781316691458.005

21. Intan Palullu A, Bahri A. Profile of self-efficacy, metacognitive skills, self-regulated learning, and biology cognitive learning outcomes of public high school students. International Journal of Science and Research (IJSR). 2023 Sept 5;12(9):1158–63. doi:10.21275/sr23830084550

22. Kanaev AV. Confidence measures of optical flow estimation suitable for multiframe superresolution. SPIE Proceedings. 2012 May 1; doi:10.1117/12.918720

23. Kantowitz BH. Human information processing. 2021 Oct 14; doi:10.4324/9781003176688

24. Kettler T, Taliaferro C. Inquiry models of learning. Personalized Learning in Gifted Education. 2022 Feb 16;125–46. doi:10.4324/9781003237136-8

25. Kundey SM. Advancing our understanding of cognition by including amphibians and reptiles in comparative cognition research. Comparative Cognition & Behavior Reviews. 2024;19:29–32. doi:10.3819/ccbr.2024.190004

26. Ladano K. Our instruments are our masks: Developing communication skills and confidence through collective free improvisation. Critical Studies in Improvisation / Études critiques en improvisation. 2022 Jul 20;15(1). doi:10.21083/csieci.v15i1.6255

27. MacKinnon LS, Archer-Kuhn B. How do I encourage my students to ask good questions? Reigniting Curiosity and Inquiry in Higher Education. 2023 Jun 26;79–89. doi:10.4324/9781003446743-10

28. Marvin CB, Shohamy D. Curiosity and reward: Valence predicts choice and information prediction errors enhance learning. Journal of Experimental Psychology: General. 2016 Mar;145(3):266–72. doi:10.1037/xge0000140

29. Melhem TY, Isa ZM. Enhancing critical thinking skills among students with learning difficulties. International Journal of Academic Research in Progressive Education and Development. 2013 Nov 25;2(4). doi:10.6007/ijarped/v2-i4/395

30. Metz T. Pursuing knowledge for its own sake amidst a world of poverty: Reconsidering balogun on philosophy's relevance. Filosofia Theoretica: Journal of African Philosophy, Culture and Religions. 2019 Sept 27;8(2):1–18. doi:10.4314/ft.v8i2.1

31. Moreno A. The key of curiosity. Purpose-Driven Learning. 2022 May 11;132–47. doi:10.4324/9781003294634-10

32. Moreno A. The key of curiosity. Purpose-Driven Learning. 2022 May 11;132–47. doi:10.4324/9781003294634-10

33. Phillips L. Confidence boost. Nursing Standard. 2006 Jul 26;20(46):72–72. doi:10.7748/ns.20.46.72.s63

34. Phillips L. Confidence boost. Nursing Standard. 2006 Jul 26;20(46):72–72. doi:10.7748/ns.20.46.72.s63

35. Roberts AP, Cole JC. Naturalistic decision making: Taking a (cognitive) step back to take two steps forward in understanding experience-based decisions. Journal of Applied Research in Memory and Cognition. 2018 Mar;7(1):70–81. doi:10.1016/j.jarmac.2018.01.003

36. Sand LA, Bolger DJ. The neurobiological strands of developmental dyslexia: What we know and what we don't know. Reading Development and Difficulties. 2019;233–70. doi:10.1007/978-3-030-26550-2_10

37. Seeliger K, Ambrogioni L, Güçlü U, van Gerven MA. Neural information flow: Learning neural information processing systems from brain activity. 2019 Conference on Cognitive Computational Neuroscience. 2019; doi:10.32470/ccn.2019.1010-0

38. SMITH C. Understanding trust and confidence: Two paradigms and their significance for health and Social Care. Journal of Applied Philosophy. 2005 Nov;22(3):299–316. doi:10.1111/j.1468-5930.2005.00312.x

39. Spitzer M, Kiesel A. Curiosity as a function of confidence and importance in knowing information. 2021 Nov 5; doi:10.31234/osf.io/dzanq

40. Strategic aspects of human cognition: Implications for understanding human reasoning. Methods of Thought. 2004 Jun 2;19–37. doi:10.4324/9780203503881-7

41. Suryanda A, Heryanti E, Khairunnisa F. Are self-confidence and curiosity in studying biology related to achievement motivation? BIO-INOVED : Jurnal Biologi-Inovasi Pendidikan. 2022 Jun 20;4(2):134. doi:10.20527/bino.v4i2.12576

42. Tekin E, Lin W, Roediger HL. The relationship between confidence and accuracy with verbal and verbal + numeric confidence scales. Cognitive Research: Principles and Implications. 2018 Nov 7;3(1). doi:10.1186/s41235-018-0134-3

43. Theobald M. Self-regulated learning training programs enhance university students' academic performance, self-regulated learning strategies, and motivation: A meta-analysis. 2021 Jan 10; doi:10.31234/osf.io/tf8nk

44. Trudewind C. Curiosity and anxiety as motivational determinants of cognitive development. Motivational Psychology of Human Development - Developing Motivation and Motivating Development. 2000;15–38. doi:10.1016/s0166-4115(00)80004-7

45. What are metacognitive assessments? Metacognition in Literacy Learning. 2006 Jun 17;105–22. doi:10.4324/9781410613301-15

46. Woolcott G. Universal Information Processing Systems, generalised educational principles and generalised cognitive processes. Reconceptualising Information Processing for Education. 2020;135–60. doi:10.1007/978-981-15-7051-3_9

47. Young MD, Diem S, Sampson C. The vital necessity of Critical Education Policy Research. Educational Evaluation and Policy Analysis. 2024 Mar 25;46(2):397–405. doi:10.3102/01623737241239985

48. Zetriuslita, Wahyudin, Jarnawi. The correlation among students' response in apply problem based learning and cognitive conflict strategy to improve critical thinking skills and curiosity attitude based on academic level. Journal of Physics: Conference Series. 2020 Apr 1;1521(3):032034. doi:10.1088/1742-6596/1521/3/032034