Cognition, Emotion & Education
CEE

Mapping out Postmethod Pedagogy Within a Brain-Based Learning Framework

Hamid Khosravany Fard[1*], Seyed Mohammad Reza Amirian[1]
[1] *Hakim Sabzevari University, Iran*

Abstract Given the importance of the macrostrategic framework (Kumaravadivelu, 2003, MSF)- as an offshoot of postmethod pedagogy- and also the growing body of research related to the brain functions in the educational systems, this study aims at mapping out MSF in light of brain-based learning framework (BBLF) from cognitive neuroscience. Brain research has helped scientists to delve into the brain's intricacies and brought about a better understanding of the functional properties of the learning brain. The growing body of research related to the brain suggests that educators should carry out fundamental educational reforms in curriculums to move beyond current approaches to teaching and learning. BBLF, drawn from the field of cognitive neuroscience, is among the models that found its way into the schools. The results of the delicate analysis of the conformity of MSF to the principles of BBLF revealed that BBLF supported the theoretical underpinnings of MSF in educational contexts.

Keywords: *Macrostrategic framework, Brain–based learning framework, Cognitive neuroscience, Applied linguistics, ELT Curriculum*

1. Introduction

Instructional approaches differ significantly regarding their view on learning complexity, teacher and learner roles (Caine & Caine, 1991). The more complicated instructional approaches are learner-centered and focus on the creation of meaning via the incorporation of engaging experiences. These instructional approaches take into consideration the entire school and the students' whole beings, including their emotions and cognitive development (Pishghadam et al., 2023). The teachers are facilitators and intelligent guides that engage learners, and learners are seen as active participants totally immersed in their world and learn from their entire experience; in other words, they learn from what they live.

Kumaravadivelu's (2003) MSF for language teaching lays the foundation for the development of postmethod-oriented pedagogies that exemplify the parameters and indicators that constitute postmethod pedagogy. MSF integrates various components into a coherent and wide-ranging multidimensional framework and views parameters as the points of departure in structuring the ten strategies expressed in operational terms for language teaching.

https://doi.org/10.22034/cee.2023.403701.1007

***Corresponding Author:**
Hamid Khosravany Fard
hamidkhosravani8@gmail.com

Received: May 2023
Revised: June 2023
Accepted: July 2023
Published: July 2023

MSF as a solid foundation for the construction of postmethod pedagogies is one of the most coherent comprehensive proposals with well-defined ideas in guiding L2 classroom activity and a clear break with the concept of method (Kumaravadivelu, 2003). This framework exemplifies some of the parameters and indicators of postmethod pedagogy. The macrostrategies in this theory-neutral and method-neutral framework, along with three parameters of particularity, practicality, and possibility, can function as general guiding principles in drawing up a situation-specific postmethod pedagogy through the implementation of microstrategies in the classroom. The number and type of microstrategies, as classroom procedures used to realize the objectives of the macrostrategies, are determined by the "national, regional, or local language policy and planning, curricular objectives, institutional resources", "learners' needs, wants, and lacks, as well as their current level of language knowledge/ability" (Kumaravadivelu, 2006, p. 209). Equipped with the MSF, which transcends the constraints of the concept of method in a principled manner, the teachers are empowered to develop a systematic alternative to method with locally grounded microstrategies in theorizing from what they practice.

Dramatic reconceptualization of teaching and learning paradigms, based on research findings related to brain functions, brings about models and frameworks that are open-ended, flexible, and resourceful and causes the learners to reach deeper meaning that is, go beyond the surface knowledge that is attained through mere memorization of the fragmented content. BBLF, as a contextual approach toward teaching and learning, supports embedding new learning in a familiar context and similarly encourages the application of authentic models of assessment (Caine & Caine, 1991), and the same applies to the theoretical insights on macrostrategies as a professional knowledge base that enable teachers to create a conducive atmosphere in which language teaching and learning take place. Caine and Caine's BBLF, developed on the basis of research findings from interdisciplinary branches of science, is founded on the premise that each individual functions as an integrated system of body, brain, and mind in the learning process. In other words, each person should be fully engaged in the natural flow of learning that necessitates a major shift in teaching, testing, and remediation.

In order to be at the leading edge of education in language teaching and learning, methods, approaches, models, and frameworks in the field of ELT require the evidence-based endorsement of the latest research findings on how people learn and should be approved in terms of their effectiveness on learners' performance. Along the same line, incorporating discoveries from cognitive science, neuroscience, and education into classroom practice calls for constructive interdisciplinary dialogue (Busso & Pollack, 2014), which assures us of the optimal brain functioning in learning. This study, as an interdisciplinary attempt to bring together MSF from the field of applied linguistics and BBLF from the field of cognitive neuroscience, draws scholars' attention to the dynamicity and effectiveness of MSF, which fuels hope and expectations of the application of new insights in brain functions into the language teaching and learning classes.

2. Brain-Based Learning Framework

Whatever we learn involves our brain; that is, whatever we experience affects the brain, hence the necessity of understanding the nature of brain physiology and functioning. Hileman (2006) argues that learning is tied to the biological and chemical forces that control the human brain. The prerequisite which makes human beings capable of learning is the brain; therefore, teaching to the learning brain should conform to the brain functioning.

It was not until the 1990s, "the decade of the brain", that neurological research gained momentum due to the emergence of advanced technologies (Sousa, 2001). Brain imaging in cognitive neuroscience has transformed our understanding of brain structures and functions since it has enabled scientists to monitor and depict brain structure (anatomy), examine brain physiology (functions), and also decode the biochemical actions of individual cells (Busso & Pollack, 2014). Greater knowledge of the brain can make great contributions to the curriculum development of education, which impacts the lives of learners, parents, educators, and policy-makers. Though scholars confirm the significant role of the brain in the learning process, sometimes educational and science communities ignore it in curriculum developments (Kaufman et al., 2008).

Cognitive neuroscience as one of the components of multi-pronged research strategies, has the potential to transform the classroom practices that can be used to address educational challenges if research initiatives take a multidimensional perspective and align findings from fields such as biology, cognitive science, or child development (Ansari & Coch, 2006; Coch & Ansari, 2012; Fischer & Heikkinen, 2010). The neuroscientific educational insights empower us to appraise the educational frameworks or instructional approaches in terms of their compatibility with the latest brain research findings and safeguard against the misappropriation of models used within educational spaces, especially language teaching and learning contexts. Caine and Caine (1990) proposed "brain-based learning" (hereafter BBL), which laid the foundation for educational reform movements.

Though the traditional approach to teaching, having the content and textbooks at the core is challenging, it is not complicated. On the contrary, teaching to the brain, which heavily relies on understanding how the brain works, makes teaching highly sophisticated and requires brilliant intellects to devise relevant curriculums. Caine and Caine (1991) urge the need for a movement away from narrow approaches to teaching and draw attention toward the input from neurosciences that can bring about a thorough grasp of educators' role in the process of teaching. Stern (2005) asserts that brain-based research has reached a point where we can use its findings in the classroom; however, he cautions that the necessity of collaboration on the part of cognitive psychologists, neuroscientists, and educational practitioners to generate quality practices is out of the question. Davis (2004) urges the collaboration between neurophysiologists, cognitive psychologists, anthropologists and social scientists, and also philosophers to recommend approaches to teaching and learning.

BBL is known as the bridge between findings of brain research and educational practices in school curricula. The 12 learning principles of natural learning or the Brain/Mind Natural Learning cajole the practitioners to bring the traditional models of instruction under close scrutiny. In this regard, input from brain research is conducive to the generation of ideas that help educators to create environments for optimized learning. These neurologically-driven principles of BBL as general theoretical foundations and the application for each of them mentioned are summarized as follows:

Table 1

Principles of BBLF (Caine & Caine, 1997)

Principles of BBL		**Implications in the Classroom**
1	The brain is a parallel processor.	All dimensions of parallel processing, thoughts, emotions, imagination, and predispositions, along with other brain processes such as health maintenance and expansion of social and cultural knowledge, are orchestrated.
2	Learning engages the entire physiology.	Learning is affected by the natural development of the body and its influence on brain growth. A wide range of health facets like stress management, good nutrition, proper sleep, positive mental attitude, proper nerve flow, exercise, and drug education are incorporated into the learning curriculum.
3	The search for meaning is innate.	Learning curriculum should provide students with stability and familiarity and, at the same time, satiate their thirst for novelty and challenge.
4	The search for meaning occurs through patterning.	Rather than making an attempt to impose patterns, learners are to be presented with the material in a way that enables them to extract the patterns. In fact, the whole language approach to reading, thematic teaching, life-related approaches to learning, and integration of the curriculum are concrete instances of such enabling approaches.
5	Emotions are critical to patterning.	Students' emotions are an inevitable determinant of learning. Their feeling and attitudes are cuddled in a supportive atmosphere that underlines deference, dignity, and support. Cooperative approaches, student and teacher reflection, and meta-cognitive approaches are the epitomes of this notion.
6	Every brain simultaneously perceives and creates parts and wholes.	Since right and left brains are interactive, neither parts nor wholes are overlooked in the teaching process; therefore,

		genuine and whole-language experiences are incorporated into the teaching process.
7	Learning involves both focused attention and peripheral attention.	Though peripheral stimuli are not consciously noticed, they are within the field of attention. Thus, it is necessary to organize peripherals (materials outside the focus of the learner's attention), including noise, temperature, light, visuals, great works of art, and even postures and inner feelings.
8	Learning always involves conscious and unconscious processes.	Creative elaboration of procedures and theories through metaphors and analogies is used to engage students in the active processing of experiences that help the students to benefit significantly from unconscious processing.
9	We have two types of memory: A spatial memory system and a set of systems for rote learning.	Skillful educators balance the application of these memory types. Focus on unrelated information and skills marked by their separation from actual experience and prior knowledge and dependent on rote memory is done to the point that facilitates the transfer of meaning and development of understanding; hence the personal world of the learner and effective functioning of the brain is not ignored.
10	The brain understands and remembers best when facts and skills are embedded in natural spatial memory.	To give meaning to specific items, teachers use "real life" activities, including classroom demonstrations, projects, field trips, visual imagery of certain experiences, stories, metaphors, and drama.
11	Learning is enhanced by challenge and inhibited by threat.	The learning context is orchestrated via particular methodologies in a state of relaxed alertness in an atmosphere that is low in threat and high in challenge.
12	Every brain is uniquely organized.	Multifaceted Teaching methodology caters to individuals with different learning styles, including visual, tactile, emotional, or auditory to facilitate optimal brain functioning.

Three interactive teaching elements emerging out of these 12 principles are relaxed alertness, orchestrated immersion in complex experiences, and active processing. These elements pave the way for the transition from memorizing information to meaningful learning (Caine & Caine, 1998). Applications of such principles to education lead to the discovery of the roles of emotions, stress, threat, memory systems, and motivation which itself leads to the reconceptualization of teaching frames in a way other than the traditional frames of reference. This dramatic shift of attention brings about a change in definitions of testing and scoring and also in the organizational structure of the classroom and the selection of appropriate programs and methodologies.

3. Postmethod Pedagogy

It is generally believed that educators are displeased at the transmission model of education and the limiting concept of method. There is an urgent need for the radical reform movement towards the construction of postmethod pedagogy conceptualized within a three-dimensional system with parameters of particularity (context-sensitivity), practicality (theory-building in action), and possibility (emancipatory identity construction) (Kumaravadivelu, 2001). The parameter of particularity is related to the development of a pedagogy based on local linguistics, particularities of sociocultural, and political issues. The practicality parameter enables teachers to take on a more active role in theorizing from practice and practicing what they theorize. And finally, the parameter of possibility advocates a pedagogy that values the experiences that participants bring to the classroom and urges the implementation of a pedagogy that empowers both teachers and learners to develop their own theories.

Macrostrategies in the postmethod framework are the broad guidelines or general plans made operational in the classroom through microstrategies as theory and method-neutral and are derived from current theories, empirical, and pedagogical knowledge relevant to L2 learning and teaching (Kumaravadivelu, 2006). This strategic framework consists of 10 macrostrategies summarized in Table 2.

Table 2

Macrostrategies and their Key Features

Macrostrategies	Key features
1. Maximize learning opportunities.	○ Teaching as a process of creating and utilizing learning opportunities by both learners and teachers ○ Ongoing assessment of learners' ability to handle classroom input and interaction ○ Recurrent modification of lesson plans based on ongoing feedback ○ Using textbooks only as springboards for launching appropriate classroom activities ○ Teachers and learners as managers of learning ○ Classroom talk as a cooperative venture embracing contributions from other partners jointly engaged in the process of creating and utilizing learning opportunities
2. Facilitate negotiated interaction.	○ Meaningful learner-learner, learner-teacher interaction ○ Learners' freedom and flexibility to initiate and navigate talk rather than just reacting and responding to it ○ Learners' active involvement in interactional activities
3. Minimize perceptual mismatches.	○ Awareness of perceptual mismatches and ambiguities in L2 classroom communication ○ Potential sources of mismatches might be cognitive, communicative, linguistic, pedagogic, strategic, cultural, evaluative, and procedural. ○ Intervening in case problems are noticed while doing classroom activity
4. Activate intuitive heuristics.	○ Creating a rich linguistic environment for the intuitive heuristics ○ Providing enough textual data so that the learner can infer certain underlying rules of form and function ○ Conveying linguistic and discoursal information indirectly through examples ○ Encountering the linguistic structure several times in various situations ○ Using language to absorb its meaning (structural, lexical, and sociocultural) inductively
5. Foster language awareness.	○ Increasing degree of explicitness through drawing learners' attention to formal properties of L2 ○ Sensitizing learners to aspects of L2 that would otherwise pass unnoticed
6. Contextualize linguistic input.	○ Contextualization of linguistic input ○ Integration of syntactic, semantic, pragmatic, and discourse phenomena ○ Bringing to the learners' attention the integrated nature of language
7. Integrate language skills.	○ parallel integration of language skills (listening, speaking, reading, and writing) in different combinations
8. Promote learner autonomy.	○ Helping learners learn how to learn ○ Equipping learners with the necessary metacognitive, cognitive, social, and affective strategies ○ Raising the consciousness of learners about learning strategies
9. Ensure social relevance.	○ Being sensitive to the L2 societal, political, economic, and educational environment
10. Raise cultural consciousness.	○ Creating an awareness of and empathy toward the culture of the L2 community in the L2 learner ○ Teaching cultural aspects, including cognitive, affective, and behavioral components

Kumaravadivelu (2003) argues that macrostrategies are the guiding principles that may change as the theoretical, empirical, and pedagogical knowledge base develops. In constructing a situation-specific

postmethod pedagogy, the aforementioned macrostrategies have the potential to make up the operating principles along with three pedagogic parameters of particularity, practicality, and possibility. The axle exemplifies the three parameters that function as the holders of the pedagogic center and the spokes exemplify the macrostrategies that connect the pedagogic wheel to its center to stabilize and strengthen it.

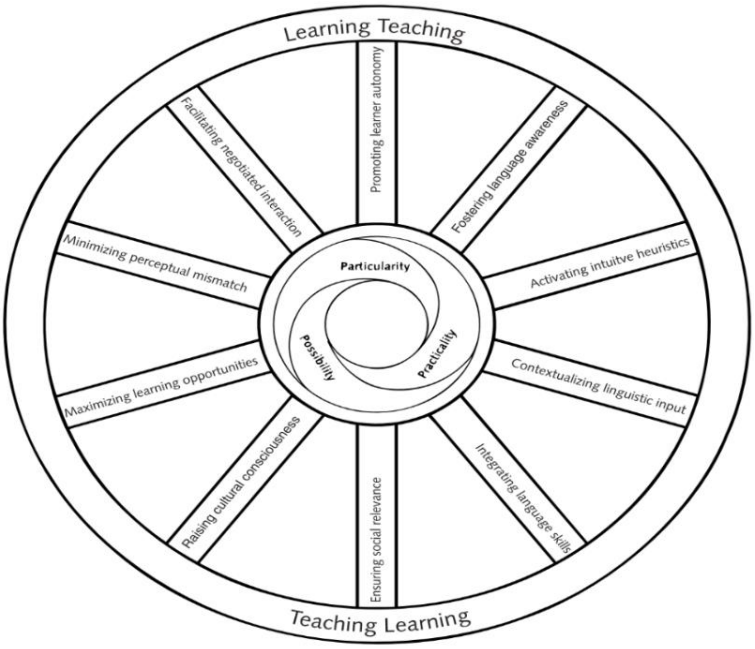

Figure 1
The Pedagogic Wheel (Kumaravadivelu, 2003, p. 41)

As presented in Figure 1, the outer rim exemplifies language teaching and learning. Each of the macrostrategies can be implemented based on a number of microstrategies depending on learning and teaching situations with endless possibilities available. What limits the choice of microstrategies relevant to macrostrategies are the learners' needs and wants, and are constrained by factors that shape learning and teaching enterprises such as local language policy and planning, curricular objectives, and institutional resources (Kumaravadivelu, 1992, 1994, 2003)

4. Mapping Out Postmethod Pedagogy within BBLF

Kumaravadivelu's MSF, as an offshoot of the postmethod era proposed in reaction to the new challenges as well as new opportunities for the profession, is a venture beyond methods. Since the 1960s, limitations of methods regarding the nature and scope of them and the endless search for a panacea as a professional attempt to construct alternative methods have resulted in the emergence of an irresistible flood of criticisms from various scholars such as Allwright (1991) and Prabhu (1990). Such a steady flow of cautionary statements against the hasty exercise of untested methods with their ongoing and never-ending cycles of birth, life, death, and again rebirth has blossomed into an awareness driving the movement away from the recycling and repackaging of the solutions toward the postmethod condition (Kumaravadivelu, 1994).

Results of meticulous analysis of the principles of MSF in relation to the principles of BBLF reveal an outstanding congruency of the MSF principles with those of BBLF. Among the ten principles of MSF, nine principles have at least one near identical twin principle among the 12 principles of BBL, and some of them have two matching items. Figure 2 is a representation of the harmony of the two frameworks. Put another way, MSF, as an offshoot of the postmethod era, is mapped out in the light of BBL as the bedrock of a successful teaching and learning practice.

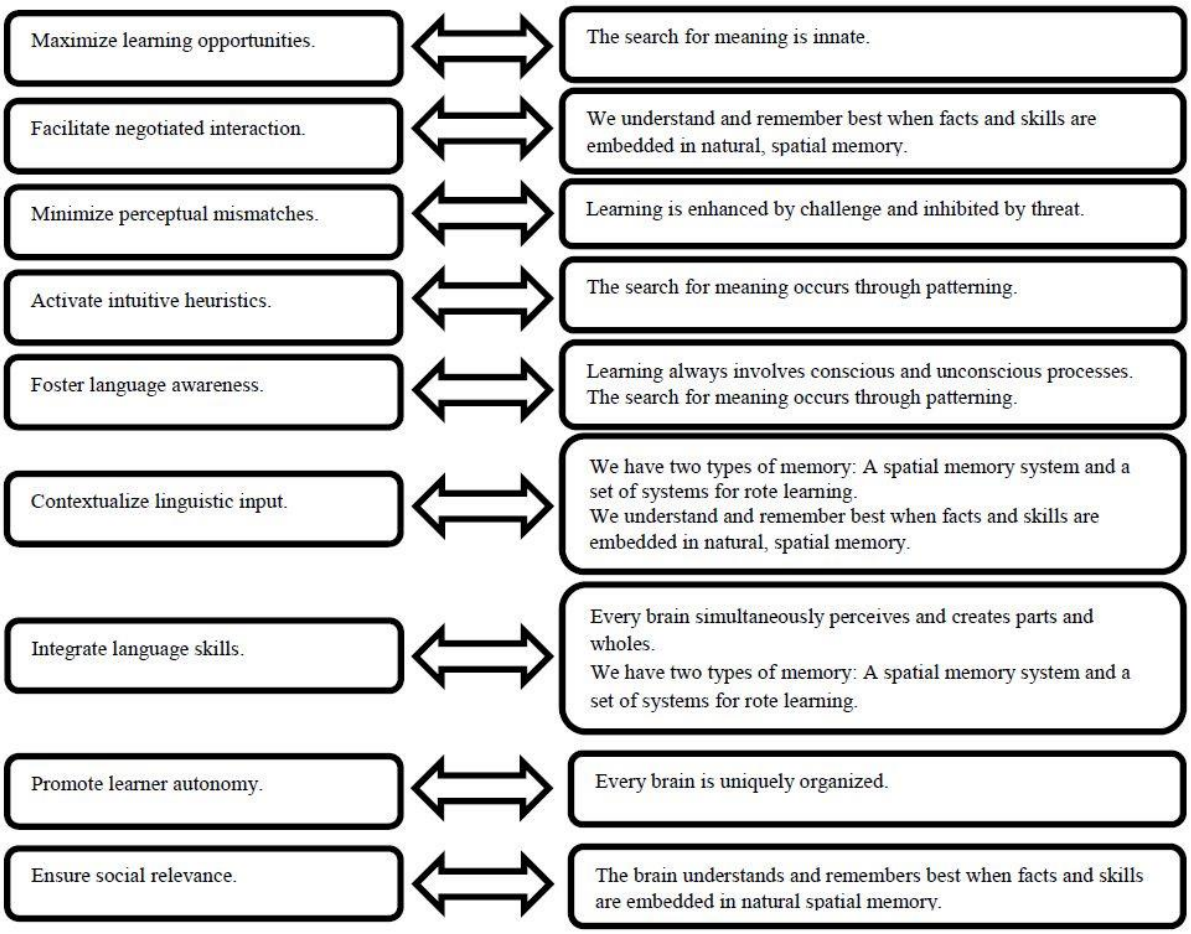

Figure 2
The Correspondence between the Principles of MSF and BBLF

As can be inferred from Figure 2, MSF is among the best candidates with a significant probability of being certified as a quality framework by the principles of BBLF. The eye-catching compatibility of MSF with BBLF does not seem to be random and might have resulted from the broad multidisciplinary outlook on teaching and learning which encompasses the latest research findings from various disciplinary and interdisciplinary studies within the academia.

- **Maximizing learning opportunities** as the first principle of macrostrategic teaching is considered the first and foremost duty of teachers. This necessitates an interactive process due to the fact that learning as a personal construct is dependent on an individual learner's willingness to get involved in collaborative teaching acts (Kumaravadivelu, 2003). The search for meaning is an automatic survival-oriented process, and the brain continuously notices and remembers familiar stimuli and responds to novel ones in disputably every moment of human life (O'Keefe & Nadel, 1978). In this regard, the ideal learning environment integrates the familiar and the novel in order to provide stability and function to satiate learners' curiosity for challenge and discovery in a positively lifelike manner with plenty of choices (Caine & Caine, 1991).

In the words of Kumaravadivelu (2003), two aspects that play very important roles in the creation of learning opportunities in terms of classroom management are learner involvement and teacher questioning, which are, to a large extent, the most lifelike practices that can be exercised in the classes if carried out intelligently to dwell on learner discourses to maximize learning opportunities while reducing the pre-planned effects of teachers' agenda, teaching materials, and syllabus specifications. Meaningful learner involvement helps both the learner and teacher to make informed choices in creating optimal learning environments in which learners' voice is regarded as both language practices and also constituting element of every fabric of lives (McKay & Wong, 1996).

The right types of questions are conducive to meaningful interaction embedded in negotiated interaction. Among the four types of questions, choice, product, process, and metaprocess questions, metaprocess questions have the potential to activate their reasoning skills and elicit new pieces of information like referential questions (Mehan, 1979). Referential questions obtain responses with longer propositions and more complex grammar compared to responses to display questions (Brock, 1986).

Kumaravadivelu's (2003) learning environment conforms to Caine and Caine's (1991) rich learning environment with complex and meaningful challenges since both necessitate learners' participation in meaningful interaction via engaging learners in practices such as systematic participatory research with the purpose of creating learning opportunities outside the classroom context via microstrategies such as connecting with the campus, local, and global community.

- **Facilitating negotiated interaction** as the second principle of MSF corresponds to the tenth principle of BBLF, which states the brain understands and remembers best when facts and skills are embedded in natural spatial memory. Dialogue in a foreign language is regarded as both a means of learning and an end in itself (Swain & Lapkin, 1998) and is the priming device that is the factor that sets the ground for acquiring language (Gass, 1997). What enhances the opportunities for language development is negotiated interaction through which the learner is exposed to a larger amount of input via the engagement of the learner in meaningful interaction with competent interlocutors (Kumaravadivelu, 2003). Negotiated interaction is not just limited to linguistic construct and embraces a wide range of factors constructing the context, such as individuality, society, culture, and political issues. Language macrofunctions as textual, interpersonal, and ideational (Halliday, 1994) play a key role in establishing a meaningful interaction.

Along the same line, Caine and Caine (1991) assert that language learning necessitates its embedding in ordinary experiences. Such experiences involve both internal processes and social interaction (Vygotsky, 1978). Embedding as a complex process gives meaning to specific items in the context of real-life activities. Kumaravadivelu (2003) underscores the role of sociopsychological and sociocultural forces, learners' active participation, and also appropriate mediational assistance from competent interlocutors in any effective social interaction. Moreover, learning management in the context of negotiated interaction is concerned with talk management and topic management to engage both the teacher and the learner in a jointly created classroom talk and cooperative decision-making, which drives the learner to use linguistic, communicative, and cognitive resources that brings about development in linguistic repertoire, conversational capacities, and individual experiences.

- **Minimizing perceptual mismatches** in MSF dovetails nicely with principle 11 of BBLF, maintaining that learning is enhanced by challenge and inhibited by threat. Considering the fact that generating learning opportunities requires the concerted collaboration of the teacher and the learner, potential mismatches between teacher intention and learner interpretation should be explored to decrease the gap between teacher input and learner intake. As Kumaravadivelu (1991) explains, what is to be done in dealing with the mismatches between teaching objectives and learning outcomes is to fathom the learner's personal approaches and concepts to improve the intervention productivity.

This awareness taps into perceptual mismatches between teaching agenda and learning outcome rooted in one of the cognitive, communicative, linguistic, pedagogic, strategic, cultural, evaluative, procedural, instructional, or attitudinal sources and the appropriate action on the part of learning co-managers, namely the teacher and the student, can reduce the odds of downshifting. Downshifting which is identified as a sense of helplessness (Caine & Caine, 1991) and a narrowing of perceptual field (Snygg & Combs, 1949), decreases the learner's flexibility and forces the learner to resort to more primitive behaviors. The expected results of narrowing the gap between teacher intention and learner interpretation are increased chances of learning achievement and teaching objectives (Kumaravadivelu, 2003). Building a bridge between teacher and learner perceptions decreases threat and permits the sensitive hippocampus, as part of the limbic system, to have full access to immense portions of the brain in an atmosphere with low threat and high challenge (Caine & Caine, 1991).

- **Activating intuitive heuristics** in MSF is the match for principle 4 in BBLF, positing that the search for meaning occurs through patterning. Heuristics is a process through which a learner's increased

language awareness results in self-discovery in a rich linguistic environment. In fact, language awareness and intuitive heuristics are closely related to each other in a way that the discovery of linguistic system rules enhances language awareness and the other way around, that is, promoting language awareness enhances the learner's capacity to discover the linguistic system (Kumaravadivelu, 2003). The importance of this process of self-discovery of underlying patterns of grammar is brought to light via theories of the language teaching profession, namely, Jeperson's Invention Grammar (1904), Rutherford's Grammaticization (1987), and Larsen-Freeman's Grammaring (2000).

The brain has a tendency to integrate information and create patterns of its own through meaningful categorization of information (Rosenfield, 1988), and as Caine and Caine (1991) posit, it repels meaningless patterns as isolated pieces of information that do not make sense to the learner. According to BBLF, the optimal approach to inspiring the learner to perceive and create meanings is the presentation of meaningful and personally relevant pieces of information in a way that activates the intuitive heuristics that allows the brain to extract patterns. This idea as the backbone of the whole-language approach to reading (Altwerger et al., 1987), and thematic teaching (Kovalik, 1986) is very similar to the notion of self-discovery in MSF founded on the belief that learner's intuitive heuristics and subsequently their working hypotheses can be activated via learner's involvement in creative exercises which help them to derive generalizations and formulate their own working hypotheses regarding a particular grammatical rule.

- **Fostering language awareness** as the 5th principle of MSF is in the same league with principles 4 and 8 of BBLF, respectively; the search for meaning occurs through patterning, and learning always involves conscious and unconscious processes. According to Caine and Caine (1991), the brain is not in favor of being indulged in fragmented pieces of information and dismisses ready-made patterns shaped and enforced by others; rather it is invigorated by those activities that involve it in patterning, critical thinking, problem-solving, perceiving and creating meaning. Likewise, as Kumaravadivelu (2003) points out, language awareness advocates a holistic fashion of teaching practice, that is, the integration of four language skills through a rich language experience by incorporating language-originated tasks in the framework content areas or application of authentic, holistic, meaningful, personally-related, and life-wise tasks to teach various components of language such as speech sounds, phonemes, words, phrases, and sentences.

Regarding the 7th principle of BBL, Caine and Caine (1991) declare that the brain is fully sensitive to the teaching and communication contexts with entire sensory stimuli that are consciously noticed, lie beyond the field of attention, such as classroom light, noise, and temperature, or subtle signals that are consciously attended to but not consciously noticed such as slight changes in gesture or body posture. Therefore, purposeful organization of peripheral information outside the learner's attention is a fundamental principle that facilitates learning by enhancing more natural acquisition of learning. Double planeness puts emphasis on the fact that both internal and external resources need to be congruent since learning is under the influence of factors such as community, school, family, and technology and send messages at any moment to the learner (Lozanov, 1978). While Caine and Caine's BBLF (1991) and Kumaravadivelu's MSF (2003) differ in emphasis, they both refer to the learner's sensitivity to any signaling stimuli that might involve the learner in coding, associating, and symbolizing. The range of stimuli in BBLF is much more inclusive and subsumes anything such as the learner's prior knowledge and experience, noise, temperature, skin color, muscular tension, posture, rate of breathing, and eye movements, while MSF is more concerned with linguistic and sociopolitical features in language usage besides social and political factors in language use such as social values pertaining to different language varieties or social inequalities practiced via power relations at an implicit level through language.

- **Contextualizing linguistic input** as the 6th principle of MSF and principles 9 and 10 of BBLF are on the same page with regard to the basic assumptions. Spatial memory as a continually engaged, inexhaustible, and natural memory system facilitates the instant registering of experiences without any rehearsal (Nadel et al., 1984) in ordinary three-dimensional space (O'Keefe & Nadel, 1978). On the other hand, separated facts and skills are organized in a different manner through more repetition and rehearsal by another memory division, namely the rote memory system. BBLF approves teaching

methods that are devoted to the learner's personal world to pave the way for the development of understanding and guards against excessive use of memorization, emphasizing the storage and recall of relatively unrelated facts which inhibit the efficient functioning of the brain. In other words, BBLF urges the creation of learning environments in which both internal processes and social interaction are involved in shaping multiple interactive experiences to give meaning to specific items by embedding them in ordinary experiences, including projects, field trips, stories, drama, or metaphor.

The concept of contextualization in language teaching as discourse is strongly emphasized in MSF as well; however, principles of MSF are more concerned with the contextualization of linguistic input consistent with features of language communication relying on a wide range of contextual factors as linguistic, extralinguistic, situational, and extrasituational realities. The linguistic context with cohesive features is mainly concerned with grammatical and lexical levels in a text and includes formal aspects of language such as pronouns, articles, conjunctions, substitutions, and other elements of linguistic code. Extralinguistic context is the immediate linguistic environment which includes prosodic signals such as stress and intonation, loudness, duration of syllables, or changes in pitch. Though these first two contexts as internal constructs shaping the systems of many languages evidently contribute to the process of meaning-making, they play a limited role in helping us to interpret the intended meaning of messages. Hence, in order to understand the intended meaning of messages in a communicative event, the situational and extrasituational contexts should be accounted for (Hymes, 1972).

- **Integrating language skills** as the 7th principle of MSF is in accord with principles 6, 9, and 10 of BBLF, maintaining that every brain simultaneously perceives and creates parts and wholes, the presence of rote and spatial memory systems, and also the brain's tendency to function best when facts and skills are embedded in natural, spatial memory. According to Kumaravadivelu (2003), contextualizing input encoded by linguistic, extralinguistic, situational, and extrasituational contexts advances toward the application of integrated approaches which consider language skills as interrelated and interactive. Therefore, only those tasks and classroom activities gain admission into the L2 teaching and learning classes that emphasize the synergy of formal and functional properties of language in an appropriate context, i.e., the integration of various language skills and language components within an interactive meaning-making collaboration. A similar view is reflected in the statement made by Caine and Caine (1991, p. 83):

> Good teaching necessarily builds understanding and skills over time because learning is cumulative and developmental. However, parts and wholes are conceptually interactive. They derive meaning from and give it to each other. Thus vocabulary and grammar are best understood and mastered when incorporated in genuine, whole-language experiences.

As reflected in both BBLF and MSF, learning is a matter of connectedness and interactivity. In terms of learning strategies and their linkages to particular skills, instances of various strategies that work together across listening, speaking, reading, and writing skill areas are selective attention, self-evaluation, analysis, synthesis, and prediction (Oxford, 2001).

Engaging language learners in tasks and activities with a meaningful, simultaneous, and personally relevant nature of involvement with language in use that does not adhere to a strict fragmented sequencing of the four skill areas as those communicative approaches. This is reflected in the BBLF via "process-oriented approaches to learning such as thematic teaching, whole-language approaches to literacy, and the integration of the curriculum" (Caine & Caine, 1991, p. 82) abound with real-life multiple interactive activities similar to interactive scenarios, problem-solving tasks, content-based activities, project-based activities, whole-language activities, and experiential activities supported by MSF.

- **Promoting learner autonomy** as the 8th principle of MSF amiably conforms to principle 12 of BBLF, positing that each brain is uniquely organized. As underscored in BBLF, human beings are endowed with a common set of systems, including senses and primary emotions; however, each individual's brain structure integrates these systems in a different manner. Due to variations among individuals in terms of their preferences, interests, and traits, teaching practices need to be multifaceted and let the learners express their choices. Simply put, BBLF advocates the reshaping of the educational arena in a way that represents life complexity which itself promotes optimal brain functioning. Contrary to BBLF, MSF

explicitly draws attention to the importance of personal ownership of learning, the significant relationship between learner autonomy and learner motivation, and the creation of individuals that think independently and act responsibly. What is stressed in BBLF is a determining or causal element in helping learners to be autonomous, as declared in MSF, through psychological preparation along with strategic training.

According to Kumaravadivelu (2003), taking charge of one's own learning requires the identification and use of appropriate strategies matching learning objectives, personality traits, and styles which induces effective learning under the auspices of freedom of thought and action. It was not until the advent of communicative language teaching and the subsequent development of concepts such as self-instruction, self-direction, self-access learning, and individualized instruction that learner-centered approaches were given an exceptional position in L2 pedagogy. The learning-to-learn approach toward autonomy calls for the use of appropriate strategies to help the learners realize their learning objectives, develop critical thinking, decision-making, independent action, self-control, self-discipline, self-esteem, self-confidence, and hold responsibility for learning; therefore, the discovery of learning potentials, psychological demands to face weaknesses, and giving up the total dependence on the teacher is required on the part of the language learner.

- **Ensuring social relevance** as the 9th principle of MSF matches principle 10 of BBLF, positing that the brain understands and remembers best when facts and skills are embedded in natural spatial memory. Embedding of ordinary life experiences as a complex process dependent on other principles of BBLF and a common defining feature of BBL theories is represented as an effective tool in invoking spatial memory by involving all learner's senses and immersing the learner in a multitude of interactive experiences through the so-called experiential learning.

Kumaravadivelu (2003) contends that whatever occurs in every language classroom as part of a larger society, including a wide range of interacting communities within itself, should be a reflection of all the factors that affect the lives of both learners and teachers besides the classroom objectives and activities such as class, gender, race, ethnicity, nationality, religion, language, and sexual orientation. To be socially relevant, L2 learning and teaching should be a reflection of broad social, political, historical, and economic conditions. Actually, ensuring social relevance in MSF to a large extent resonates with the pedagogy of possibility, which asserts that social and historical conditions should be considered seriously since they affect the experiences that the participants bring to the classroom, and this has the potential to unexpectedly influence classroom practices. Hence, MSF urges language teachers to satisfy learners' linguistic needs in a pedagogic context where both sociopolitical and sociocultural realities are taken into account in the formation of individual and social identity. An instance of this, as Kumaravadivelu (2003) asserts, is the recognition of the rich linguistic and cultural resources that language learners bring into the classroom; therefore, all those who are concerned with education, especially policy planners, curriculum designers, or textbooks producers cannot deny the significant role that home language plays in building bridges between old and new information.

5. Concluding Remarks

The inherent weaknesses and recurrent criticisms toward the concept of the method have led to the emergence of a coherent postmethod-oriented framework for pedagogy. The reason behind such a magical long-term survival on the part of method-based approaches to language teaching in the face of enlightening awareness of obsession with the concept of method and entrenched adherence to it can be traced back to the two main problems of teacher education, the pedagogical barrier, and imperialistic character of English language and English-language education, the ideological barrier (Kumaravadivelu, 2008). The postmethod pedagogy invigorates the transition from transmission models of teacher education established on the transfer of predetermined digestible packages of knowledge to transformative teacher education focusing on the creation of personal meaning and also the emergence of practices that overshadow the marginalization of local knowledge and gainsay dominant Western knowledge that regards them as periphery communities.

The fact that postmethod pedagogy is structured on categorically different philosophical, pedagogical, and ideological tenets and demands for streamlining of teacher education via reframing the liaison

between theory and practice brings into view a three-dimensional system that encapsulates its essentials in terms of pedagogic parameters. The parameters of particularity, practicality, and possibility are the interrelated unifying attributes that empower the pedagogy to rejuvenate and liberate itself from the conceptual confines of methods. The birth of postmethod pedagogy has spawned a surge of endorsements for three primary attributes, including the products of bottom-up processes, i.e. construction of personal theories that are context-sensitive, teacher autonomy in taking a critical approach to self-observe, self-analyze, and self-evaluate in their teaching practice, and principled pragmatism that summons teachers' sense of plausibility (Prabhu, 1990) to frame and reframe classroom learning in line with their subjective understanding arising from different sources, namely their own experience and professional education.

By exploring the intersection of postmethod MSF with the principles of brain-based, brain-integrated, brain-compatible, or brain-targeted learning framework, educational practitioners get more confident in making giant strides in developing and practicing MSF in the context of foreign and second language teaching and learning. Actually, the movement toward *brain culture* shapes contemporary practices that are derived from new knowledge, expertise, as well as representations of the brain as the source of human behavior in educational environments (Pykett, 2015). Therefore, brain sciences are taking over the conduct of human beings via utilizing knowledge of the human brain (Rose & Abi-Rached, 2014). In the same vein, Pitts-Taylor (2016) argues that curricula and pedagogies are expected to endorse and promulgate neuroscientifically-based programs that adhere to strategies that target the plasticity of the brain for individual and societal improvement.

Despite the fact that MSF is not derived from conceptualizations and insights from cognitive neuroscience, its harmony with BBLF, an educational theory of brain science and natural learning, makes it more appealing to be assimilated into educational settings, in general, and into language teaching curriculum, in particular. MSF, being a close relationship with BBLF as a brain-inspired model, enhances attempts to incorporate brain-targeted pedagogic activities that blossom into personal improvement and optimization of language teaching endeavors. The application of brain-based approaches results in cognitive enhancement and brain-targeted teaching and learning.

As Kumaravadivelu (2003) claims, MSF, including macrostrategies and microstrategies is consistent with characteristics of postmethod pedagogy. Macrostrategies regarded as both theory-neutral and method-neutral are defined as general guidelines that function as blueprints in generating situation-specific or need-specific microstrategies or classroom techniques. Though MSF is not associated with any particular brain-based theory or neuroscientific discourse, its principles "drawn mostly from theoretical, empirical, and experiential knowledge grounded in classroom-oriented research" (Kumaravadivelu, 2003, p. 40) are in promising compliance with those of BBLF, which acknowledges the brain's rules for meaningful learning and organizing teaching with those rules in mind, assumed to enhance learning achievements. Hence, among the models and frameworks that "enable teachers to develop the knowledge, skill, attitude, and autonomy necessary to devise for themselves a systematic, coherent, and relevant personal theory of practice that is informed by parameters of particularity, practicality, and possibility" (Kumaravadivelu, 2003, p. 40), MSF can be conceivably regarded as a perfect match for BBLF in the field of English language teaching and learning. The strong association between MSF and BBLF results in educators' awareness of how they can confidently interact with the brains of language learners through the orchestration of complex experiences. Scrutinizing the principles of MSF in light of BBLF confirms the interdisciplinary nature of instruction planned within one of the variations of the postmethod theme.

Disclosure Statement

The authors claim no conflict of interest.

Funding

The research did not receive any specific grants from funding agencies.

References

Allwright, R. L. (1991). *The death of the method* (Working Paper No. 10). The Exploratory Practice Center, the University of Lancaster, England.

Altwerger, B., Edelsky, C., & Flores, B. M. (1987). Whole language: What's new?. *The Reading Teacher*, *41*(2), 144-154.

Ansari, D., & Coch, D. (2006). Bridges over troubled waters: Education and cognitive neuroscience. *Trends in Cognitive Sciences*, *10*(4), 146-151. https://doi.org/10.1016/j.tics.2006.02.007

Brock, C. A. (1986). The effects of referential questions on ESL classroom discourse. *TESOL Quarterly*, *20*(1), 47-59. https://doi.org/10.2307/3586388

Busso, D. S., & Pollack, C. (2014). No brain left behind: Consequences of neuroscience discourse for education. *Learning, Media and Technology*, *40*(2), 168-186. https://doi.org/10.1080/17439884.2014.908908

Caine, R. N., & Caine, G. (1990). Understanding a brain-based approach to learning and teaching. *Educational Leadership*, *48*(2), 66-70.

Caine, R. N., & Caine, G. (1991). *Making connections: Teaching and the human brain*. Association for Supervision and Curriculum Development.

Caine, R. N., & Caine, G. (1997). *Education on the edge of possibility*. Association for Supervision and Curriculum Development.

Coch, D., & Ansari, D. (2012). Constructing connection: The evolving field of mind, brain and education. In S. Della Sala & M. Anderson (Eds.), *Neuroscience in education: The good, the bad and the ugly* (pp. 33-47). Oxford University Press. https://doi.org/10.1093/acprof:oso/9780199600496.003.0020

Caine, R. N., & Caine, G. (1998). Building a bridge between the neurosciences and education: Cautions and possibilities. *Nassp Bulletin*, *82*(598), 1-8. https://doi.org/10.1177/019263659808259802

Davis, A. (2004). The credentials of brain-based learning. *Journal of Philosophy of Education*, *38*(1), 21-36. https://doi.org/10.1111/j.0309-8249.2004.00361.x

Fischer, K. W., & Heikkinen, K. (2010). The future of education neuroscience. In D. A. Sousa (Ed.), *Mind, brain, and education: Neuroscience implications for the classroom* (pp. 249–270). Solution Tree Press.

Gass, S. (1997). *Input, interaction, and the second language learner*. Erlbaum.

Halliday, M. A. K. (1994). *An introduction to functional grammar*. Edward Arnold.

Hart, L., (1983). *Human brain, human learning*. Longman, Inc.

Hileman, S. (2006). Motivating students using brain-based teaching strategies. *Agricultural Education Magazine*, *78*(4), 18-20.

Hymes, D. H. (1972). On communicative competence. In J. B. Pride & J. Holmes (Eds.), *Sociolinguistics, selected readings* (pp. 269-293). Penguin.

Jeperson, O. (1904). *How to teach a foreign language*. Swan Sonnenschein & Co., LTD.

Kaufman, E. K., Robinson, J. S., Bellah, K. A., Akers, C., Haase-Wittler, P., & Martindale, L. (2008). Engaging students with brain-based learning. *Techniques: Connecting Education and Careers, 83*(6), 50-55.

Kovalik, S. (1986). *Teach for success: An integrated thematic approach to teaching science*. Discovery Press.

Kumaravadivelu, B. (1992). Macrostrategies for the second/foreign language teacher. *The Modern Language Journal*, *76*(1), 41-49. https://doi.org/10.1111/j.1540-4781.1992.tb02577.x

Kumaravadivelu, B. (1994). The postmethod condition: (E)merging strategies for second/foreign language teaching. *TESOL Quarterly*, *28*(1), 27-48. https://doi.org/10.2307/3587197

Kumaravadivelu, B. (2001). Toward a postmethod pedagogy. *TESOL Quarterly*, *35*(4), 537-560. https://doi.org/10.2307/3588427

Kumaravadivelu, B. (2003). *Beyond methods: Macrostrategies for language teaching*. Yale University Press.

Kumaravadivelu, B. (2006). *Understanding language teaching: From method to postmethod*. Lawrence Erlbaum.

Kumaravadivelu, B. (2008). *Cultural globalization and language education*. Yale University Press.

Larsen-Freeman, D. (2000). Grammar: Rules and reasons working together. *ESL Magazine*, *3*(1), 10-12.

Lozanov, G. (1978). *Suggestology and suggestopedia: Theory and practice*. United Nations Educational, Scientific and Cultural Organization.

McKay, S. L., & Wong, S. L. C. (1996). Multiple discourses, multiple identities: Investment and agency in second-language learning among Chinese adolescent immigrant students. *Harvard Educational Review*, *66*(3), 577-609. https://doi.org/10.17763/haer.66.3.n47r06u264944865

Mehan, H. (1979). "What time is it, Denise?": Asking known information questions in classroom discourse. *Theory into Practice*, *18*(4), 285-294. https://doi.org/10.1080/00405847909542846

Nadel, L., Wilmer, J., & Kurz, E. M. (1984). Cognitive maps and environmental context. In P. Balsam & A. Tomi (Eds.), *Context and learning* (pp. 385–406). Lawrence Erlbaum.

O'keefe, J., & Nadel, L. (1978). *The hippocampus as a cognitive map*. Clarendon Press.

Oxford, R. (2001). *Integrated skills in the ESL/EFL classroom*. ERIC Digest.

Pishghadam, R., Ebrahimi, S., Rajabi Esterabadi, A., & Parsae, A. (2023). Emotions and success in education: From apathy to transpathy. *Journal of Cognition, Emotion and Education*, *1*(1), 1-16. https://doi.org/10.22034/cee.2023.172495

Pitts-Taylor, V. (2016). *The brain's body: Neuroscience and corporeal politics*. Duke University Press.

Prabhu, N. S. (1990). There is no best method-why?. *TESOL Quarterly*, *24*, 161-176. https://doi.org/10.2307/3586897

Pykett, J. (2015). *Brain culture: Shaping policy through neuroscience*. Policy Press.

Rose, N., & Abi-Rached, J. (2014). Governing through the brain: Neuropolitics, neuroscience and subjectivity. *Cambridge Anthropology*, *32*(1), 3–23. http://doi.org/10.3167/ca.2014.320102

Rosenfield, I. (1988). *The invention of memory: A new view of the brain*. Basic Books.

Rutherford, W. E. (1987). The meaning of grammatical consciousness-raising. *World Englishes*, *6*(3), 209-216. https://doi.org/10.1111/j.1467-971X.1987.tb00201.x

Snygg, D., & Combs, A. W. (1949). *Individual behavior: A new frame of reference for psychology*. Harper & Brothers.

Sousa, D. A. (2001). *How the brain learns: A classroom teacher's guide* (2nd ed.). Corwin Press.

Stern, E. (2005). Pedagogy meets neuroscience. *Science*, *310*(5749), 745-746. https://doi.org/10.1126/science.1121139

Swain, M., & Lapkin, S. (1998). Interaction and second language learning: Two adolescent French immersion students working together. *The Modern Language Journal*, *82*(3), 320-337. https://doi.org/10.1111/j.1540-4781.1998.tb01209.x

Vygotsky, L. S. (1978). *Mind in society: The development of higher mental process*. Harvard University Press.