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The Use of Neuroscience in the Design of Arabic Learning Material Development: Its Implications for Arabic Language Education

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ABSTRACT

This study aims to analyze Arabic learning materials with a neuroscience approach, to facilitate students in learning mufrodat, quwaidul arobiyah, and muhadasah. In the preliminary study, the researcher interviewed directly with the students, that so far they have found it difficult to understand, memorize, and practice mufrodat and muhadasah. Researchers provide an alternative to students at school, namely the development of Arabic language material by using neuroscience. This research data is sourced through literature observations related to scientific journal descriptions as well as scrutiny of research results references, both manually and digitally which focus on analyzing the development of Arabic learning materials by utilizing neuroscience. This type of research used is field study research with content analysis in the form of descriptive analysis. The results of the study prove that neuroscience in developing Arabic language material responds to students in accelerating memorization (mufrodat) and the practice of reading, writing, listening, and speaking (muhadasah). The development of neuroscience-based Arabic learning materials directs students with a brain approach, stimulation from the right brain and left brain as the central neuron for the growth of intelligence. The use of neuroscience in the development of Arabic language material has implications for the educational and psychological foundations of students, which are related to intelligence and affective, cognitive, and psychomotor abilities.

Introduction

The main problem in this research is the Arabic language learning material delivered by the teacher, has not been responded to well by the students. Students do not understand the material presented by the teacher. The teacher implements the material with the development of conventional material, among others, by directing students to write, read, and explain. The teacher in explaining the Arabic language material is guided by module-based material or teaching materials. The teacher in explaining the material to students only leads to the *caramah* technique or conventional model (Jailani, Suyadi, and Bustam, 2021a). The reason is, the functional utilization

of the brain can affect the performance of reason and the design of the educator's thinking in implementing Arabic language material. The real implications of the problems of learning Arabic are centered on the overall use of reason from the human brain (Mustafa, 2020). The gap in the functional use of reason affects the complexity and comprehensiveness of learning Arabic in real terms in educational discourse (Khozin and Taufik, 2021). So far, research that discusses the focus of Arabic learning explains the use of neuroscience in the Arabic curriculum (Tripathi, 2019). The research that tells about Arabic language issues, describes the models and techniques of learning Arabic in schools or *madrasah*. Following up on Fauzi's 2020 research, regarding the use of neuroscience related to learning Arabic, namely the use of the Arabic curriculum (Fauzi Muhammad Ilfan, 2020). related to this research which focuses on discussing the use of neuroscience in the development of Arabic language material. Arabic material involving chapters on *mufrodat* or *quwaidul arobiyah*. The focus of this research is the use of neuroscience in the development of Arabic language material in schools. Researchers argue that this research is new and different from previous research. This research is a supporter of previous research related to the use of neuroscience in the development of Arabic language material. as a novelty in this study, the researcher analyzed the use of neuroscience on the development and use of Arabic language materials in schools. material development with a neuroscience approach that is utilized for students through the use of their brains.

The purpose of this study is to analyze the use of neuroscience in the development of Arabic language material. development of Arabic material that describes the subject matter of the *mufrodat* chapter or *quwaidul arobiyah* material in Arabic subjects. students are directed to understand the material that has been adjusted to the indicators and basic competencies of learning Arabic (Rini and Harahap, 2021). development of material that has been adjusted to the direction and purpose of the student's brain. The use of students' brains adjusts to the material contained in Arabic books. This means that the use of neuroscience is used to measure student learning outcomes and the level of understanding of the material that has been mastered by students (Wargadinata et al., 2020). This research is based on the argument that a brain is an approach that relies on human potential. The brain is the center of control, development, and improvement of human potential. Sousa stated that although educators (teachers and lecturers) are not brain experts (neuroscience), but from a neuroscience perspective, the daily profession of educators is to "change the brain." This is because when the brain learns, neurophysiological changes occur towards the optimization of higher thinking skills. This means that the brain is very influential on the development of students' Arabic learning abilities (Jailani, Suyadi, and Bustam, 2021b). The brain has an increase in student learning outcomes standardized by the approach and learning delivered by the teacher (Jailani and Suyadi, 2021). Brain and language are the ability of students

to produce Arabic material (Zakir et al., 2021).

Method

This type of research is library research with a content analysis approach (Sugiyono, 2012). Content Analysis is an instrument used to process and analyze message content in the form of notes, documents, and data sources objectively and systematically (Sanapiah Faisal, 1982). The research method uses primary data that relies on bibliographic sources in the form of books and scientific journal articles related to the theme of the study. Especially the scientific book presented by Dr. Suyadi, M.Pd.I on Islamic education and neuroscience traces the traces of the mind and brain in the Qur'an to the development of neuroscience in Islamic education (Suyadi, 2020). Researchers develop and implement the concepts and theories developed by Suyadi. Researchers developed it in the aspect of developing Arabic language material, Figure 1.

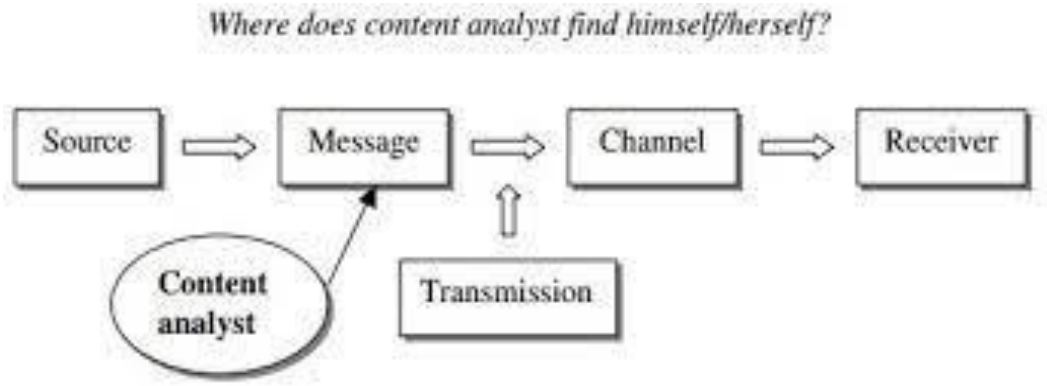

Figure 1. Content analysis approach.

Based on this, the argument of this study is the research conducted by Suyadi on the right brain as the basis for development in Arabic learning materials to answer the dehumanization factor (Balogun, 2021). This paradigm requires a synthesis carried out by Arabic language experts and neuroscientists to optimize several methods and strategies in learning Arabic. a synthesis required a comprehensive analysis to address the needs of modern academic contexts. Entering the 21st century, the functional use of the left brain cannot be denied as the basis for thinking about the needs of Arabic learning materials. left brain function to analyze the need for learning materials to contribute as a complement to the right brain function in applying Arabic language material (Jailani, Widodo, Fatimah, et al., 2021). both involve the nervous system (neuroscience) to optimize knowledge into integral knowledge (Ritonga et al., 2021). Through this study, researchers offer the concept of using neuroscience that involves the functional right and left brain in developing Arabic language material design optimally (Aflisia, Ahmad E.Q, and Suhartini, 2021).

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Discussion

Arabic Language Material Development

The reality of the deep-rooted material concept among researchers is more concerned with the material as an academic subject (Mohammadipur, 2018). This view sees science as dominating the entire educational process. In other words, it can be understood that science is more pro to educational activities than the interests of teachers and students (Akerele, 2021). This is in line with Habibi's opinion that science is oriented to communication and global insight so that material as an academic subject becomes the center of attention in the learning system (Lau, Loi, and Nor, 2021). Furthermore, at the material level, it was stated that the concept of a learning mindset was developed and refined from teacher-centered to learner-centered. Learning is student-centered so that it can add multidimensional knowledge to students' learning styles (learning style) (Boudelaa et al., 2010). Materials that are more concerned with teachers and students as objects tend to view science as a source of fame to develop intellectual power (Arifa, 2021). Organizers of academic subject matter are perennial and essentialists who develop children's intellectual power to achieve universal truths and instill self-discipline from sources of truth such as global religious values (Bustam et al., 2021).

Arabic has language skills that not only stand as an instrument to preserve Islamic religious teachings and values, but also function to encourage the development of the intelligence and creativity of students through psychological aspects (emotions, feelings, and psychology) as well as the development of productive forces who have a competitive spirit, patience, humble, maintain self-esteem (self-esteem), and able to control oneself or lust (self-control) (Ibrahim and Baharum, 2021). As humans who need communication in a social context, the intensity of communication intelligence in science and religion can be built through Arabic. The centralization of the Arabic language makes an introduction as the main dimension to maintain the oral and written content contained in the study of Arabic linguistics (Zaini, Hasan, and Husaini, 2021). This Arabic study is then organized into interrelated material components to reconstruct the main goal of material development that makes it easier for students to develop analytical skills of various kinds of social life problems that indirectly rub against humanity (Aspects, 2020).

Arabic Learning Book

Students in delivering material, educators use books and take teaching materials in the book "Arabic Language Education SMA/SMK/MA Muhammadiyah" for class X (Ten), by the application and specifications of the objectives of this learning media. However, the application of the use of Arabic learning media as a research sample is aimed at class x (Ten) TKJ 1 SMK Muhammadiyah 3 Yogyakarta (Student, 2021b). See the following Figure 2.

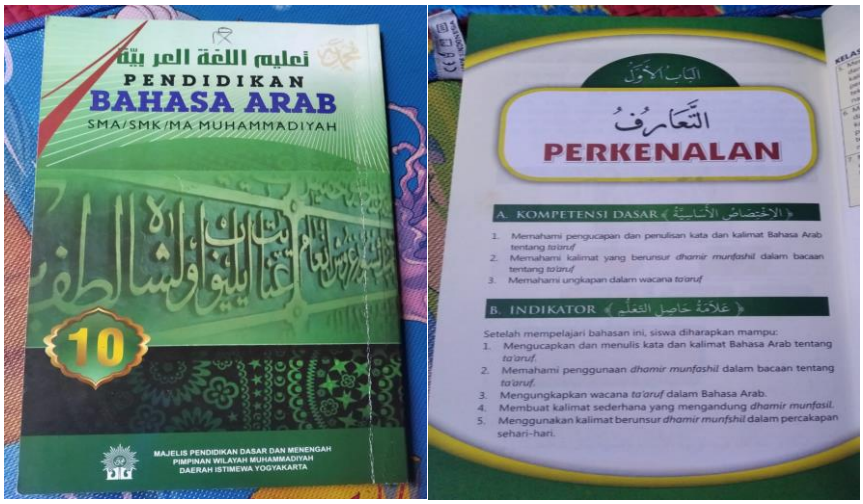

Figure 2. Arabic Education Textbook (Student, 2021a)

Content Materials commonly used in Arabic learning videos

The material presented in Arabic learning with the theme (Introduction) "taaruf" there are several strategies and methods applied by educators in delivering the material in Arabic learning media, Figure 3. The learning materials are as follows; (1) *Mufrodat*, educators are directed to be able to practice vocabulary related to khiwar or taaruf. In this chapter, discourses and conversations about ta'aruf will be described. Students with this theme are expected to be able to recognize some expressions and taaruf in Arabic.

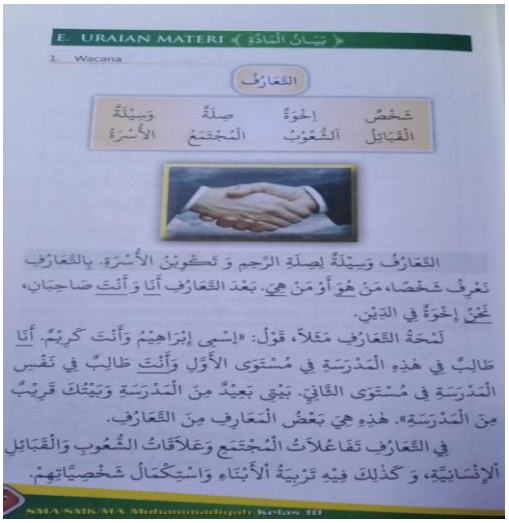

Figure 3. Arabic Learning Materials (Student, 2021a).

Among them are about syahsun, ikhwatun, syifatun, wasyilatun, alqobailu, assy'ubu al'mujtamau, alusrotu. Followed by students' practice, including reading, writing, and listening, the final result of the material is a conversational practice about the introduction; (2) Learning Arabic listening strategy (istima'). In this strategy, an example of an Arabic conversation will be given and

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then at the end, it will be checked, including being corrected by the educator, regarding the Arabic text and its translation. In listening, students focus and adjust the material presented with concentration and focus. Learning videos that are shown with visualization of interesting pictures or acting conversations in the video or media; (3) Arabic learning strategies for writing the book, hijaiyah letters that cannot be combined in writing, writing material for students to learn to write well; (4) Strategies for learning Arabic reading (qiroah). In this strategy students are directed to read well, reading Arabic learning material about taaruf; (5) Strategies for learning Arabic speaking (kalam).

In this strategy, students make a conversation or short story of their daily life at home with their family. To train in pronouncing Arabic. Furthermore, the thing that needs to be reconstructed in the development of Arabic language material is the reality of the objectives and direction of the study orientation of Arabic learning. According to Fathul Mujib, the organizational orientation of Arabic language education studies still seems ambiguous (Boudelaa et al., 2010). Both are divided on the aspect of skill and knowledge. The skill aspect demands the interest of the *maharah* who is required to master four levels at once. While the scientific orientation makes Arabic a basic instrument in learning Arabic by emphasizing aspects of the ability to understand linguistics, the ability to translate, and the ability to provide innovations in understanding the structure of learning Arabic. This empirical reality then becomes a discourse that must be addressed in mapping Arabic language knowledge so that connectivity can be found that can bring organizational changes in the strategies and principles of developing Arabic language materials (Hassan, Dehraj, and Kabooro, 2021).

Implementation of Neuroscience in Arabic Language Material Development

Neuroscience can be said to be a science that explains the relationship between the brain and the mind (brain-mind-connection), or the soul and body (Novossiolova, Dando, and Martellini, 2021). Scientific studies of neuroscience specialize in the function and nervous system in the brain which then develops and expands in neuro-anatomy of the brain (brain structure) and brain neurophysiology (parts and functions of the brain) which function to make important contributions to the transfer of knowledge morally and rationally (Atoum and Nouman, 2019). The following is the use of neuroscience in learning (Figure 4). Para Experts in the physiological study of the soul-body relationship try to understand human dynamics as a whole to see the study of brain objects at the molecular level (Jailani & Nur Kholis, 2021). The object of this study then gives rise to three main pillars in the study of neuroscience, namely neurogenetics (neuromuscular), neurotechnology (instrumentation), geoengineering (neural engineering) (Di Luca et al., 2006).

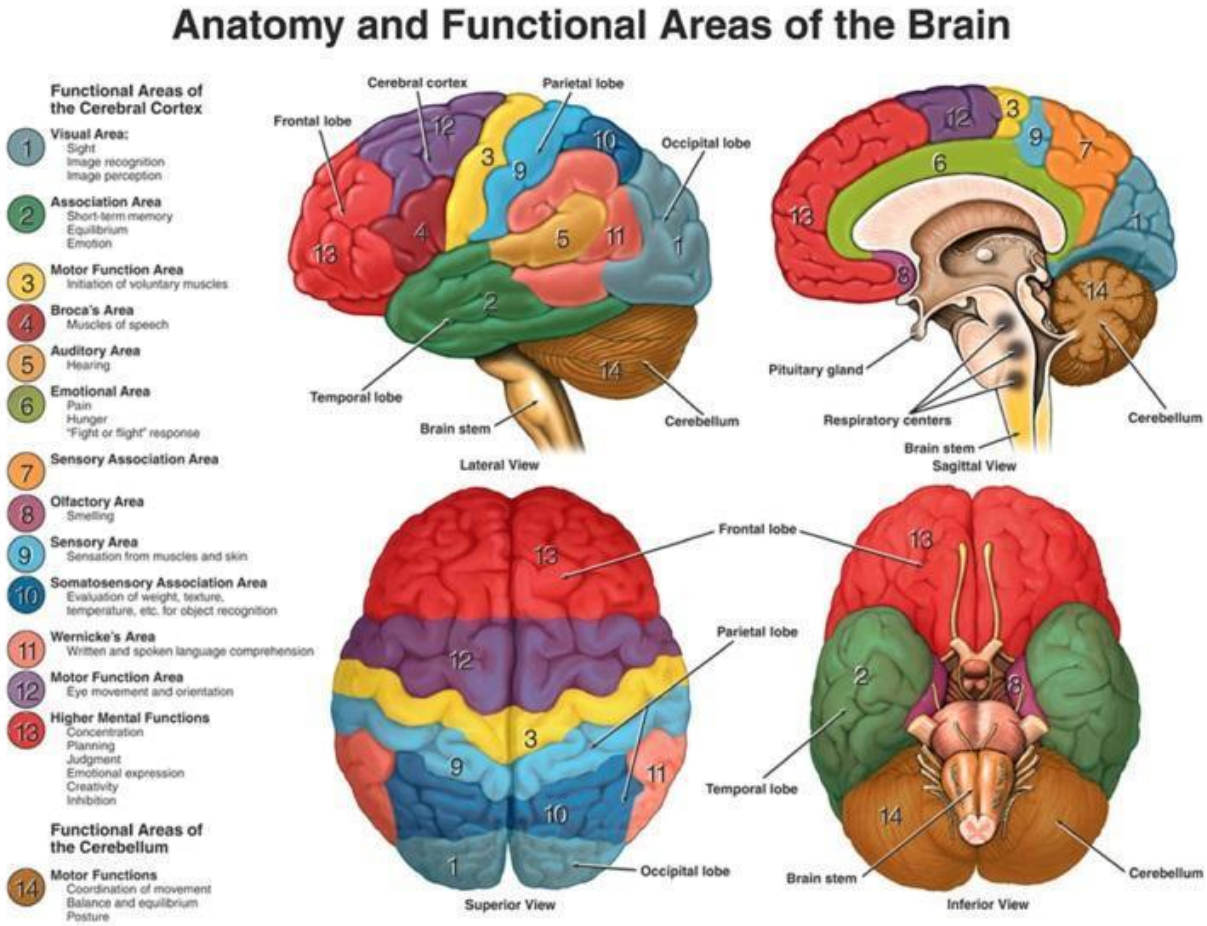

Figure 4. Use of Neuroscience (Bahril Hidayat, 2017).

Characteristics and Applications of Neuroscience

Neuroscience regulates all body functions and identifies the most primitive human behavior and is responsible for all activities involving thoughts, emotions, and feelings (Vogel, Goffin, and Ansari, 2015). There are at least six characteristics of neuroscience that are applied and can cause a paradigm shift in the development of the theory of neurons and the brain, namely; (1) *multiple intelligences,* Multiple intelligences that connect brain areas that regulate language, music, motor skills, social relationships, and spirituality (Desfa et al., 2020); (2) *Emotional Intelligence,* Emotional intelligence that holds optimism, enthusiasm, and self-motivation integrated with social intelligence rest on the human social brain (Suyadi, Nuryana, and Fauzi, 2020); (3) *Spiritual Intelligence,* spiritual intelligence that adopts the concept of emotional intelligence; (4) *Adversity Quotient,* intelligence faces challenges to respond to stimuli through aspects of cognitive psychology; (5) *Brain-based learning,* adopting learning techniques that refer to learning styles and brain work to process information and response patterns; (6) *Instrumentation,* manage the potential of thinking by segmenting and classifying ways of thinking by involving all aspects of human life (Suyadi and Widodo, 2019).

The results of neuroscience development research give birth to mental processes that are not

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only based on stimulus-response but also involve biological mechanisms that can monitor brain performance when performing an action that allows experts to enter the human brain (living brain) and study it carefully. The results of this research were carried out with the latest and most advanced technologies such as PET (Positron Emission Tomography), SPECT (Single-Photon Emission Computerized Tomography), and fMRI (Functional Magnetic Resonance Imaging), thus giving birth to characteristics by replacing the old paradigm with a new paradigm in neuroscience. The paradigm shift can be seen in the Table 1 (Zainuddin et al., 2020). The change in the neuroscience paradigm gave birth to many fields of study that were as broad as possible so that experts tried to give birth to experiments and practical implications into aspects of human life by sitting on the neuron system.

Table 1. Comparison of the old paradigm with the new paradigm in the characteristics of neuroscience

Old Paradigm	***New Paradigm***
Motivations come from outside	Motivations come from within
There are four personality traits	There are five personality traits, namely openness to new things, cautious nature, extraversion, agreeableness, and neuroticism
Aging lowers ability	If you don't use it, it will be lost
Single-faced IQ academic concept	IQ faces many intelligence concepts
There is no sex difference	There is a sex difference
Maintenance of nature is the main factor	Innate nature is the main factor
Seeds of disease are the cause of disease	Thoughts can control disease
The brain is like a computer	The brain is like a drug factory
Memories can be recalled after passing a complete episode	Memory is composed of episodes of pieces of information
Spirituality is separate from brainwork	Spirituality is related to brainwork
The search for meaning is not an important activity of the human brain	The search for meaning is related to human existence and is an important activity of the brain

Neuroscience and Its Implications in the Development of Arabic Learning Materials

The implications of educational neuroscience in the process of developing Arabic language material can be maximized by optimizing the right and left brain nerves (Akkurt, 2021). Brain optimization commands the entire nervous system to jointly involve as many senses as possible simultaneously to bring up Arabic learning goals that involve rational, emotional, feeling, psychological, and spiritual. The following is an overview of the integration of neuroscience in the process of developing Arabic language material (Jailani et al., 2021). Figure 5 explains that the neural network of the right and left brain is the central center of the natural potential possessed by humans. This neural network is integrated by cognitive, psychomotor, and affective aspects and has a complete connection to maximize the Arabic learning process. the cognitive aspect represents the substance of the Arabic language learning material, the psychomotor aspect represents the mastery of the four Arabic language skills, and the affective aspect represents the attitudes or character values in the Arabic learning process. These three aspects are processed in the right brain and left

brain approaches which are then connected in the objectives, methods, techniques, and evaluations of learning Arabic. To maximize the potential of the brain, learning Arabic requires a relaxation system (Suyadi, 2019a). However, it is more about optimizing the soul and mind before receiving learning information or language learning materials. Relaxation can be applied by praying before studying, or playing certain music before learning activities begin. The strains of tones contained in music can slowly activate brain waves so that they are always in a state of alert to receive information and help transfer information in the long term (Jailani, Wantini, et al., 2021). Based on this statement, Arabic education experts should be able to understand the workings and natural development of the brain in students so that the brain can function intelligently giving birth to the natural potential of student brain development through neuroscience in Arabic learning (Suyadi and Sutrisno, 2018).

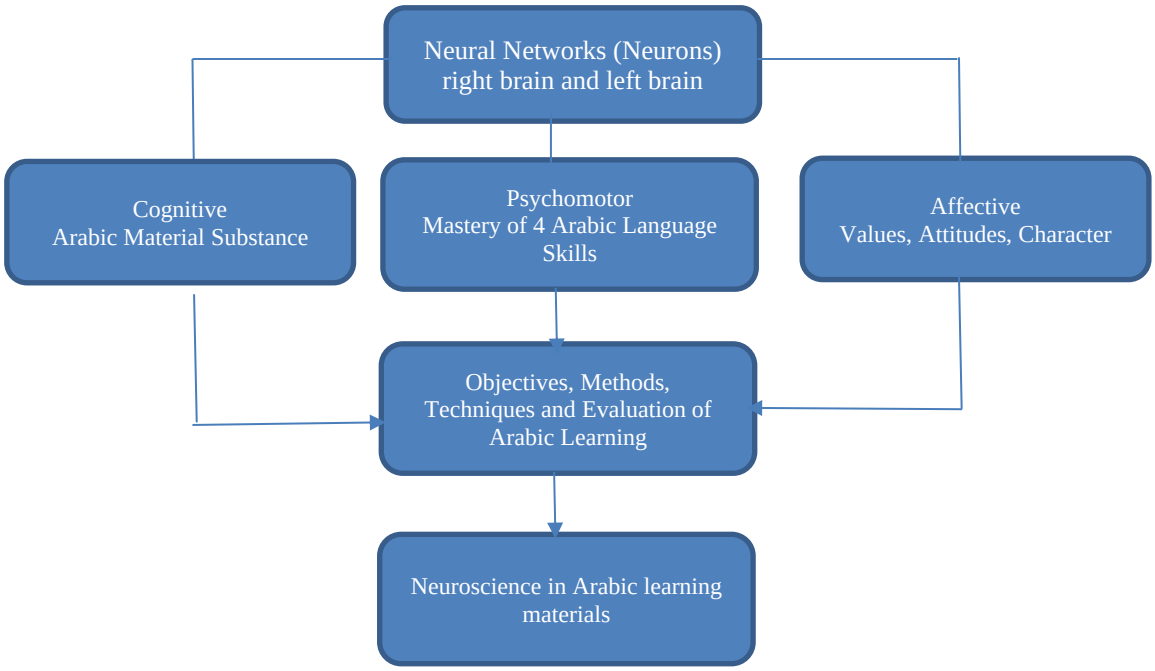

Figure 5. Schematic of Neuroscience in Arabic Language Material Development

Contribution of Neuroscience in the Development of Arabic Learning Materials

The development of Arabic language material from time to time is considered very important and still accepts constructions of new and relevant material development models according to the needs of society and students in the modern era(Jailani, Suyadi, and Muallimah, 2021). This is because the formulation of Arabic learning is still teaching language, not teaching about language (Al-Khresheh, Khaerurrozikin, and Zaid, 2020). The material as an educational plan has the function of providing guidelines regarding the type, scope, and sequence of contents in the Arabic language education process. According to Sousa in the study of educational neuroscience, educators are not the only experts in the field of the brain. But educators are the only profession that always touches

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and changes the brain (Jailani, Suyadi, and Djabedi, 2021). New humans use 5-8% of the potential of the brain and 10-15% of the application of the brain in the scope of education. The formulation of education in the Arabic curriculum cannot be separated from the role of the brain which has an important meaning from the side of the *nafs*, *qalb*, and *arruh*. Thus, the essence of education in the Islamic perspective of a neuroscience approach is to produce human beings consisting of various physical, spiritual, and intellectual elements; IQ/EQ/SQ; as well as cognitive, affective, and psychomotor aspects (Abu Bakr Siddiq, 2020). Psychologically, the needs of students in the learning process include a sense of security, comfort, ability, freedom, affection or attention, success, and recognized existence. This sense of security and affection is the most important factor in the scope of learning. Furthermore, to be able to formulate Arabic language material, it is necessary to optimize the right brain and left brain so that there can be no gaps and foster balance in determining Arabic learning objectives, Arabic learning methods, Arabic learning techniques, and evaluating Arabic learning. The following (Figure 6) is a scenario chart of the use of neuroscience in the components and systems of Arabic learning.

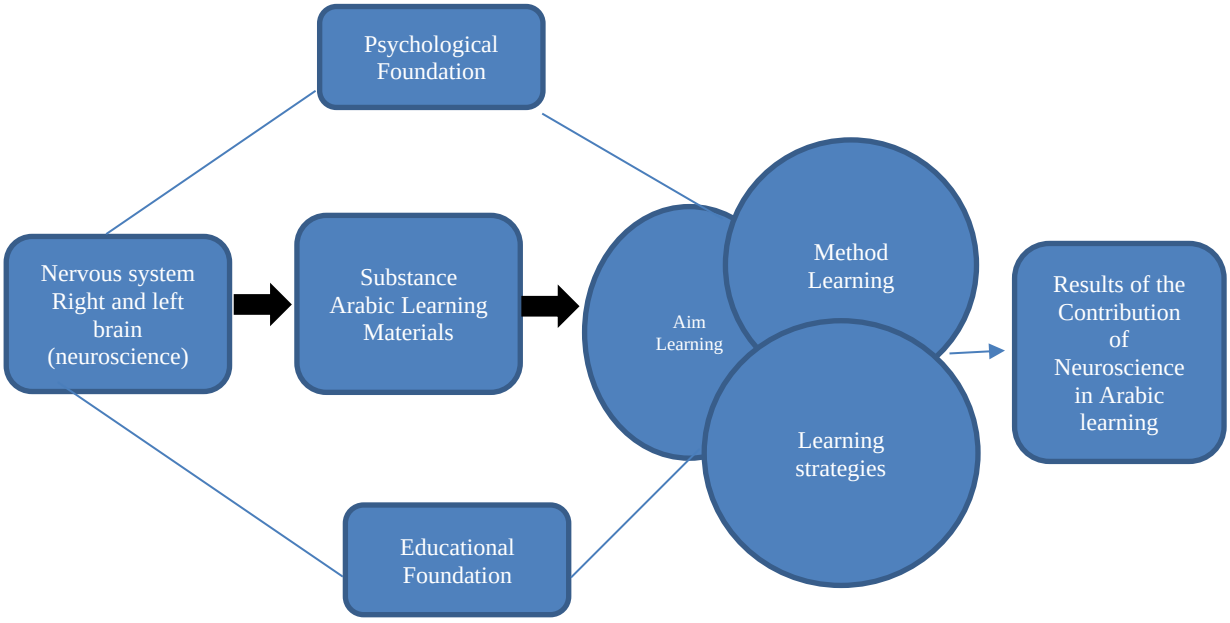

Figure 6. Schematic of Using Neuroscience in Arabic Learning

Figure 6 explains that all aspects of Arabic learning activities begin with the potential of human nature, namely the brain nervous system (neuroscience) (Suyadi, 2019b). This nervous system is equipped with an educational foundation and a psychological foundation in the management of Arabic learning materials. The educational foundation plays a role in the cognitive (basic knowledge of Arabic) and psychomotor (Arabic language skills) aspects. Likewise, the psychological basis plays a role in the affective aspect which regulates the values of attitude, character, emotions, feelings, and psychology. Another function of the psychological and educational foundation is quotient (EQ),

intuitive ability, and learning interactions as well as validation of logical abilities in reading and writing Arabic. these two foundations are integrated into each other in components so that they can produce neuroscience creativity in Arabic language education.

Conclusion

Based on the results and discussion, researchers can conclude that neuroscience studies in the development of Arabic language material use a right brain and left brain approach that relies on the prefrontal cortex as the center of human emotional control and intelligence. This approach is reviewed on an educational and psychological basis that involves cognitive, affective, and psychomotor processes. This process is then combined in the objectives, methods, techniques, and strategies of learning Arabic so that the knowledge generated by the nervous system (neuroscience) in the Arabic learning curriculum becomes integral knowledge. In addition, neuroscience in Arabic language material is by the principles carried out by the latest Arabic language development material concepts and by Arabic curriculum guidelines. The suitability is found in the learning mindset that is developed and perfected with learner-centered learning. This mindset involves the right brain and left brain nervous systems whose role is to transfer object images and analysis so that they can make students more creative in developing learning. Thus students get multidimensional knowledge that is not only glued to the help of the teacher. More independent and effective in mastering *mufrodat*, *muhadasah*, and *quwaidul arobiyah* skills in learning Arabic. This mindset involves the right brain and left brain nervous systems whose role is to transfer object images and analysis so that they can make students more creative in developing learning. Thus students get multidimensional knowledge that is not only glued to the help of the teacher. More independent and effective in mastering *mufrodat*, *muhadasah*, and *quwaidul arobiyah* skills in learning Arabic. This mindset involves the right brain and left brain nervous systems whose role is to transfer object images and analysis so that they can make students more creative in developing learning. Thus students get multidimensional knowledge that is not only glued to the help of the teacher. More independent and effective in mastering mufrodat, *muhadasah*, and *quwaidul arobiyah* skills in learning Arabic. This research has limitations and weaknesses in the aspect of substance and research content, therefore the researcher recommends and provides input to academics, scientists, researchers, teachers, and lecturers. To follow up on what is relevant to this research, especially in the discourse on the development of Arabic language learning in the realm of language education Arab.

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