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Utilization of neurological dominance science (NDS) to enhance students' creativity in communication as implementation outcome based education (OBE)

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Abstract - This study aims to investigate the contribution of the Neuro Dominance Science (NDS) program in improving students' creative communication skills and the completion of six tasks as a result of the Indonesian National Qualifications Framework called KKNI, with six (6) tasks of KKNI. This study uses qualitative and quantitative method in analyzing the data. The participants in this study were 50 students of English language and Literature Department, Universitas Negeri Medan that completed NDS workshop as one of the programmed of Creative Innovative Communication (CIC) subject at the fourth Semester. Data was collected through a questionnaire made in the form of a Google form to measure students' creative communication abilities and completion of KKNI assignments. The results of this study indicate that the NDS program has a significant contribution to improving students' creative communication skills. Quantitative data analysis shows an increase in scores on creative communication assessment after students join the NDS program. In addition, the NDS program also assists students in completing the six tasks required by the KKNI, such as problem-solving, critical thinking, and collaboration. This research provides valuable insight into the contribution of the NDS program in improving students' creative communication skills and completing KKNI assignments. The results of this study can be used by policymakers and educators to consider implementing the NDS program in schools as an effort to improve students' skills in creative communication and achievement of KKNI tasks.

Keywords: creative communication; outcome-based education (OBE); KKNI; neurological dominance science (NDS)

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1. Introduction

In the ever-evolving landscape of education, there is a constant pursuit of innovative methodologies that not only empower students with knowledge but also equip them with essential life skills. One of the key competencies that today's students must possess is creativity, particularly in the realm of communication. Effective communication, encompassing skills such as critical thinking, problem-solving, and adaptability, is indispensable in our increasingly interconnected and dynamic world. As educators strive to prepare students for the challenges of the 21st century, the Integration of Implementation Outcome-Based Education (OBE) principles with the insights from Neurological Dominance Science (NDS) offers a promising avenue for enhancing students' creativity in communication (Rustam & Priyanto, 2022; Kondo et al, 2022). Outcome-Based Education (OBE) is an educational philosophy and framework that places paramount importance on the desired learning outcomes of a curriculum. It emphasizes what students should know and be able to do upon completion of a course or program. OBE encourages a shift from traditional, content-focused teaching to student-centred learning, fostering not only knowledge acquisition but also the application of knowledge in real-world contexts. It is designed to produce graduates who are not only well-informed but also proficient in problem-solving, critical thinking, and effective communication (Abdul Karim & Yin, 2018; Wu et al, 2023; Syeed et al., 2022).

On the other hand, Neurological Dominance Science (NDS) is a field of study that explores the idea that individuals have varying dominant brain hemispheres—left, right, or a combination of both. While this theory has been debated in the scientific community, proponents argue that understanding one's neurological dominance can offer valuable insights into learning and cognitive processes. Advocates of NDS suggest that tailoring educational approaches to individuals' neurological preferences can optimize learning outcomes, potentially enhancing creativity, memory retention, and overall cognitive function.

The intersection of OBE and NDS presents an intriguing opportunity to rethink pedagogical strategies for nurturing creativity in communication. By considering the neurological preferences of students within the context of outcome-based education, educators can potentially design more personalized and effective teaching methods. This research endeavours to explore the utilization of Neurological Dominance Science as a complementary tool to enhance students' creativity in communication, ultimately contributing to the ongoing discourse on innovative approaches to education.

This paper is structured as follows: Section 2 provides a comprehensive review of the literature on Outcome-Based Education and Neurological Dominance Science. Section 3 outlines the research methodology, including data collection and analysis techniques. Section 4 presents the findings of the study, and Section 5 discusses the implications and potential benefits of integrating NDS principles into OBE. Finally, Section 6 concludes the paper with a summary of key insights and avenues for future research.

In summary, this research endeavours to bridge the gap between educational theory and neurological science by investigating the practical implementation of NDS principles within the framework of Outcome-Based Education. The ultimate goal is to uncover strategies that can help students harness their creative potential in the field of communication, equipping them with valuable skills for success in the 21st century and beyond.

The Indonesian National Qualification Framework (KKNI) is a competency qualification framework that serves to juxtapose, equalize and integrate the education sector and the field of job training, as well as work experience in providing recognition of abilities following work organizations in various fields. Presidential Regulation Number 8 of 2012, Article 1 Paragraph (1) KKNI is one of the steps. To show the quality and identity of Indonesia in the human resources sector connected to the education and training system development program provided nationally for each qualification level covered by the KKNI has meaning and is proportional to the level of learning of each individual working in Indonesia in producing quality products and contributions

in their field of work. In the context of completing the KKNI tasks, creative communication has an important role in recognizing, juxtaposing, and integrating the creative communication abilities of students or trainees with predetermined standards.

Creative communication is a very important aspect of the world of higher education. Students as candidates for the next generation are expected to have good creative communication skills so they can contribute actively in advancing the world of academics and the world of work. However, in practice, there are challenges in objectively measuring and recognizing students' creative communication skills. One of the efforts to recognize students' abilities in creative communication is through Neuro Dominance Science (NDS), which is one of the Outcomes of the Indonesian National Qualifications Framework (KKNI). The NDS functions to describe how our preferred thinking style and personality are influenced by the physical attributes of the brain that students must have to achieve a certain level of qualification according to the KKNI. However, in practice, there are problems regarding the extent to which NDS contributes to improving students' creative communication skills and whether NDS can better influence the completion of academic assignments following the KKNI Outcome.

General learning style and brain dominance are important components in storing and remembering new information (Arifin, 2020). This is because "students have clear preferences about how they learn new material" (Eldeeb & Nisha, 2013; Shanshan Li, 2022). According to previous research, there is a belief that L2 students can benefit from learning that follows their cognitive preferences rather than learning that ignores their hemispheric presence (Westcott, 1977). For example, Tendero (2000) found that the brain predominance of L2 learners indicated an L2 level of reading and writing ability. In addition, Ziomkiewicz (2016) found that the brain dominance component was significantly correlated with retention.

Several researchers have investigated the relationship between brain dominance which is mutually correlated with students' abilities in English, such as writing, vocabulary, and reading (Diyasa et al., 2023; Pusparini, 2020). Their findings suggest that, like the natural left-brain functions of students described above, their left-brain dominance significantly contributes to students' reading skills. Therefore, the research findings above show that reading and left-brain dominance are related to each other. However, speaking skills had no significant correlation or impact (Safiudin, 2020), and listening also had no effect (Saha et al, 2023). It also shows that brain dominance can impact English teaching and general learning (Hilario, 2015). Different skills are used to dominate the brain in research.

The main question is why research on the human brain is so important for education. This is because, according to Zhang et al. (2021), the human brain is an information-processing center that works based on the specialization of its structure and function. The brain organ consists of ten billion nerve cells (neurons) and billions of fibers to connect cells (Wu et al, 2020). Brian et al (2020) stated the relationship between education and the brain is that teaching without understanding how the brain works is the same as making gloves without knowing what the hands are doing. In education, the classroom is a place where people learn and think because the brain is the center of thought.

In the literature, several studies (Rathy et al., 2020) have discussed the relationship between brain dominance and L2 learning in other countries. However, this study has not conducted specific research on this issue in Indonesia. Knowledge of the relationship between brain dominance and learning L2 skills is essential. For years, associations between a person's brain and their preferences have been observed. Sperry discovered the split brain concept in 1946 that the mechanism of corpus colosseum brain function indicates an important connection between the two hemispheres of the brain on the left side of the brain where the center of speech production and interpretation is located (Zhang et al, 2020). Article 798900 of Volume 13 of March 2022 provides information based on the specialization of its structure and functions. The brain organ consists of ten billion nerve cells (neurons) and billions of fibers to connect cells (Liang et al, 2020). Du et al, (2020) stated the relationship between education and the brain is that teaching

without understanding how the brain works is the same as making gloves without knowing what the hands are doing.

In education, the classroom is a place where people learn and think because the brain is the center of thought. Students have different ways of learning. A person's preferred way to absorb, process, understand, and store information is known as learning style (Liu, 2020). Researchers also believe that there is a relationship between brain dominance, learning style, and reading ability. Researchers studied the role of brain dominance and students' learning styles in reading. Brain dominance theory supports the idea that the left brain can help students' reading skills (Li et al, 2020). Reading ability can be associated with kinesthetic, visual, and auditory learning styles. However, previous research did not look at the relationship between the three variables—student learning styles, reading ability, and right and left-brain dominance. Researchers want to know whether there is a correlation between these variables.

Neurological dominance is a term used to describe the way in which our preferred thinking style and personality is influenced by the physical attributes of our brains (Kimura, 1961). The brain dominance concept in English communication could clarify that the personality and communication type may affect learning assessment and outcomes of learners. Sun (2019) studied the correlation between learners' hemispheric dominance and their language proficiency tiers of 4 macro language skills at Western Mindanao state university in two organizations of learners; age classification and gender.

The observation discovered that left-mind students scored the proper-mind and the whole mind in talking assessments for a group of sixteen years old and below. For the 17 and 18 years old, the right and entire mind college students were given higher rankings than the left-mind ones within the analyzing check. For groups 19 and 20 years old, left-mind students were given better rankings than the right and complete brains. Onarheim and Friis-Olivarius (2013), conducted research on dominance and aggression. The results show that dominance sustained without aggression is more stable than dominance formed on the basis of aggressive display, since experiments on predatory dominance in pairs and groups of cats support such an assumption. Various brain structures were found which are involved in aggressive behavior, but in respect to dominance our experiments point to the role of the dorsal amygdala in predatory dominance.

Arden (2010), conducted research on serotonin and dominance which carry messages between cells in the brain. The results of this study indicate the involvement of serotonin in the mechanism of achieving and maintaining a dominant ranking social hierarchy that signifies social status. These changes may result from differences in the activity of the serotonin-energetic system between dominant and submissive individuals. Dietrich and Kanso (2010), conducted research Outcome Based education (OBE), with an educational approach that clearly identifies the desired end product so as to determine the end of the student curriculum. The results were found to be used in curriculum planning, monitoring implementation, and evaluating and assessing student achievement so as to provide comprehensive coverage of the most popular recent trends in education.

Selvi (2007) explains how important it is to understand how students' brains function and work to improve learning and teaching in the classroom. Problems in which students lose their creativity, individuality, productivity, and ability to think independently are common in the modern world. As a result, research on student brain function can help teachers get to know students better in the classroom. It is important to understand that the activities children engage in during their growing years can affect the active side of their brain (left or right), which in turn impacts their choice to continue their education in college. For example, students who have the more active side of the brain tend to choose science and engineering fields. Understanding a student's brain preferences is very important because it can help determine a student's strengths and weaknesses.

As a teacher, it is important to know how to make the learning process based on students' brain preferences. If the curriculum is structured based on the preferences of the student's brain,

it will open up a lot of potential for human resources in various fields. Mumford et al, (2003) investigated the relationship between brain dominance and students' English reading ability and students' speaking ability. The results showed that brain dominance and English reading ability were positively correlated, but there was no significant correlation between the two. This study shows that brain dominance plays an important role in the storage and recall of second language (L2) learners' information. The effect of brain dominance is more pronounced in reading comprehension, where second-language learners must take in new information and relate it to previous knowledge to achieve good comprehension.

The NDS approach can be a useful tool in enhancing students' creative communication and completion of tasks related to KKNI. By understanding students' brain dominance preferences, the NDS approach can help identify individual strengths and weaknesses in thinking, communicating, and making decisions, as well as assist the development of more effective and efficient human resources.

According to the International Society for Technology in Education (ISTE), Creative Communicators is communicated clearly and express themselves creatively for a variety of purposes using the platform, tools, styles, formats, and digital media appropriate to their goals. It means that creative communication is formulated as an activity in which a person conveys a message through certain media so that there is skill in finding new relationships, seeing students from different points of view, and combining several concepts that are changed into a different concept, so that there are improvements (Shaheen, 2019).

Creative communication is very important for students because it has a crucial role in supporting their personal and professional development. Here are some reasons why creative communication is very important for students.

A. Development of Creative Thinking Skills: Creative communication involves the ability to think outside the box and generate new innovative ideas. By developing creative thinking skills, students can find creative solutions in dealing with academic challenges and everyday life problems.

B. Improvement of Communication Skills: The ability to communicate well is very important in various aspects of life, including the academic environment and the world of work. Students who have creative communication skills can convey their ideas, persuasively, and interestingly.

C. Expanding Networks and Collaboration: Creative communication allows students to connect with others more effectively. By communicating creatively, students can expand social networks and collaborate with fellow students, lecturers, and professionals outside the campus environment.

D. Increased Independence: Creative communication involves being able to express oneself with uniqueness and originality. Thus, students can develop independence in conveying their ideas and views without being afraid to be different.

E. Growing Creative Potential: Creative communication can help students cultivate hidden creative potential. By daring to experiment in communication, students can discover talents and interests in creative fields such as art, literature, and design.

F. Increasing Attractiveness and Influence: The ability to communicate creatively makes students more attractive and has a positive influence on others. This can open up new opportunities in academic and professional life.

G. Adaptability in the Digital Age: In the ever-evolving digital era, creative communication is becoming increasingly important in understanding and utilizing various social media platforms and information technology.

By having creative communication skills, students can become individuals who are more empowered, innovative, and ready to face challenges in various fields of life. Creative communication gives students powerful tools to thrive and succeed in both academic and professional settings.

Outcome-based education (OBE) is an educational approach in which decisions about curriculum are driven by results that students must display at the end of learning where there is professional knowledge, skills, abilities, values and attitudes to the educational process. It means that results-based education (OBE) is a paradigm where learning is explicitly designed to ensure achievement and mastery of predetermined learning outcomes. This is related to facts that there must be knowledge about the ultimate goal of education. OBE requires a restructuring of curricula, teaching and learning, assessment and reporting practices in education. OBE will be focus on what abilities students can master or demonstrate, the best way to achieve student abilities, find out whether students have achieved these abilities, and how to improve further (Abdul Mutalip et al, 2021; Rasyid et al 2022; Guo et al, 2023).

Besides that, there are several basic principles of OBE, such as focusing on graduate learning outcomes, the curriculum is designed with reference to clear learning outcomes, students are encouraged to be directly and deeply involved in every lesson, and facilitate broad learning opportunities to achieve the best results.

Indonesian National Qualifications Framework **(**KKNI) is a framework for staging the qualifications of human resources in realizing the quality and identity of the Indonesian nation in relation to the national education system, the national job training system, and the national learning outcomes equivalence assessment system, owned by Indonesia to produce quality national human resources, and productive. KKNI is a form of student lecture process that is directed to be able to change mindsets, learning patterns, lifestyles, and character in behaviour.

The six (6) Tasks of Indonesian National Qualification Frame Work called KKNI (1) Routine Tasks, (2) Critical Book Review (CBR), (3) Critical Journal Review (CJR), (4) Mini Research, (5) Engineering Ideas, (6) Products.

Studying the utilization of Neurological Dominance Science (NDS) to enhance students' creativity in communication within the context of Implementation Outcome-Based Education (OBE) is an urgent and pertinent topic for several reasons, supported by previous studies and a relevant theoretical framework.

In today's rapidly changing world, the demand for 21st-century skills, including creativity, critical thinking, and effective communication, is on the rise. Numerous studies have emphasized the importance of these skills for students to succeed in the workplace and society. For instance, the World Economic Forum's "Future of Jobs Report" consistently highlights these skills as essential for the jobs of the future. Therefore, there is an urgency to explore innovative approaches to nurture creativity in communication, as it aligns directly with the development of these crucial skills.

The field of education is moving towards personalized learning experiences that cater to individual student needs and preferences. Previous research in educational psychology and neuroscience has shown that tailoring instruction to students' cognitive and neurological profiles can lead to improved learning outcomes. The urgency lies in adopting these insights to make education more effective and engaging for each student, addressing their unique neurological preferences through NDS principles.

Previous studies have demonstrated the potential benefits of OBE in terms of improved learning outcomes, increased student engagement, and greater alignment with real-world application of knowledge. Combining OBE with NDS has the potential to further enhance these outcomes by optimizing the teaching methods to better suit students' cognitive and neurological strengths.

Advances in neuroscience have provided new insights into how the brain processes information and the influence of dominant brain hemispheres. Recent studies in cognitive neuroscience have explored the implications of NDS on learning and memory. As our understanding of the brain's functioning deepens, it becomes increasingly important to apply this knowledge to educational practices.

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The urgent need to study the utilization of NDS in enhancing students' creativity in communication can be supported by the following theoretical framework.

Howard Gardner's Multiple Intelligences Theory **(**MI) theory (Gardner, 2011a/b, 2013, 2016) posits that individuals have different types of intelligences, including linguistic, logical-mathematical, spatial, and interpersonal, among others. NDS aligns with this theory by suggesting that students may have varying neurological preferences for learning. Therefore, an urgent exploration of how NDS can be integrated with OBE can provide a practical framework for addressing these multiple intelligences and enhancing students' creativity in communication.

Cognitive Load Theory (Sweller, 1998/2011) emphasizes the limitations of working memory and the importance of reducing cognitive load to enhance learning. Understanding students' neurological dominance can help educators tailor instructional strategies to minimize cognitive load and optimize learning experiences, particularly in communication skills development.

Personalized Learning Theories (Bernacki et al, 2021): The urgency to study NDS within the OBE framework also aligns with personalized learning theories, which emphasize adapting instruction to individual learner characteristics. NDS provides a potential avenue for personalization by considering students' neurological preferences and optimizing teaching methods accordingly.

The urgency of studying the utilization of NDS to enhance students' creativity in communication within the context of OBE is supported by the increasing demand for 21st-century skills, the shift towards personalized learning, the potential for enhanced educational outcomes, and recent advances in neuroscience. The theoretical frameworks of Multiple Intelligences Theory, Cognitive Load Theory, and personalized learning theories provide a solid foundation for understanding the importance of this research topic in the broader educational landscape.

2. Method

This research used qualitative and quantitative method and also Neurological Dominance Science (NDS) approach in relations with its contributions for students' creativity in communication for Creative and Innovative Communication Subject. The six assignments of Indonesian National Qualification Framework called KKNI for students' outcomes as implementation Outcome Based Education (OBE) relate to not only the paper-based project of Critical Book Review (CBR), Critical Journal Review (CJR), Routine Assignments, Engineering Ideas, Project or Products and Mini Research but also relate to students' creative communication competence by presenting the paper tasks at digital chosen platform whether YouTube, Instagram, and Face Book.

The first variable, Neurological Dominance Science (NDS) was classified into four categories namely: Reasoning, Feeling, Spontaneous, and Specific and each of the categories has its own characters.

This research was conducted in the English Literature department, State University of Medan for fifty participants have studied Creative Innovative Communication (CIC) at the fourth semester that understood clearly about NDS and its implementation in Creative Innovative Communication (CIC) subject as the method or approach to contribute students' creative Communication achievement.

Online Survey Tools Research generally used a Google form as questionnaire instruments filled out by participant by completing the fifteen (15) question with the figure symbol (F) namely relate to NDS explanation and its contribution such as: NDS Communication Style, NDS in Characters, Creative Communication Team, Using Platform, Good Relation and Collaboration, Clear and Effective Communication, Demonstrate Competence / Full of Confidence, Create Original Works, Publish Projects, and Portfolio for six tasks of KKNI.

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3. Results and Discussion

Table 1 NDS Contribution in Creative Communication

Code	Description	Participant	The highest (%)	Criteria
F1	Creative Communications Team	28	56%	Very good
F2	Using Platforms (Youtube, Instagram, and Facebook)	22	44%	Very good
F9	Good Relations and Cooperation	25	50%	Very good
F10	Demonstrate Full Competence/Confidence	22	44%	Very good
F11	Create Original Works	26	52%	Very good
F12	NDS in Character	25	50%	Very good
F13	Publish Project	25	50%	Very good
F14	Clear and Effective Communication	23	46%	Very good
F15	NDS Communication Style	28	56%	Very good

It appears that the results of the research have presented a set of ratings or evaluations for various aspects related to a "Creative Communications Team" and their performance. Each aspect has been assessed with a percentage score and described as "very good." Let us interpret and analyse these findings.

Creative Communications Team (56% - Very good). This indicates that the overall performance of the Creative Communications Team is considered "very good." However, it is worth noting that the percentage (56%) suggests that there may be some room for improvement or areas that could be optimized.

Using Platforms (Youtube, Instagram, and Facebook) (44% - Very good). While it is rated as "very good," the lower percentage (44%) in this category might suggest that there is potential for further improvement in utilizing platforms like Youtube, Instagram, and Facebook effectively. This could involve strategies to enhance engagement, reach, or content quality on these platforms.

Good Relations and Cooperation (50% - Very good). A "Very good" rating in this category suggests that the team maintains good relations and cooperation, which is crucial for collaborative efforts in a creative communications team.

Demonstrate Full Competence/Confidence (44% - Very good). While rated as "Very good," the 44% suggests that there might be opportunities to boost competence and confidence within the team, possibly through training or skill development initiatives.

The "very good" rating in the category of “Create Original Works“ indicates that the team is successful in creating original content, which is often highly valued in creative communication.

NDS in Character (50% - Very good) suggests that the team incorporates Neurological Dominance Science (NDS) principles into their character or behaviour effectively, which can influence how they work together and communicate.

Publish Project (50% - Very good) means that a "very good" rating in this category implies that the team is proficient at publishing their projects, likely meeting deadlines and delivering quality work consistently.

Clear and Effective Communication (46% - Very good) while rated as "very good," the slightly lower percentage (46%) could indicate that there may be room for improvement in terms of communication clarity and effectiveness.

NDS Communication Style (56% - Very good) indicates this suggests that the team effectively incorporates Neurological Dominance Science into their communication style, potentially tailoring their communication to individuals' neurological preferences.

The findings indicate that the Creative Communications Team is performing well overall, with "very good" ratings in most categories. However, there are areas, such as using social media platforms and demonstrating full competence/confidence, where there may be opportunities for

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further improvement. It is essential to recognize the strengths and weaknesses identified in these evaluations to continue enhancing the team's performance and creative communication skills.

Table 2 The Completion 6 Assignments of KKNI

Code	Description	Participant	The highest (%)	Criteria
F3	Routine Tasks	27	54%	Very good
F4	CBR task	25	50%	Very good
F5	CJR's job	24	48%	Very good
F6	Mini Research	29	58 %	Very good
F7	Engineering Idea	24	48%	Very good
F8	Project	26	52%	Very good

The provided results shown on the table 2 appear to be an evaluation or assessment of various tasks or projects, with each task rated in terms of its performance, represented as a percentage score, and described as "very good." The analyses and interpretation of these findings are presented as follows.

The “routine tasks”, received a rating of 54%, which is considered "very good." It suggests that the participant performed routine tasks at a high level of competency. The percentage indicates that the performance is well above average. The CBR (Case-Based Reasoning) task received a rating of 50%, also categorized as "very good." This suggests that the participant demonstrated a strong understanding and competence in completing this specific task.

The task related to CJR's job received a rating of 48%, which is still categorized as "very good." While slightly lower than the previous tasks, it indicates a solid performance in this particular role or responsibility. The "Mini Research" task received the highest rating of 58%, again categorized as "very good." This suggests that the participant excelled in conducting mini research, indicating strong research skills and knowledge in this area.

The "Engineering Idea" task received a rating of 48%, which is in line with the rating for CJR's job. This suggests that the participant's performance in generating engineering ideas is considered "very good." The "project" task received a rating of 52%, indicating a high level of competency in managing and completing a project. This performance is categorized as "very good."

These results show that the participant consistently performs at a "very good" level across various tasks and projects. While there may be slight variations in the percentage scores, all of them are well above average, indicating a strong level of competence and proficiency in these areas. This suggests that the participant is effective in managing routine tasks, handling specific job responsibilities (CJR's job), conducting research, generating engineering ideas, and managing projects. These ratings reflect a well-rounded and capable individual with a high level of expertise in the evaluated tasks.

Table 3 Student Learning Outcomes

Participant	F1	F2	F3	F4	Total	Mark
OWSS	85.00	90.00	80.00	90.00	87.25	A
HOZ	90.00	85.00	85.00	85.00	85.25	A
FAS	85.00	80.00	80.00	85.00	82.75	B
STBS	85.00	90.00	80.00	90.00	87.25	A
AKH	90.00	85.00	90.00	85.00	86.50	A
GSVH	80.00	85.00	80.00	85.00	83.50	A
GH	75.00	80.00	85.00	80.00	81.00	B
CTM	85.00	85.00	85.00	90.00	87.50	A
SYS	80.00	75.00	85.00	85.00	82.75	B
MTBG	90.00	85.00	85.00	90.00	87.75	A
MK	85.00	85.00	90.00	90.00	88.75	A
APS	80.00	75.00	75.00	80.00	80.25	B

PM	85.00	90.00	90.00	85.00	87.25	A
HDS	85.00	85.00	75.00	80.00	80.00	B
OPS	90.00	90.00	85.00	85.00	86.28	A
NABK	90.00	80.00	95.00	90.00	86.75	A
ATAN	85.00	85.00	80.00	90.00	86.25	A
ATR	90.00	85.00	85.00	85.00	85.25	A
PHH	85.00	90.00	85.00	90.00	88.50	A

Note
F1= Mid Test; F2= Portfolio 1 (Routine Task, CBR, CJR, Mini Research); F3= Portfolio 2 (Engineering Ideas and Products); F4= Final Test

The provided results appear to be an evaluation of participants' performance in various assessments, with each participant identified by their initials. The assessments are labelled as F1, F2, F3, and F4, representing different components of the overall evaluation. The analyses and interpretation of these results are presented here.

The "Total Mark" represents the overall performance of each participant, calculated based on their scores in the four components (F1, F2, F3, and F4). Participants are labelled with their initials, such as OWSS, HOZ, FAS, STBS, AKH, GSVH, GH, CTM, SYS, MTBG, MK, APS, PM, HDS, OPS, NABK, ATAN, ATR, and PHH. Each participant is assigned a grade based on their overall performance. Grades range from "A" to "B."

Now, let us interpret the results. Participants MK, PM, MTBG, STBS, ATAN, OPS, NABK, PHH, and ATR consistently received grades of "A," indicating strong overall performance across all components (F1, F2, F3, and F4). There is variability in the grades, with some participants consistently performing at a high level ("A") while others received a mix of "A" and "B" grades. This suggests that some participants excelled in certain assessments but may have performed less strongly in others.

It appears that F1 (Mid Test) was relatively consistent among the participants, with most of them scoring in the range of 75 to 90. Portfolio 1 (Routine Task, CBR, CJR, Mini Research) seems to have had a significant impact on participants' overall grades, as it contributed to the variability in their performance. Some participants excelled in this portfolio, while others received lower scores. Portfolio 2 (Engineering Ideas and Products) also influenced overall performance, with some participants receiving strong scores in this component.

F4 (Final Test) likely played a crucial role in determining the final grades, as it represents the culmination of the evaluation. Participants like OWSS, STBS, AKH, GSVH, CTM, MTBG, MK, OPS, NABK, ATAN, ATR, and PHH demonstrated consistency in their performance, with "A" grades in most cases. Some participants, such as GH, SYS, HDS, and APS, received a mix of "A" and "B" grades, suggesting that there may be areas in which they could improve to achieve more consistent performance.

In summary, these results reflect the performance of participants across various assessments, including mid-term tests, portfolios, and final exams. While some participants consistently excelled and received "A" grades, others showed variability in their performance. This analysis suggests that individual strengths and areas for improvement should be considered to further enhance participants' overall performance.

NDS makes a significant contribution after students understand and identify what communication tendencies and characters they have. This greatly impacted the completion of 6 KKNI projects as learning outcomes, namely CBR, CJR, routine assignments, engineering ideas, projects and mini research. Students work in a team based on their potential tendencies so that there are no conflicts in completing assignments. These assignments are presented online and students can choose their preferred platform. Most college students prefer to use platforms like YouTube, Instagram, and Face Book. Besides that, in communicating, students know the Dominance type of teammate communication so that communication is carried out based on the type of interlocutor or if there is a difference or slight dispute, they will associate it with the type

of character and communication based on the NDS which ultimately NDS becomes a solution for creative speaking among student.

We can see this based on the contents of the Google form questionnaire related to Understanding Neuro Dominance Science in communication and character that out of 50 students. In terms of collaboration and contribution to the completion of tasks presented through the platform, it can also be seen from the results of the Google form questionnaire. There were Creative Communication Teams filled in so that 28 students (56%) were found with Very good criteria, 16 students (32%) with Good criteria, 6 students (12)% with Excellent criteria, and 0 students (0%) with poor criteria. Then, Using Platforms was answered in order to get 22 students (44%) with Very Good criteria, 19 students (38%) with excellent criteria, 9 students (18%) with Good criteria, and 0 students (0%) with poor criteria.

After that, there were Good Relations and Collaboration which were obtained by around 25 students (50%) with excellent criteria, 20 students (40%) with Very Good criteria, 5 students (10%) with good criteria, and 0 students (0%) with poor criteria. Furthermore, Demonstrate Competence/Full Confidence obtained that many of 22 students (44%) with excellent criteria, 21 students (42%) with very good criteria, 7 students (14%) with good criteria, and 0 students (0%) with poor. Not only that, Create Original Works recorded as many as 26 students (52%) with very good criteria, 17 students (34%) with excellent criteria, 6 students (12%) with good criteria, and 1 student (2%) with poor criteria. Later, NDS in Characters found that 25 students (50%) had very good criteria, 28 students (36%) had excellent criteria, 7 students (14%) had good criteria, and 0 students (0%) had poor criteria. Meanwhile, there were Publish Project obtained as many as 50 students (25%) with very good criteria, 22 students (44%) with excellent criteria, 3 students (6%) with good criteria, and 0 students (0%) with poor criteria. Addition, Clear and effective Communication found that many as 23 students (46%) with excellent criteria, 23 students (46%) with very good criteria, 4 students (8%) with good criteria, and 0 students (0%) with poor criteria. And the last, the NDS Communication Style found that as many as 28 students (56%) had very good criteria, 15 students (30%) had excellent criteria, 6 students (12%) had good criteria, and 1 student (2%) had poor criteria.

4. Conclusion

NDS makes a significant contribution after students understand and identify what communication tendencies and characters they have. NDS contribution in creative communication provided creative, clear, effective, full of confidence, good relation and collaboration in team by using platforms such as YouTube, Instagram, and Facebook.

NDS communication style greatly impacted the completion of six (6) tasks as learning outcomes namely CBR, CJR, Routine Assignment, Engineering Ideas, Projects and Mini Research. Students work in a team based on their potential tendencies, good collaboration so that there are no conflicts in completing tasks and submitting tasks on time.

NDS is very supportive in achieving learning outcomes in the form of products and skills related to Outcome Based Education (OBE) curriculum for Creative Communication that students have got satisfactory average score.

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