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The Neurological Correlates of Leadership and their Relevance to Education 5.0#

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Abstract

From an organizational standpoint, Neuroleadership has been described as a leadership style where the leader is aware of the neurological and neuroscientific basis of behaviour and utilizes this understanding to create a positive workplace climate. Education 5.0 is a paradigm shift in the teaching-learning process resulting from digital transformation revolving around changes in IT mainframes. The shift from Education 4.0 to Education 5.0 marked by online classes and distance learning was accelerated by the COVID-19 pandemic and the need for sound academic leadership concurrently acquired salience. The goal of this research is two-fold: First, to gain a scientific understanding of the mechanisms involved in the integration of cognitive neuroscience into the field of educational leadership. Second, to investigate the dynamics of the teaching-learning process and accompanying deviations from a neuroscientific perspective. The present study is a review article based on Scopus-indexed papers published in the last 5 years (2019-2023). A keyword search of the reputable database was carried out using the string "Neuroleadership" or "Neuroscientific Leadership" or "Neuro-based Leadership" with the TITLE-ABS-KEY as "Education". The review provides a comprehensive account of research on the link between neuro-based leadership and educational outcomes - a research domain still at the nascent stage. The results indicate that leaders, whether administrators or teachers, who view the teaching-learning process from a neuroscientific perspective can deal with a vast array of academic challenges such as cultivating creativity, empathy, goal striving, and dealing with rejection sensitivity. A brain-based understanding of student behaviour can help facilitate modification of their responses in the classroom. A major outcome of this research is a theoretical framework derived from neuro-behavioural data contained in various studies. The study highlights that research on neuroscience and educational leadership has practical implications for curriculum design, modification of pedagogical techniques, and special education programs.

Keywords: Caveman's Brain, Education, Neuro-Based Leadership, Neocortex, Neuroplasticity, SCARF Model

1. Introduction

Literature emphasizes the role of leadership for the effectiveness of educational institutions. Researchers (*e.g.*, Daniëls *et al.*, 2019; Fields *et al.*, 2019; Hitt & Tucker, 2016) have defined leadership in education as the process directed towards unleashing the talents and energies of teachers, students, and parents for the attainment of academic objectives. It is about guiding students and helping them develop initiative and leadership skills. Principals and deans occupy formal leadership roles, and their job description entails the formulation of disciplinary policies that aid in enhancing student learning outcomes (Liu, 2021). In the context of informal leadership, Perna (2022) talks at length about leadership quality in teachers. Going beyond curriculum content and engaging students by establishing connections evokes students' desire to follow them and is a testimony to their leadership abilities. The process of streamlining education, by default, places educators in a position of leadership. In the fast-changing environment, the hierarchical leadership style is no longer effective and collaborative or distributed leadership models have been found to

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enhance organizational capacity (Liu & Watson, 2020; Sebastian & Huang, 2017). Distributed leadership is both spread and shared across all stakeholders (Bolden *et al.*, 2009). According to these researchers, distributed leadership '... is represented as dynamic, relational, inclusive, collaborative and contextually-situated' with the aim of establishing best practices for the educational institute. With varieties of expertise existing across a distributed leadership network (Bennet *et al.*, 2003), formal leadership roles may be rendered irrelevant. Instructional leadership (Day, 2011), in relation to education, is mainly about enhancing the quality of instruction through curriculum development, teacher training, and classroom observation. It includes data-driven decision-making resulting in enhanced student outcomes, teacher empowerment, focus on continuous improvement, alignment of resources, and stronger school culture.

Informal educational leaders are described by Fields *et al.* (2019) as knowledge catalysts who have the ability to produce new knowledge and disseminate it. Fields *et al.* (2019), in an extensive research, tried to understand how faculty members in an academic development program perceived and conceptualized educational leadership from the perspective of leaders being change agents. A five-pillar framework with five key characteristics describing effective leadership in higher education emerged based on the key themes from participants' interviews: affective qualities, mentoring and empowering, action orientation, teaching excellence and research and scholarship.

IT has had a disruptive influence on all facets of business, including education. The educational transformation labelled Education 5.0 marks a new era defined by a balanced development resulting from an integration of human-centred aspects with information from cyberspace and physical space (Iaskyana, 2022). Adaptation and competence are two necessary conditions in dealing with Industry 5.0 (Imtinan, 2021). In order to successfully navigate the change, leaders need to make adjustments to inculcate in the students 21st-century skills associated with scientific and technological progress. Iaskyana (2022) enlists five strategies that will enable education leaders to cope with the demands of Industry 5.0:

(i) *Transformational Leadership Role*

A transformational strategy is where leaders design empowerment programs to hone their abilities and potential and build a positive educational climate that results in organizational citizenship behaviour among institutional residents (Marisa & Nur, 2021; Rahmansyah, 2017)

(ii) *Curriculum Development Strategies*

The educational curriculum needs to be flexible, enabling students to learn critical and creative thinking skills and attain digital and technology literacy along with life skills competencies (Rahayu, 2021).

(iii) *Educator Empowerment Strategies*

The focus of education in Industry 5.0 is on inquiry-based and freedom learning through the use of PBL (Problem Based Learning), PJBL (Project Based Learning) models (Mohan & Sharma, 2021; Saini & Dawra, 2022), and case-based learning that improves the ability of students in solving problems (Fitria, 2021). Upskilling through training programs is required to achieve educational goals in Industry 5.0. The outcome should be educators developing educational and research competence, digital literacy, agile thinking skills, and global competence (Prasetiyo *et al.*, 2022). The educator must be a facilitator, enabling students to freely access teaching materials in learning by utilizing technology.

(iv) *Relationship and Partnership Development Strategies*

For the sustainability of learning and fulfilment of demands of the community, educational institutions must involve the community members in decision-making and customizing of the curriculum (Fatchurrohman, 2018).

(v) School Management and Entrepreneurship Development Strategies

School-Based Management (SBM) is a strategy to improve education and build a democratic, accountable and transparent culture by transferring significant decision-making authority from state and district offices to individual schools. This autonomy can help school leaders set up school creative business units that involve students and educators and intend to foster creativity

and the spirit of entrepreneurs in their students. Various entrepreneurship activities instil in students risk-taking ability and an achievement-oriented mindset (Elitawati & Haq, 2020; Siregar *et al.*, 2021).

The five aforementioned strategies that can enable educational leaders to cope with the demands of Industry 5.0 have an intricate link with the neuroscientific mechanisms behind leading and being led.

1.1 Purpose of the Study

The change in the nature of education, labelled as Education 5.0, has led to a shift in understanding the phenomenon of academic leadership. With increasing digitalization, researchers are delving deep into the neurological underpinnings of leadership and examining possible links between neuroscience, organizational climate and behavioural management (Balconi *et al.*, 2017; Sułkowski & Chmielecki, 2017). However, neuroleadership as a field is still evolving.

The present research is a based on a review of literature with the following objectives:

(i) To understand how neuroscientific insights can aid in leadership effectiveness.
(ii) To understand the link between neuroleadership and student learning.
(iii) To develop a theoretical framework in the context of the studies reviewed.

2. Method

The present study is a review-based article based on Scopus-indexed papers published in the last 5 years (2019-2023). A keyword search of the reputable database was carried out using the string "Neuroleadership" or "Neuroscientific Leadership" or "Neuro-based Leadership" with the TITLE-ABS-KEY as "Education". A total of 21 papers dealing with brain-based leadership and its link with educational outcomes were found and reviewed.

3. Review of Literature

Review of literature entails:

(i) The link between neuro-based leadership and education.
(ii) Implications of a brain-based environment for the attainment of academic objectives.

3.1 The Concept of Neuroleadership and its Relevance to Education

There is a reciprocal relationship between brain and behaviour. The neuroscientific information acquired from advances in science and technology has led to the evolution of leadership. Neurological concepts can help understand the actions of leaders and the purpose behind these (Waldman *et al.,* 2011a). Other related mechanisms that are a subject of analysis are the brain, mind and education (Howard-Jones, 2008).

Viewing the phenomenon of leadership through the lens of brain function requires a comprehensive approach to understand it. The phrase "neuroleadership", first used by Rock (2006), is also known as "neuro-based leadership" or "brain-minded leadership". It describes how brain science might improve our understanding of the phenomenon of leadership and assist leaders to adopt more successful strategies and behaviours. According to Liu *et al.* (2015), "Neuroleadership can be defined as an applied field of social cognitive neuroscience that aims to analyze and understand leaders' behaviour." Neuroleaders have the expertise to draw parallels between various regions of the brain, the biological and chemical processes on the one hand and behaviour on the other. This knowledge enables them to manage their institutions by setting a management strategy based on brain-based findings (Badenhorst, 2015). According to Pittman (2020), neuroleadership has a supportive role in creating a more resistant organizational structure and providing employee retention. It has been discovered that knowledge of the neuroscientific foundations of leadership influences employee behaviour, allows workplace transformation, and helps leaders modify how they lead or manage themselves. As a result, businesses in various sectors are able to design mentally stimulating workplaces that maximize worker engagement and provide positive work outcomes. Particularly in the post-Covid workplace and in the VUCA environment, brain-minded leadership is essential. Turbulence in the form of abrupt, unprecedented developments has, like other businesses, impacted the education sector. To re-iterate, authoritarian management is no longer effective; instead, new leadership techniques

need to be devised after a thorough understanding of how the human brain functions. The age-old argument over whether leaders are born or made can be connected to the idea of "neuroleadership". The evidence supporting the biological or genetic roots of leadership does not refute the influence of environmental circumstances in altering or affecting brain architecture and functions, which allows room for the argument that leaders are made.

In a review of research Gocen (2021) reports that neuronal networks in the prefrontal cortex referred to as the CEO of the brain, in the dopaminergic system which is the brain's reward provider, and in the limbic system or the emotional brain determine the leadership profile of people (*e.g.*, Goldberg, 2009; Wang, 2019). Interactions in the right front of the brain may be related to charismatic leadership behaviour (Waldman *et al.*, 2011b).

Gocen (2021) has quoted teacher studies involving EEG frequencies and brain waves that have applications in the areas of education management and leader development. Using the neurofeedback method, stimuli given through sound and video are used to measure alpha, beta, delta, theta, gamma waves, or combinations of these (Edison *et al.*, 2019). Alpha waves are associated with a feeling of relaxation, improved memory and mental performance, healing brain trauma, and strengthened creativity. Meditation generally increases alpha waves. If beta activities are not optimal, it may cause depression or other mental illnesses. Delta waves help decrease anxiety, improve the quality of sleep, and alleviate headaches, brain trauma, learning disabilities, and seizures. Theta waves have a close link with memory, emotion regulation, creativity, and hypnosis. These waves are associated with the early stage of sleep. Gamma waves have the highest frequency and are associated with mental clarity and problem-solving. If these waves have a faster rhythm, the speed of remembering increases. Electroencephalography (EEG) and the neurofeedback method help understand various facets of a leader's behaviour.

Some of the aspects of neuroleaders, as highlighted in research (*e.g.*, Broomfield & D'Amato, 2018; Kraus, 2018; Pope, 2019), are:

(i) *Neuroleaders Avoid Multitasking:* Leaders with neuro-based knowledge do not focus on different tasks at a time to prevent the autopilot feature of the brain, which results in 'thoughtless' decision-making regardless of the context.

(ii) *Neuroleaders Learn How the Brain Works and Spread it to Others:* Understanding people's biological foundations strengthens management. The need for neuroleadership studies in education is primarily to learn how much a human being is affected by the non-social, biological part of him. For instance, stress at low levels triggers a dopamine release, which facilitates learning and development, however, chronic stress shrinks the hippocampus area of the brain (Yasar, 2019). According to Pope (2019), when people think they have control over decisions and choices in their work environment, there is a decrease in the release of the stress hormone cortisol.

(iii) *Neuroleaders Conduct Emotion Management Effectively:* They practice mindfulness and work-leisure balance, thus establishing an organizational growth mindset (Zwaan, Viljoen, & Aiken, 2019).

(iv) *Neuroleaders Direct Change by Taking into Account Implicit Variables:* An understanding of the physiological basis of change resistance enables educational leaders to provide certainty and clarity as regards the change vision, thus minimizing the sense of perceived threat (Pope, 2019).

From the vantage point of educational outcomes, goal achievement is the biggest challenge for educators. A goal is any desired outcome that wouldn't occur without a set of antecedent acts and some kind of intervention. An understanding of the physiological basis of motivation can enable teacher-leaders to instil goal direction in students. Berkman (2018), in a study, defines learning as 'behaviour modification', which has two dimensions - motivational (the will) and cognitive (the way). Cognitive factors include 'executive function', and motivational factors include 'reward learning'. Neuroscientific studies on each of these aspects of goal attainment have uncovered the machinery behind goal pursuit and how various ways of behaviour change may go wrong. In his comprehensive research on the neuroscience of goals and behaviour, Berkman (2018)

describes executive functions as higher-level skills and capacities such as planning, attention, task switching, inhibitory control and working memory. These functions are effortful, operate consciously, engage in the pursuit of novel goals instead of routine ones (*e.g.*, Miyake & Friedman, 2012) and are represented within neural systems and circuits. Roos *et al.* (2017) found how goal attainment is thwarted due to the activation of the sympathetic nervous system and hypothalamic-pituitary-adrenal axis during stress and the consequent influence on executive functions. Neuroscientific investigations centring on brain training have revealed an improvement in executive functions such as inhibitory control (involving the prevention of ongoing behaviour) with practice at a related task. Goal attainment is not possible without motivation or "the will" to achieve a desired outcome, which is perceived as rewarding. The activity of Mesolimbic dopaminergic neurons is associated with the will to obtain a reward; the primary neurotransmitter involved is dopamine.

The development of self-esteem in learners is central to a holistic approach to education and closely associated with academic achievement. Both social affiliation and the threat of social rejection are crucial in this regard. Lieberman and Eisenberger (2015) report that neuronal networks associated with physical pain are triggered in response to an experience of social rejection which is unpleasant, enhances defensiveness, generates a stress response resulting in a narrowing of attention on the social threat and a disengagement from other ongoing goals (Muscatell *et al.*, 2016).

In a study using functional magnetic resonance imaging, Morelli *et al.* (2014) found the neural bases of feeling understood and not understood - two psychological states associated with personal and social well-being. Feeling understood activated neural regions associated with reward and social connection (*i.e.*, ventral striatum and middle insula), while not feeling understood activated neural regions associated with negative affect (*i.e.*, anterior insula). Both feeling understood and not feeling understood activated different brain areas (feeling understood: Precuneus and temporoparietal junction; not feeling understood: dorsomedial prefrontal cortex) with trait differences in rejection sensitivity amplifying neural responses in these regions. These neural responses were associated with subsequent feelings of social connection or disconnection. The study provides insight into the psycho-physiological processes underlying feeling understood (or not) and has implications for the teaching-learning process. Teachers could devise targeted interventions that amplify the benefits of feeling understood or buffer individual students from the harmful consequences of not feeling understood - the two mind states being powerful drivers of social behaviour, as well as a critical component of positive social relationships.

The following research observations by Strategic Leadership Institute (n.d.) will help understand the applicability of neuroscientific principles to education:

(i) In the last 50,000 years, there has been only a minuscule change in the genetic make-up of the human brain

(ii) The neocortex, despite its inbuilt capacity to form new neural pathways in response to a changing environment - a process referred to as 'neuroplasticity' - is unable to cope with the varied and continuous demands of the Industry 5.0 workplace marked by exponential technological advancement. It gets overloaded and, thus, overpowers the very existence of leaders and stakeholders in all sectors of the knowledge-based economy. This neuro-overload leads to stress and a breakdown of higher functions of decision making, problem solving, communication, goal setting and collaboration with others.

(iii) The old 'caveman brain' is still more powerful and exerts a much larger influence on behaviour. Despite socio-economic progress, the homosapiens' primordial instinct to survive is still all powerful - the survival being by way of dealing with threats and rewards.

The essential components of learning are rewards and punishments. Teacher-leaders will be able to create a conducive classroom atmosphere if they understand the brain basics behind student receptivity to learn.

The student brain is continually scrutinizing the environment (both physical and social) for threats and rewards - actual or perceived. Any aspect of the physical environment, such as ventilation or the formal or informal behaviour of the teacher or peers, will be seen as either threatening or rewarding. The basic approach-withdrawal tendency will make students run away from predators in school or college and approach significant others. Threats will result in a symbolic paralysis of the brain, impairing thought and affect - the two precursors of behaviour - leading to 'automated disengagement' from the environment. This will further manifest in depleted memory and judgement, inability to solve problems, ineffective decision making, misperception, defensive mindset, change resistance, poor communication patterns, and interpersonal conflicts. The most harmful outcome is alienation from the learning environment - a non-productive reaction as the brain expends all its energy in dealing with the threat. Learners get into an 'automated engage' state in response to a reward stimulus and can thereafter give optimal performance both at cognitive and emotional levels. Rewards trigger the subconscious tendency to approach, leading to a creative mindset.

3.2 Creating a Brain-Engaging Environment: Implications for Educational Leadership

A useful manual for creating an atmosphere that supports both emotional well-being and cognitive function is Rock's (2008) SCARF Model. As was previously indicated, two strong drives associated with the survival response — minimizing perceived threat and maximizing possible reward—guide social behaviours that are powered by brain systems. Our brain classifies inputs as either good (non-threatening) or bad (dangerous), depending on the circuits that are activated. As discussed earlier, this leads to approach and avoidance responses. The limbic system's amygdala houses these reactions. Upon re-exposure to the stimulus, the amygdala triggers an appropriate emotional reaction based on its level of activation. Our limbic system is governed by the Approach/avoid reaction, which has a major effect on cognitive function. Incentives boost curiosity, self-assurance, and inventiveness, which in turn increases our inclination to interact with people and activities. Threats reduce the ability to perceive fine details and think critically, which increases generalization and protective behaviour. Any workplace contains five intrinsic elements, collectively referred to as SCARF, that provide social encounters involving perceptions of either reward or threat. Leaders may create a safe and emotionally supportive work environment for their team members by concentrating on these five social dimensions:

(i) *Status:* Our perception of our value and our social position in respect to others around us. Giving learners praise for their efforts and providing them with learning opportunities will help them feel important. Teacher-leaders shouldn't give out too many instructions, publicly criticize students, or keep some of them out of social situations.

(ii) *Certainty:* The degree to which future events seem foreseeable. Inquiring about students' expectations, communicating plans and tactics, and upholding transparency can all help achieve this. If the educator acts mysteriously or unpredictably, uncertainty will rise.

(iii) *Autonomy:* Our perception of our level of control over our lives and the circumstances that surround us. Allowing students to make their own decisions, assigning them complete assignments, allowing them to participate in decision-making, avoiding micromanagement, and a dictatorial leadership style.

(iv) *Relatedness:* Our sense of security and belonging in a group setting. Promoted by telling stories, allowing social interaction, and providing mentorship. If social interactions are discouraged, particular students isolate themselves and unhealthy competition is induced.

(v) *Fairness:* How we perceive equity, justice, and respect, as well as how appropriately we think we are treated. If accomplishment is acknowledged, values are created, ground rules are made and followed, trust is built via openness, and favouritism is avoided, then learners and other stakeholders will experience organizational justice and equity.

Optimum performance and creativity are not possible under constant neurological fear states. The SCARF

model defines the parameters that are necessary ingredients of a brain-friendly workplace and will enable educators and other stakeholders to flourish at work.

The fundamental ideas behind the phenomenon of neuroleadership are the brain's plasticity, sensitivity to incentives, the strength of mirror neurons, and the important role that emotional processes play in behaviour (Nelson, 2022). According to the theory of brain plasticity, an individual can get rewarded for learning something new. It has been discovered that rewards associated with social interaction release more dopamine than other types. A unique class of neurons known as mirror neurons fires when a person performs an action or watches someone else perform one that is identical to or similar to it. In other words, when one person watches someone else perform an action, their neurons fire just like they would if they were performing the action themselves. The procedure is crucial for empathy, emotional intelligence, and learning. The physical and emotional states displayed by educators will define student behaviour. The creation of a collaborative and cooperative work atmosphere will be mirrored by all individuals in the organization. Hence, leaders may better navigate the ups and downs of the economic environment by implementing a brain-based workplace.

3.3 Theoretical Framework

Neuroscientific findings help understand educational processes and have an external validity in terms of solving practical problems in academic settings. The preceding review provides a comprehensive account of research on the link between neuro-based leadership and educational outcomes - a research domain that is still evolving. A theoretical framework (Figure 1) has been derived from neuro-behavioural data gathered from various studies. The following leadership qualities given by Fields *et al.* (2019) are incorporated in the framework:

(i) *Affective Qualities:* Displaying humility, respect, and empathy; forming relationships; and fostering trust.
(ii) *Mentoring and Empowering:* Assisting colleagues in improving their teaching and learning methods by coaching and mentoring, resource sharing, developing growth capacity, and exchanging ideas and counsel.
(iii) *Action Orientation:* Bringing about change, taking chances, promoting long-term transformation, developing and putting into practice new teaching and learning initiatives.
(iv) *Teaching Excellence:* Facilitating student learning by empowering and enabling students, motivating and boosting students' self-esteem, removing obstacles to learning, becoming model instructors, communicating and working with students effectively, and enhancing their learning experiences.
(v) *Research and Scholarship:* Application of research and dissemination of scholarship in education

Through their methods of information sharing, creating supportive social networks, mentoring relationships, and promoting change, educational leaders - whether in formal or informal roles - can significantly influence teaching and learning cultures (Mårtensson & Roxå, 2016; Pifer *et al.*, 2015).

The framework depicts how the affective and cognitive qualities of educational leaders (Fields *et al.*, 2019) possessing a neuroscientific understanding can help them create an environment marked by status, certainty, autonomy, relatedness, and fairness (Rock, 2008). These five areas of the SCARF model have been found to influence behaviour. The human brain, as discussed earlier, wants to maximize reward and minimize danger. The absence of these five factors is perceived as threatening, resulting in a withdrawal reaction, while their presence is seen as rewarding, leading to an approach response. The threat state activators, for instance, could be harsh criticism, unpredictable behaviour and unclear expectations, excessive command and control, instilling of disempowering competition, prohibition of socializing, and biased approach on the part of the educator. Factors such as positive feedback, communicating clear goals, inculcating self-responsibility, mentoring, and fair decisions will activate the reward state. Within such an environment, students will show a readiness for learning, which will lead to positive academic outcomes and behavioural changes.

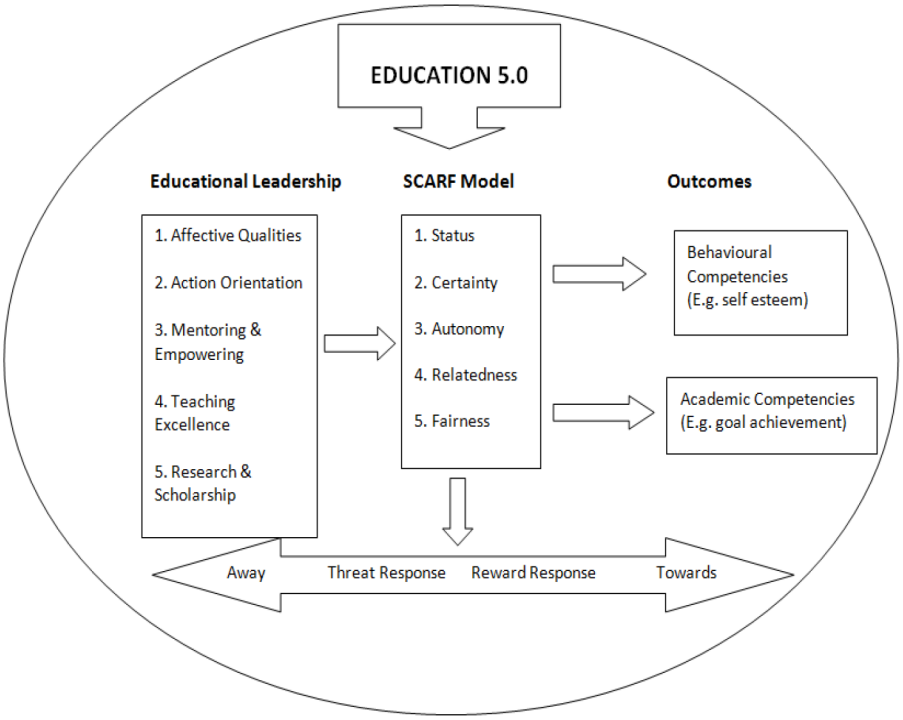


Figure 1. Theoretical framework depicting the Link between neuroleadership and educational outcomes within Education 5.0. (Source: Author)

4. Conclusion

The studies reviewed give a comprehensive account of a leader's understanding of neuroscience and its correlation with leadership effectiveness. Research findings also throw light on the teaching-learning process from a neuroscientific perspective. Technology has made possible the effective assessment of cognitive and emotional processes along with associated functions of brain systems (da Motta *et al.*, 2019). Neuroleaders are aware of the role of both the right and left brains in the holistic development of students. Leisman (2012) asserts that educational systems prioritize students' verbal and numerical skills while undervaluing their imagination, imagery, sensory, and perceptual abilities - all of which are components of the human right brain. Generally speaking, textbooks disregard intuitive, analogical, and metaphorical thinking in favour of linear cognitive processes. According to Cushman's (2013) interviews with young kids, the majority of the students' accomplishments in sports, the arts, and the community took place outside of the classroom. The insights signify that curriculum and pedagogical changes are required to create learning opportunities that engage several brain regions. Furthermore, dividing the human brain into left and right can be just as deceptive as dividing the realms of reason and aesthetics in the classroom.

There are significant practical implications of research on neuroscience and Education 5.0. The fact that learning changes individual brains can drive teachers to incorporate neuroscience ideas in classroom practices. Neuroscience behind Vygotsky's (1978) Zone of Proximal Development (ZPD), for example, says that despite biological and neurological constraints at a particular stage of development, an individual can learn concepts when assisted by others, highlighting the principle of neuroplasticity (UNESCO International Bureau of Education, 2021). An understanding of neuroscience is of much utility in special education programs for students with disorders like ADHD, dyslexia, dysgraphia, etc. (Howard-Jones *et al.*, 2016). Educational Neuroscience Concepts (ENCs) such as 'learning strengthens synapses while remembering reactivates plasticity' or 'emotions facilitate memory and decision making' affect pedagogical decision-making and student perceptions. Through classroom

observations and interviews, it was found that ENCs influenced teachers' (i) thoughts about pedagogy and students, (ii) actions in planning and execution of lessons, and (iii) responses to events in and out of the classroom. Thus, neuroscience supplied teachers with practical knowledge that made the teaching process dynamic (Chang *et al.*, 2021). The higher leadership in an educational institution can organize training programs based on the SCARF Model. The five dimensions of the model are conducive to choice-based learning, where students are given the freedom to select their educational path that aligns with their unique goals and aspirations. They become self-regulated learners and work in groups to construct their knowledge. Neuroscience-based training can form the basis of policies regarding the acquisition and development of leaders and help devise remedial measures to solve educational problems. Neuroleadership in education is a nascent field with studies showing a gap in terms of operationalization and measurement of the concept. Also, there is a dearth of research on the differences between male and female leadership from the neuroscientific perspective. The theoretical framework derived provides a scope for empirical research and is a significant outcome of the present study.

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