# Neurobehavioural approach to enhance human literacy for character development in creative communication

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**Abstract -** In recent years, the intersection of neurobehavioral science and human literacy has garnered significant attention, particularly concerning its potential to enhance character development through creative communication. This study aims to investigate how neurobehavioral strategies can be employed to enhance literacy and character development. This research uses a qualitative and quantitative mix method with a neurobehavior approach. In producing products, this research also uses Research and Development (R&D). The research instrument uses a Google form. This research involved 100 students of English Literature Study Program at UNIMED who took the Creative and Innovative Communication course. Firs finding, students predominantly answered 'agree' that environmental, socio-economic, media and technology, academic, and leadership factors influence student character development. Second finding, students were able to answer correctly regarding neurobehavior literacy towards character development so that students' character significantly improved and was reflected in their creative communication. Environmental, socio-economic, media and technology, academic, and leadership factors have a big impact on character development. Therefore, based on the neurobehavior approach, we need to have a variety of literacy that supports positive character and experiences. This research will continue regarding how our brains have an impact on increasing creative communication and developing Emotional intelligence with other innovative approaches.

**Keywords**: character development; creative communication; human literacy; neuro-behavioural approach

## 1. Introduction

The intersection of neurobehavioral science and education offers a promising avenue for enhancing human literacy and fostering character development through creative communication. Communication is the art of conveying information (messages, ideas, attitudes or ideas) from communicator or delivering news, to change and shape communication behaviour or recipient of the news (pattern, attitude, view and understanding), management and desired understanding together. Communication must be carried out effectively so that the communication can be easily understood by the person communication, effective communication can be carried out if the person communicating understands about the meaning of effective communication, the effective communication process and the elements of effective communication (Nurul, 2023).

Modern society increasingly relies on the ability to communicate effectively and creatively. Human literacy includes a deep understanding of how to communicate well, understanding the emotions and perceptions of other people, as well as critical thinking skills needed in various contexts. Neurobehavior is the coordination between noble functions and human behavior, where noble functions are functions that enable humans to fulfill physical and spiritual needs in accordance with applicable moral values. The brain causes humans to communicate with each other through speaking, writing and gestures.

Neuro-behavioural approaches can provide deeper insight into how humans understand, respond and process information, which can be applied to improve communication effectiveness. This research aims to develop integrated human literacy in the Creative Innovative Communication (CIC) course. This research really needs to be carried out because it can provide various benefits and a deeper understanding of the relationship between creative and innovative communication and increasing human literacy. Apart from that, this research is useful for developing more effective CIC learning methods, namely neurobehavior methods including curriculum development, teaching approaches, and strategies and evaluations to be achieved.

In an article entitled "Increasing Human Literacy for Generation Z Through Learning to Use Technology in Indonesia", which uses a qualitative SWOT analysis research method, it was found that there are still difficulties in increasing human literacy among Gen Z. This is due to their own characteristics which find it difficult to communicate directly and instantly.

By examining the neurological and behavioral underpinnings of literacy, we can develop innovative methods to cultivate more effective and empathetic communicators. This study aims to bridge the gap between cognitive science and communication, offering new insights into how we can nurture individuals to become not only literate but also morally and emotionally intelligent beings, capable of contributing positively to society. Through this lens, we explore how a neurobehavioral perspective can revolutionize our understanding and practice of creative communication, ultimately leading to more profound and meaningful human interactions. The research questions comprise as follows:

(1) Can certain factors influence student character development?
(2) How can understanding neurobehavioral literacy improve student literacy?
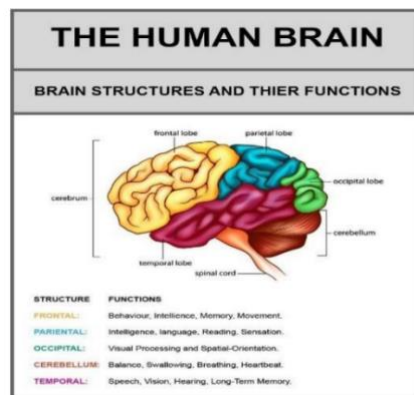


Figure 1 Brain Structures and Their Functions

Neurobehavioral approaches to character growth involve using insights from neuroscience and behavioral science to foster the development of positive character traits. This approach can be applied in

educational settings, therapeutic interventions, and personal development programs. Neurobehavioral literacy refers to a person's ability to understand and recognize the relationship between brain function and human behavior. This includes knowledge of how neurobiological and neurological processes influence actions, emotional reactions, decision making, and social interactions.



Figure 2 Dynamic of Change-Induced Stess

The psychological approach tries to explain the relationship between observable behavior and mental events (such as thoughts and emotions) into biological processes. This approach results in the assumption that intelligence has an anatomical and biological basis. Human behavior is basically controlled by the activity of the brain and nervous system. So a person's behavior really depends on the condition of their brain and the condition of their nervous system. If the brain and nerves are disturbed, their behavior will also be disturbed. A person's success is influenced by 80% EQ (Emotional Quotient) and 20% IQ (Intelligence Quotient). The Five Pillars of Emotional Quality include 1. Self-Awareness, 2. Self-Regulation, 3. Motivation, 4. Empathy, and 5. People Skills.

Emotional Intelligence is how an individual is called intelligent, so that individual can maintain their life. Emotional intelligence (EQ) has recently been considered no less important than intellectual intelligence (IQ). A study revealed that emotional intelligence is twice as important as intellectual intelligence in contributing to a person's success. (https://youtu.be/vr-64vhxPYM?si=vVBOeAvG-ge39p6W).

Ashrawi (2015) said that as living creatures, humans will respond, namely a thought process that involves the brain. From this response behavior arises. Behavior itself is a representation of the working system of the human body's functions in responding. Apart from that, hormones also play an important role in regulating the human body's performance in behavior. 7 Recently, many new studies have concluded that the use of blue light (light with a short wavelength) regulates human emotions and behavior. However, in Indonesia there is still little research on the use of blue light to change behavior. Lulu pioneered one of the studies on blue light in Indonesia through research entitled "Evaluation of the Level of Alertness and Reaction Time of Night Car Drivers to Exposure to Blue Light Based on Brain Wave Responses".

*Perkembangan Neurobehavorial of* Myrtle McGraw conducted by (Dalton, 1998). It focused on neural behavioral patterns that had just formed from their uncertain and overlapping precursors because he believed that it was precisely at this point or critical period, when behavior appeared most disorganized, uncertain, and unbalanced, that thought and consciousness, brain and behavior work together.

Character has traditionally been described in terms of virtues that result from socialization processes that cultivate traits that are culturally valued and serve as behavioral guidelines (Nucci, 2018). When character is defined in terms of virtues, it goes against the data, which dates back to Hartshorne and May, 1928, which shows that individuals use virtues inconsistently since their behavior varies depending on the situation (Turiel & Nucci, 2018).

Human literacy for characters growth refers to the ability to create and develop fictional characters with realistic and interesting personalities, motivations, goals, conflicts, and storylines. Learning aims to build student character by choosing the right learning media which will influence the learning process, namely building character.

Creative communication is widely used in marketing, education, media, and other fields where effective message delivery is crucial. Components of Human Literacy:

(1) Traditional Literacy: Reading and writing skills: Fundamental for understanding and creating content.

(2) Critical thinking: Ability to analyze and evaluate information critically.

(3) Digital Literacy: Navigating digital platforms: Proficiency in using digital tools and technologies.

(4) Online Communication: Effective and responsible use of social media and digital communication channels.

(5) Emotional Literacy:
- Understanding and managing emotions: Crucial for empathy and interpersonal communication.
- Emotional intelligence: Recognizing and responding to others' emotions appropriately.

(6) Cultural Literacy:
- Awareness of cultural differences: Important for global communication and understanding.
- Inclusion and diversity: Promoting inclusivity in communication practices.

Exploring the relationship between human literacy and character development can reveal how the ability to read, write, and communicate effectively influences personal growth, ethical behavior, and social skills. Below are some essential points to take into account in the present research.

(1) Critical Thinking: Literacy enhances critical thinking skills, which are crucial for making ethical decisions and developing a strong moral character.

(2) Empathy and Understanding: Reading diverse texts allows individuals to understand different perspectives and cultures, fostering empathy and compassion, which are essential for character development.

(3) Self-expression and Communication: Literacy skills enable individuals to express themselves clearly and confidently, contributing to their self-esteem and social interactions.

(4) Moral and Ethical Lessons: Literature often contains moral and ethical lessons that can shape an individual's values and beliefs, influencing their character development.

(5) Resilience and Problem-solving: Engaging with complex texts and ideas helps individuals develop resilience and problem-solving skills, which are important aspects of a strong character.

(6) Lifelong Learning: Literacy encourages a love for learning and intellectual curiosity, which are key traits of a well-developed character.

(7) By enhancing human literacy, we can positively impact character development, leading to individuals who are not only knowledgeable but also ethical, empathetic, and effective communicators.

In a journal titled "Character Building Training Model for Young People to Strengthen Religious Moderation" (Munawir et al., 2023), data analysis indicates that the CBT program has enhanced religious character, discipline, good manners, environmental awareness, and patriotism. The most significant improvements were observed in religious character and national pride.In a journal entitled "The Efficiency of Learning Media in Building Student Character" conducted by (Yves et al, 2023). From the research conducted, it was found that the efficient application of learning media in building character in students will provide an effective and optimal learning process.

In research entitled "Human Resources Training "*Pelatihan Sumber Daya Manusia "Character Building" Posyandu Remaja Mekarmukti Kecamatan Cikarang Utara Kabupaten Bekasi*". From this research, it was found that there was an increase in understanding among youth posyandu cadres regarding Character Building, namely 25% were in the fair category and 66% were in the Good category.

In a journal titled "School Culture: A New Strategy in Building Student Character," data analysis was conducted interactively following several steps, including data collection, reduction, presentation, and conclusion drawing. The research revealed that strategies for fostering student character in schools are categorized into development programs, subject integration, and the reinforcement of character through school culture.In the research entitled "Experiential Learning: Exploring Human literacy of English Language Teaching in Education 4.0" most English teachers have a positive perception of experiential learning because it helps students relate learning to real world experiences, encourages collaboration, critical thinking, problem solving, skills communication, and effective use of technology.

In the journal entitled "Increasing Human Literacy for Generation Z Through Learning to Use Technology in Indonesia", which uses a qualitative SWOT analysis research method, and from research that has been conducted it is found that there are still difficulties in increasing human literacy in Gen Z because of their characteristics. most find it difficult to communicate directly and instantly.

In the journal entitled "Teacher's understanding of teaching models and students' human literacy" which uses qualitative research methods at two vocational schools in Surakarta, it uses semi-structured interviews and documentation for data collection purposes. From the research conducted, it was found that teachers had an inadequate understanding of the teaching model used in Basic Accounting subjects. This qualitative research at two vocational schools in Surakarta used semi-structured interviews and research documentation with the title "Exploring the Implementation of Local Wisdom-Based Character Education among Indonesian Higher Education Students "teaching character education in higher education based on local wisdom can be done by integrating values and aesthetics in courses, internalizing positive values in

students, habituation and training, providing examples and models, creating character-based situations local wisdom, and civilization (Hidayati et al, 2020).

Creative communication involves the use of innovative and imaginative methods to convey messages, ideas, or information effectively. It goes beyond traditional forms of communication by incorporating artistic, visual, and unconventional techniques to engage and connect with the audience. Creative communication can include storytelling, visual arts, multimedia, interactive media, and other creative strategies to make the communication process more engaging, memorable, and impactful. Key aspects of creative communication include:

(1) Innovation: Utilizing new and original ideas to convey messages.
(2) Engagement: Capturing and maintaining the audience's attention.
(3) Emotional Connection: Establishing a strong emotional link with the audience.
(4) Interactivity: Encouraging participation and interaction from the audience.
(5) Visual Appeal: Using visuals, graphics, and other artistic elements to enhance the message.
(6) Adaptability: Tailoring messages to different audiences and contexts.

Creative communication is essential for students as it significantly contributes to their personal and professional growth. Possessing creative communication abilities enables students to become more empowered, innovative, and better prepared to tackle challenges across different aspects of life. These skills equip them with the necessary tools to excel in both academic and career contexts (Meisuri & Hartati, 2023). The results of research related to the use of the Neuro Dominance Science (NDS) approach have a significant contribution to improving creative communication skills.

This qualitative research further explores the effective implementation of sustainable development of creative communication. Using semi-structured interviews and focus group discussions (FGD), identifying stakeholder perceptions in ensuring the sustainable development of creative communication in the digital era in the UDINUS communication science study program (Yudha, 2019). Research findings on the application of 10 Toastmaster International projects to six KKNI assignment models were significantly able to maximize the increase in various competencies in public speaking (Hartati, Meisuri, & Ginting, 2022). This research aims to determine innovation communication and the level of adaptation to new habits among business actors with a descriptive study in Riau Province using a quantitative approach with a survey method of 220 business actors. This research instrument was built using innovation communication theories and concepts.

This research found that the highest source of innovation communication information was social media, followed by mass media, and interpersonal communication from the government. Most respondents stated that health protocol information was an important message so they agreed to comply. Respondents also confirmed that they would continue to comply with health protocols until the pandemic is over, because apart from protecting individuals, it is also for the sustainability of their business (Badri, 2022). In the journal entitled "Modified International Toastmaster Approach to Improve Public Speaking Competence" Competency-Based Education is important in the era of the industrial revolution 5.0 and the application of the toastmasters approach provides a significant increase in students' speaking competence (Hartati et al, 2022).

Meisuri and Hartati (2023) explore how the principles of neurological dominance science (NDS) can be leveraged to enhance students' creativity, particularly in the context of communication skills. The research emphasizes the application of outcome-based education (OBE) strategies to foster creativity by aligning educational practices with students' neurological strengths. Through this approach, the study demonstrates that understanding neurological dominance can be a significant factor in improving communication-related creativity among students.

Saggar et al (2019) examine the neurobehavioral foundation of creativity development during middle childhood, focusing on the fluctuations often referred to as "creativity slumps and bumps." This research investigates how neural changes during this developmental stage impact creative abilities. By analysing neuroimaging data, the study provides insights into the brain's role in creativity, identifying critical periods where creativity may either decline or surge.

Jolles and Jolles (2021) address the importance of improving neuroscientific literacy among educational professionals. The study argues for the integration of neuroeducation into teacher training and professional development programs. By enhancing educators' understanding of neuroscience, the research suggests that educational practices can be better aligned with how students learn, leading to more effective teaching methods and improved learning outcomes.

Leisman et al (2015) investigate the neurological development of children, exploring how

educational enrichment can influence brain development. They highlight the significance of early educational experiences in shaping neurological growth and cognitive abilities. The research underscores the role of enriched learning environments in supporting the neurological and psychological development of children, emphasizing the long-term benefits of such approaches in education. Together, these studies contribute to a growing body of research that connects neuroscience with educational practices, offering valuable insights into how an understanding of the brain can inform and improve teaching and learning processes.

The study by Higuera-Trujillo et al (2021) presents a comprehensive scoping review of neuroarchitecture, a multidisciplinary field that examines the relationship between architectural design and human cognition and emotions. The review focuses on how architectural spaces can be designed to influence cognitive and emotional responses, drawing on insights from neuroscience, psychology, and environmental design.

The authors begin by outlining the concept of neuroarchitecture, which seeks to understand how the built environment affects the brain and behaviour. They discuss the historical development of this field, highlighting precursor approaches that laid the groundwork for contemporary research. These include environmental psychology, which explores how physical spaces impact psychological well-being, and cognitive science, which studies how spatial environments can affect cognitive processes like attention, memory, and perception.

In their review, Higuera-Trujillo et al (2021) and colleagues systematically analyse existing literature on neuroarchitecture, identifying key themes and trends. They find that much of the research in this area has focused on specific architectural elements—such as lighting, colour, and spatial layout—and their effects on emotional states and cognitive performance. For instance, studies have shown that certain lighting conditions can enhance mood and productivity, while the layout of a space can influence how people navigate and interact within it.

The review also addresses the methodologies used in neuroarchitecture research, noting a reliance on both qualitative and quantitative approaches. These include behavioural experiments, physiological measurements (such as brain imaging and heart rate monitoring), and subjective assessments of emotional and cognitive responses to different environments. The authors emphasize the importance of using rigorous and interdisciplinary methods to capture the complex interactions between architecture and human experience.

Higuera-Trujillo et al (2021) conclude by discussing the practical implications of neuroarchitecture for the design of spaces that promote well-being, productivity, and positive social interactions. They call for further research to deepen our understanding of the cognitive-emotional impact of architectural design and to develop evidence-based guidelines for creating environments that support human health and performance.

Fan et al (2022) explore the relationship between creativity and semantic distance in creative writing, showing that greater semantic distances are linked to higher creativity. They use neuroimaging and behavioural methods, identifying brain activity in the prefrontal cortex associated with creative thinking. Saggar et al. (2019) focus on creativity development during middle childhood, finding "slumps and bumps" in creativity that correspond to changes in brain networks, especially those related to executive functions and imagination. Their research highlights the importance of this developmental phase for fostering creativity.

Jolles and Jolles (2021) advocate for improving neuroscientific literacy among educators, suggesting that a better understanding of brain functions can enhance teaching practices and student learning outcomes. They call for the integration of neuroscience into teacher education programs. Claire et al. (2020) examine the psychosocial impact of neurobehavioral disabilities, emphasizing their effects on emotional well-being and social interactions. The authors underscore the need for holistic treatment approaches that combine neurological care with community support and rehabilitation.

Kurniasih and Khairi (2021) explored the integration of children's literacy into teaching and learning practices to foster student character development. Their work highlights the importance of literacy in shaping values and behaviours, emphasizing its role in holistic education. Berg and de Villiers (2021) discussed the development of communication skills in sports students through the use of vlogs as an assessment tool, presenting a framework that enhances both communication and content learning. Bilro et al (2022) examined the impact of creative communication and gamification in student engagement, using sentiment analysis to understand its effectiveness in higher education. Idawati et al (2022) focused on 21st-century learning skills, emphasizing active, creative, and fun learning approaches that build character in

students. Thornhill-Miller et al. (2023) assessed the promotion of 21st-century skills like creativity, critical thinking, communication, and collaboration, highlighting their significance for future educational and professional landscapes. Leisman et al (2015) addressed the neurological development of children, particularly in relation to educational enrichment, stressing the role of cognitive development in learning. Gotlieb et al. (2022) connected neuropsychological development with reading and social-emotional skills, examining their coordinated growth in diverse youth. Bjorklund (2022) discussed children's evolved learning abilities, offering insights into how these innate capacities affect education. Gonzalez and Mukhopadhyay (2019) studied the role of creative imagination in concept formation for primary school children, identifying key variables that influence learning outcomes. Claire et al. (2020) analysed the psychosocial impacts of neurobehavioral disabilities, exploring the effects of such conditions on children's development and behaviour. Smith and Pollak (2020) reviewed how early life stress influences developmental trajectories, identifying potential mechanisms behind adverse outcomes in children. Finally, Timmis et al. (2024) presented a concept for societally relevant microbiology education, proposing a model for disseminating microbiology knowledge to broader society.

Overall, the study provides a valuable overview of the emerging field of neuroarchitecture, highlighting its potential to inform the design of spaces that are not only functional but also psychologically and emotionally supportive.

## 2. Method

This research utilizes a mixed-method approach, incorporating both qualitative and quantitative techniques, and is framed within a neurobehavioral perspective. The combination of these methods allows for a more comprehensive understanding of the research problem by capturing both numerical data and in-depth qualitative insights. In line with the study's objectives, the Research and Development (R&D) model developed by Borg and Gall (1983) is employed to guide the process of creating and refining research products. This approach is particularly useful in studies aimed at developing practical tools, interventions, or frameworks, ensuring that the outcomes are both theoretically sound and practically applicable.

The research instruments used for data collection are diverse and include online surveys, observations, interviews, and Focus Group Discussions (FGD). The online survey instrument is designed using Google Forms, which provides an accessible platform for participants to complete the questionnaire. The use of Google Forms as a survey tool aligns with the practices outlined by Vasantha and Harinarayana (2016), who emphasized the efficiency and effectiveness of this method in reaching a large number of respondents, especially in educational settings. This method also allows for quick data collection and analysis, providing a structured and systematic way to gather responses from participants.

To ensure that the sample size is appropriate and reflective of the population, the study follows the guidelines proposed by Arikunto and Suharsimi (2017). According to these guidelines, if the population size is fewer than 100 individuals, the entire population should be included in the study as the research sample. In this case, the population consists of 100 students enrolled in the English Literature Study Program at Medan State University (UNIMED), all of whom are taking the Creative and Innovative Communication course. By involving the entire population, the study ensures that the data collected is comprehensive and representative of the group under investigation, thereby increasing the validity and reliability of the findings.

The combination of qualitative and quantitative methods, along with the neurobehavioral approach, provides a robust framework for analyzing the data. The neurobehavioral perspective helps in understanding how cognitive and behavioral processes influence communication, particularly in the context of creativity and innovation. This approach is particularly relevant to the subject matter of the course, which focuses on enhancing students' creative and innovative communication skills.

The use of multiple data collection methods, such as surveys, observations, interviews, and FGDs, further strengthens the research. Surveys provide quantitative data that can be statistically analyzed to identify trends and patterns, while observations and interviews offer qualitative insights into the students' experiences and perceptions. FGDs allow for in-depth discussions among participants, facilitating the exploration of diverse viewpoints and collective problem-solving. This triangulation of data collection methods ensures that the research captures a holistic view of the phenomenon being studied, allowing for a more nuanced analysis.

The present study employs a well-rounded mixed-method approach, guided by the R&D model and framed within a neurobehavioral perspective. The use of multiple data collection tools, including

Google Form surveys, observations, interviews, and FGDs, ensures that the research is both comprehensive and methodologically sound. By involving the entire population of 100 students from the Creative and Innovative Communication course, the study provides valuable insights into how creative communication skills can be developed and enhanced within an academic setting.

## 3. Results and Discussion
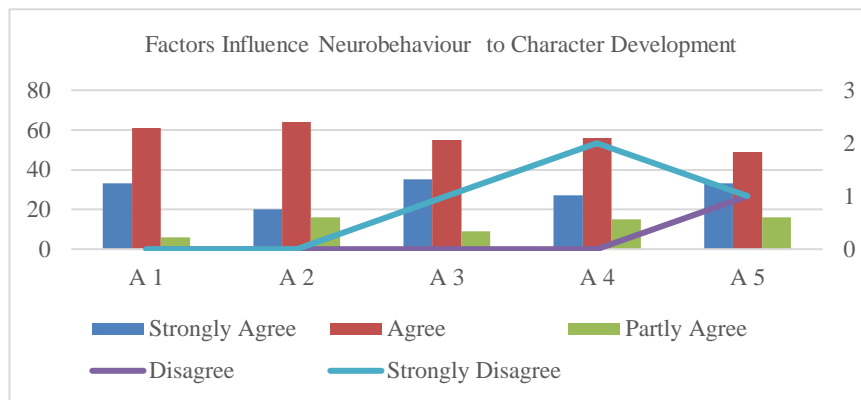## 3.1 Results
## First Finding



Figure 3 Factors Influencing Neurobehavior and Character Development

From the picture above, it can be seen that environmental factors, socio-economic factors, media and technology factors, academic factors, leadership factors have a big impact on character development. Therefore, based on the neurobehavior approach, we need to have a variety of literacy that supports positive character and experiences in order to be able to regulate and respond to emotional intelligence effectively, behavioural conditioning using positive reinforcement which can help instill good habits and character. The image above will be explained further in the table below.

Table 1 Factors Influencing Neurobehavior and Character Development

| Code | Description | Criteria (%) | | | | |
|---|---|---|---|---|---|---|
| | | SA | A | PA | D | SD |
| A 1 | Environmental factors can shape an individual's character | 33 | 61 | 6 | 0 | 0 |
| A 2 | Socioeconomic status influences neurobehavioral development and character formation | 20 | 64 | 16 | 0 | 0 |
| A 3 | Media and technology impact character development in today's society | 35 | 55 | 9 | 0 | 1 |
| A 4 | College environment plays in character development | 27 | 56 | 15 | 0 | 2 |
| A 5 | Leadership and training program for certificate influence character development and personal growth for college students | 33 | 49 | 16 | 1 | 1 |

Note, SA= Strongly Agree, A=Agree, PA= Partly Agree, D=Disagree, SD=Strongly Disagree

## 3.2 Discussion
### A 1

From the 100 respondents, 61% chose "Agree" that environmental factors are significant in shaping individual character from a neurobehavioral perspective. This shows that the majority of respondents believe that environmental factors play an important role in the development and formation of individual character. The percentage of 61% shows quite strong dominance, which indicates that more than half of the respondents are aware and acknowledge the importance of environmental factors in character development. The neurobehavioral perspective focuses on how the brain and nervous system influence individual behaviour. In this context, we talk about how environmental factors, such as family environment (parenting patterns and interactions with family members), education (learning experiences, interactions with teachers

and peers) can influence a person's development and character. Environmental factors include everything around an individual that can influence their mental development and behaviour.

**A 2**

The survey results showed that 64% of 100 respondents agreed that socio-economic status influences neurobehavioral development and character formation. Socioeconomic status refers to the economic and social position of a person or family in society, as measured through income, education, and employment. It involves the way the brain and nervous system develop and function, influencing a person's behaviour, emotions, and cognition. Research shows that children from low-SES families may experience challenges such as chronic stress, lack of access to educational resources, and exposure to less stimulative environments, all of which can affect their brain development. For example, nutritional limitations and limited access to health care can negatively impact brain development.

Character refers to an individual's moral and ethical traits which include attitudes, habits, and behaviour. The social and economic environment in which a person is raised can influence the values, beliefs, and attitudes they develop. For example, children from high SES families may have access to high-quality education and enriching extracurricular experiences, which can shape their character in positive ways.

Many studies show a correlation between SES and neurobehavioral development. For example, neuroimaging studies show that children from low SES backgrounds tend to have different brain development compared with those from high SES backgrounds. Environmental factors such as school quality, access to books and educational materials, and emotional stability at home also play an important role.

**A3**

From the 100 respondents, 55% chose "Agree", while 35 people (35%) chose "Strongly Agree". This percentage shows that the majority of respondents agree that media and technology influence character development in today's society from a neurobehavioral perspective.

"Agree" was chosen by 55% of respondents indicating that they feel fairly confident that there is a significant impact, but there may still be room for debate or doubt. "Strongly Agree" chosen by 35% of respondents shows a strong belief that media and technology have a big influence on character development, without much doubt.

Media and technology have an increasingly dominant role in everyday life, from information, entertainment, to communication. Constant exposure to media and technology can shape a person's views, values, and behaviour. For example, the influence of celebrities, trends, or information that is presented repeatedly. From a neurobehavioral perspective, our brains are influenced by what we see, hear, and experience through media and technology, which then influences how we behave and interact with others.

With the majority of respondents choosing "Agree" or "Strongly Agree", it can be concluded that many people believe that media and technology have a significant influence on the development of the character of today's society. This shows the importance of understanding how media and technology are used and their impact on individual and societal development. This explanation provides deeper context regarding how the survey results describe society's views on the influence of media and technology from a neurobehavioral perspective.

**A 4**

56% selected "Agree", this indicates that the majority of respondents agree that the college environment plays a role in character development from a neurobehavioral point of view, while 27% selected "Strongly Agree", meaning that the majority of these respondents even more strongly agreed with the statement, indicating higher beliefs about the influence of the college environment on character development.

Agree (56%) shows that more than half of respondents feel that the college experience is quite influential in shaping their character from a neurobehavioral perspective. They may see positive changes in themselves or others as a result of the college experience. Strongly Agree (27%) have a firmer view of the importance of the role of the college environment in character development. They may have strong personal experiences or vivid observations about how college has deeply influenced character development.

These results indicate that the majority of respondents feel that higher education plays an important role in their character development. This could be the basis for more research or policies that support the development of programs aimed at strengthening the positive impact of the college environment on student character development. With this more in-depth explanation, we can understand that the university

environment is indeed recognized by the majority of respondents as an important factor in character formation, which is supported by evidence from a neurobehavioral perspective.

**A 5**

49% of 100 people chose "Agree", this means that the leadership program and training for certification did have an effect on their character development and personal growth. This figure shows that almost half of the surveyed population has a positive view of the program.

33 people voted "Strongly Agree," meaning they felt strongly that the program had a significant impact on their character development and personal growth. Not only do they agree, but they also have stronger beliefs than the "Agree" group.

Although the 49% of respondents who voted "Agree" is not an absolute majority, it is still dominant in the context of this survey. This dominance shows that leadership programs and training for certification are viewed positively by the majority of respondents.

From a neurobehavior perspective, character development and personal growth can be seen as a result of the learning and experiences gained through these programs. The learning process in leadership and training programs can influence participants' thinking, behaviour and emotional responses. This is in line with neurobehavior principles which link learning experiences with changes in brain structure and function. The results of this survey indicate that leadership programs and certification training have a significant impact on student character development and personal growth.
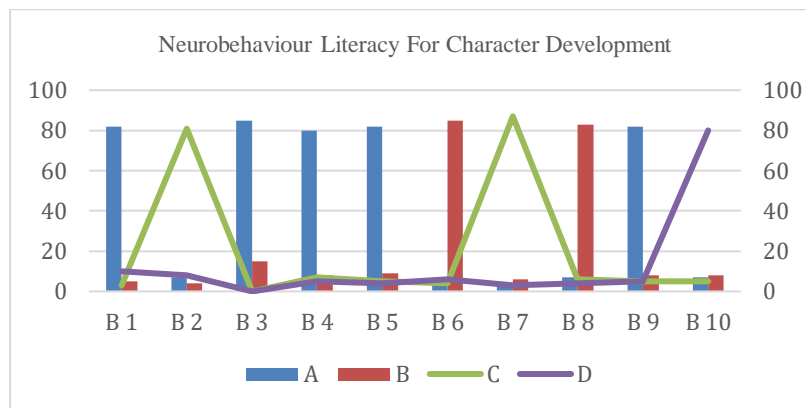
**Second Finding**



Figure 4 Neuro-behaviour Literacy For Character Development

From the picture above, it can be seen that students were able to answer correctly regarding neurobehavior literacy towards character development so that students' character significantly improved and was reflected in their creative communication. The image above will be explained further in the table below.

Table 2 Neuro-behaviour Literacy For Character Development

| Code | Questions | Options (%) | | | |
|------|-----------|---|---|---|---|
| | | **A** | **B** | **C** | **D** |
| B 1 | What is neurobehavioral literacy? | 82 | 5 | 3 | 10 |
| B 2 | Which of the following brain regions is primarily responsible for emotional responses? | 7 | 4 | 81 | 8 |
| B 3 | Neuroplasticity refers to the brain's ability to reorganize itself by forming new neural connections throughout life. | 85 | 15 | - | - |
| B 4 | How can an understanding of neurobehavioral concepts enhance character development in literature? | 80 | 8 | 7 | 5 |
| B 5 | Which of the following neurotransmitters is associated with feelings of pleasure and reward? | 82 | 9 | 5 | 4 |

| B 6 | In storytelling, what role does mirror neurons play in character interaction? | 5 | 85 | 4 | 6 |
|---|---|---|---|---|---|
| B 7 | Which part of the brain is responsible for decision-making and problem-solving? | 4 | 6 | 87 | 3 |
| B 8 | How can an author use knowledge of neural pathways to develop a character's growth throughout a story? | 7 | 83 | 6 | 4 |
| B 9 | What is the term for the brain's ability to filter unnecessary information to focus on what's important? | 82 | 8 | 5 | 5 |
| B 10 | Which brain wave pattern is associated with deep relaxation and meditation? | 7 | 8 | 5 | 80 |

**B 1**

Neurobehavioral literacy is a deep understanding of how the brain influences human behavior. This knowledge is important to help individuals and society manage behavior, improve mental health, and implement effective strategies in various aspects of life.

**B 2**

The amygdala is a small part of the brain that is shaped like an almond and is located within the medial temporal lobe. There are two amygdalas in the human brain, one each in the left and right hemispheres.

The percentage of 81% is a significant number because it shows a large majority of respondents agreeing that the amygdala is the answer. This strengthens the validity that the amygdala is widely known in the scientific and general community as the centre for controlling emotional responses in the brain. With this explanation, we can understand why the amygdala was the answer chosen by the majority of respondents in questions regarding the part of the brain responsible for emotional responses.

**B 3**

In the context of this question, 85% of 100 respondents chose the answer "TRUE" which states that the definition of neuroplasticity is correct. This shows that the majority of respondents understand and agree with the definition of neuroplasticity as the brain's ability to reorganize itself by forming new neural connections throughout life. The percentage of 85% indicates a fairly high level of understanding among the respondents regarding this concept. The dominance of the "TRUE" choice by 85% of respondents also indicates that knowledge about neuroplasticity is quite common and widely accepted among survey participants. This may be due to increasing awareness of the importance of neuroplasticity in the context of mental health, recovery from brain injury, and the learning process.

**B 4**

The vast majority, namely 80% of 100 people, chose option A. This shows that understanding neurobehavioral concepts can help create more realistic and nuanced characters. Neurobehavioral concepts involve the study of how the brain and nervous system influence human behaviour. By understanding this, writers can create characters that show more authentic and complex reactions and emotions, consistent with the way the human brain works in real life.

Characters influenced by neurobehavioral understanding tend to have greater psychological depth. They can have rich backstories and complex motivations, which makes them feel more alive and more interesting to readers.

**B 5**

Dopamine is one of the main neurotransmitters in the central nervous system which plays an important role in regulating various brain functions. In the context of human behavior, dopamine influences activities such as attention, problem solving, and decision making. An active dopamine system can increase focus and the ability to plan and achieve goals. With this understanding, it is not surprising that the vast majority of respondents chose dopamine as the neurotransmitter associated with feelings of pleasure and reward.

**B 6**

Mirror neurons play a crucial role in storytelling, particularly in how characters interact and empathize with each other. These specialized neurons, discovered in the brains of primates and later identified in humans, fire both when an individual performs an action and when they observe someone else performing the same action. This mirroring mechanism is fundamental to understanding and sharing the emotions and intentions of others. In summary, mirror neurons play a significant role in character

interaction by enabling empathy, learning, social bonding, conflict resolution, and audience engagement. These interactions, influenced by the mirror neuron system, are fundamental to creating believable and emotionally compelling narratives.

**B 7**

The part of the brain responsible for decision making and problem solving is the prefrontal cortex. The prefrontal cortex is located at the front of the brain, precisely behind the forehead. This part of the brain plays an important role in executive function, which includes the ability to plan, make decisions, solve problems, control impulses, and regulate social behaviour.

Based on studies that have been conducted, the majority of respondents in the survey (87%) recognized the prefrontal cortex as the part of the brain responsible for decision making and problem solving. This indicates a fairly good general understanding of brain function and the importance of the prefrontal cortex in higher-order cognitive processes.

**B 8**

To explain this answer in detail, we need to understand the relationship between neural pathways and character development in a story. Neural pathways are complex networks in the brain that are responsible for processing and storing information, including emotional experiences and responses to the environment. When a person experiences something, their brain makes and strengthens connections between neurons, which influences how they respond and interact with the world around them. Thus, answer choice B highlights the importance of realistically depicting a character's emotional journey as an effective way for writers to utilize an understanding of neural pathways in developing character growth throughout the story.

**B 9**

Sensory gating is a process used by the brain to screen and filter irrelevant or redundant sensory information, so that only important and relevant information is noticed. This allows individuals to focus on stimuli that are considered significant and ignore unnecessary distractions. Sensory gating helps maintain concentration and efficiency in processing sensory information.

According to a survey of 100 people, 82% of respondents chose "Sensory gating" as the term for the brain's ability to filter out unnecessary information. This shows that the majority of respondents have a correct understanding of the function of sensory gating in information processing.

**B 10**

The human brain produces different types of electrical waves known as brain waves, which are classified based on their frequency. Theta waves are low frequency waves that appear when a person is in a state of deep relaxation. During deep meditation, theta waves can increase, indicating a very relaxed and open state of mind. This is a phase where a person may experience feelings of peace, increased creativity, or even spiritual experiences.

The answer to this question showed that 80% of 100 people chose theta waves as the brain waves most associated with deep relaxation and meditation. This means that the majority of respondents believe that theta waves are the most dominant in creating a state of deep relaxation and meditation compared to other brain waves. In other words, theta waves play a major role in processes involving calm and deep connection with oneself, making them very relevant in the practice of meditation and relaxation techniques.

Human Literacy for Character Development in Creative Communication refers to a deep understanding of humanity and character development that enables a person to communicate creatively and effectively. Focusing on character development means building positive traits such as integrity, responsibility, and respect. This is important in communication because strong character creates trust and credibility. Creative Communication refers to the ability to convey messages in an interesting and meaningful way. Creativity in communication allows conveying complex ideas in a way that is easy to understand and remember. Apart from that, understanding how to use modern communication technology wisely is also part of human literacy. Technology can expand the reach of communication and provide tools for creative expression.

This has been applied in the Creative and Innovative Communication (CIC) class at UNIMED, where students work on a project by creating a digital advertisement. Not only focusing on digital advertising project, but also on applying communication skills that reflect empathy, good relationships, and other positive communication characteristics in everyday life in the classroom during the teaching and learning process. By working on this project, students not only hone technical skills in creative communication, but also develop character based on human literacy. They learn to become communicators who are not only creative, but also empathetic, ethical, and responsible. By combining an understanding of

human literacy with character development, individuals can communicate in more creative and meaningful ways, creating a positive impact in various aspects of personal and professional life.

## 4. Conclusion

Based on first finding, students predominantly answered 'agree' that these factors (environmental factors, socio-economic factors, media and technology factors, academic factors, leadership factors and certified training programs) influence student character development. Based on second finding, students were able to answer correctly regarding neurobehavior literacy towards character development so that students' character significantly improved and was reflected in their creative communication. In this case, understanding neurobehavioral literacy increases human literacy which is reflected in students' creative communication, both verbal and nonverbal, with an increased level of emotional intelligence.

Environmental factors, socio-economic factors, media and technology factors, academic factors, leadership factors have a big impact on character development. Therefore, based on the neurobehavior approach, we need to have a variety of literacy that supports positive character and experiences in order to be able to regulate and respond to emotional intelligence effectively, behavioural conditioning using positive reinforcement which can help instil good habits and character. This research will continue regarding how our brains have an impact on increasing creative communication and developing Emotional intelligence with other innovative approaches.

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**Appendices**
Options for B 1
A.   Understanding how the brain

B. Understanding literary devices influences behavior related to neuroscience.

C.   Using behavior to interpret neuro-scientific data

D.   None of the above

Options for B 2
A.   Frontal lobe

B.   Occipital lobe

C   Amygdala

D.   Parietal lobe

Options for B 3
A.   True

B.   False

Options for B 4
A.   By creating more realistic and characters

B.   By ensuring all characters have nuanced similar traits.

C.   By simplifying character motivations

D.   By focusing exclusively on physical descriptions

Options for B 5
A.   Dopamine

B.   Serotonin

C.   Acetylcholine

D.   GABA

Options for B 6
A.   They regulate sleep patterns of Characters

B.   They influence how characters empathize with others..

C.   They control motor functions of Characters

D.   They help characters memorize information

Options for B 7
A.   Hippocampus

B.   Cerebellum

C.   Prefrontal cortex

D.   Medulla oblongata

Options for B 8
A.   By having the character make consistent decisions

B.   By portraying the character's emotional journey realistically

C   By limiting the character's interactions with other story elements

D.   By avoiding any scientific principles

Options for B 9
A.   Sensory gating

B.   Cognitive bias

C.   Attentional blink

D.   Neurofeedback

Options for B 10
A.   Gamma waves

B.   Beta waves

C.   Alpha waves

D.   Theta waves