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The Effect of Dopamine Stimulation Activities on English Language Learners: An Empirical Research

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ABSTRACT: This study explores the perceptions of dopamine-stimulating activities among students and the challenges faced by teachers in implementing these activities in language education at Dai Nam University. A mixed-methods approach was employed, involving surveys and semi-structured interviews with 220 non-English major students and language teachers. The surveys assessed students' perceptions of various dopamine-stimulating activities, including gamified vocabulary acquisition courses, interactive language games, reward-based speaking activities, physical activity breaks, and project-based learning with rewards. Results indicate varying perceptions across academic years, with first-year students expressing the highest perceptions of effectiveness, followed by a decreasing trend in perceptions among higher-year students. Teachers reported challenges such as balancing novelty with meeting specific learning objectives, resource constraints, and classroom management difficulties.

Qualitative data from semi-structured interviews with language teachers provided additional insights into the challenges and strategies encountered in implementing dopamine-stimulating activities. Themes emerged around the excitement and perceived effectiveness of these activities, specific activities utilized by teachers (such as interactive games, multimedia presentations, and real-world simulations), challenges faced, positive outcomes observed (including enhanced student engagement, participation, and language proficiency), and the need for flexibility and creativity in overcoming challenges.

The study highlights the importance of considering students' perceptions and challenges faced by teachers in optimizing the effectiveness of dopamine-stimulating activities in language education. Tailored approaches to address varying perceptions and challenges are necessary to ensure meaningful engagement and promote effective language learning experiences. The findings contribute to the ongoing discourse on innovative pedagogical approaches in language education and offer practical implications for educators seeking to enhance student engagement and learning outcomes.

KEY WORDS: dopamine stimulation activities, classroom practices, challenges, implementation of activities

I. INTRODUCTION

1.1. Background to the study

Dopamine plays pivotal roles in fostering motivation for language learning through its involvement in reward processing, reinforcement learning, and goal-directed behavior. As a key neurotransmitter in the brain's reward system, dopamine signals the anticipation and experience of rewards associated with language learning tasks and achievements (Schultz, 2002; Dreher & Tremblay, 2013). This reward anticipation and feedback loop reinforces motivated behavior, encouraging learners to actively engage in language learning activities. Moreover, dopamine facilitates reinforcement learning by strengthening neural connections associated with successful language learning outcomes, such as understanding new concepts or effectively communicating in the target language (Wittmann et al., 2008). By modulating motivation and persistence, dopamine promotes the pursuit of language proficiency goals and facilitates focused effort towards achieving them (Berridge et al., 2009; Zelazo & Cunningham, 2007). Overall, dopamine serves as a key neurochemical mechanism underlying the motivation to learn languages, driving learners to pursue their language learning objectives with enthusiasm and determination.

Incorporating dopamine enhancing activities into language teaching offers significant benefits and insights into optimizing learning outcomes. In the first place, neurobiological research on dopamine sheds light on the underlying neural mechanisms involved in language learning processes, such as perception, memory, and cognition (Ullman, 2001). By understanding how the brain processes and stores linguistic information, educators can tailor instructional approaches to align with these natural learning processes, enhancing comprehension and retention (Pulvermüller, 2002). In the second place, dopamine enhancement studies have identified positive correlates of individual differences in language learning aptitude, motivation, and resilience (Makuuchi et al., 2009). Furthermore, insights from neuroscience can inform strategies for enhancing learner motivation and engagement in language learning activities. Dopaminergic pathways, for example, play a crucial role in reward processing and motivation (Schultz, 2002).

Educators can leverage this knowledge to design tasks and provide feedback that activates the brain's reward circuitry, promoting intrinsic motivation and sustained engagement (Kidd & Hayden, 2015). Besides, neurobiological research provides evidence-based principles for designing and implementing effective instructional methods. Brain-compatible teaching practices, such as multisensory instruction and active learning, align with the brain's natural learning processes and promote deeper comprehension and retention of linguistic material (Jensen, 2008). By incorporating these principles into language teaching, educators can enhance instructional effectiveness and learning outcomes. It is also believed that neurobiological insights can help identify and address the underlying neural factors contributing to learning challenges, such as language processing difficulties or attention deficits (Friederici & Singer, 2015). Understanding the neural basis of these challenges allows educators to implement targeted interventions and accommodations to support learners with diverse learning needs, fostering greater inclusivity and equity in language education (Hasson et al., 2018). The integration of research into language teaching can inform the development of evidence-based educational policies and practices at institutional and systemic levels. By advocating for the implementation of neuroscience-informed strategies in curriculum design, assessment practices, and teacher training programs, educators can promote more effective and equitable language instruction (Howard-Jones, 2014).

1.2. Research problem

This study aims to address the gap in understanding strategies to enhance dopamine levels among English students and their subsequent impact on language learning outcomes. While existing literature extensively explores the importance of motivation and engagement in language learning, there remains a notable dearth of research specifically investigating interventions aimed at modulating dopamine levels in the context of English language education. Drawing upon neurobiological theories of motivation and reward processing (Schultz, 2002), this study seeks to fill this gap by examining the feasibility and effectiveness of dopamine-enhancing strategies for English language learners. By elucidating the neurobiological underpinnings of motivation in language learning and exploring practical interventions to enhance dopamine levels, this research holds the potential to inform pedagogical practices and educational policies aimed at promoting more effective language instruction and fostering greater student engagement and success.

1.3. Purposes of the study

The first purpose of the research is to examine what activities in a language classroom that emit dopamine or make students excited and engaged. Dopamine, known for its role in motivation and reward processing (Berridge, 2007), influences individuals' engagement and willingness to pursue language learning tasks (Murayama et al., 2010). Activities that stimulate dopamine release, such as interactive language games (Salimpoor et al., 2015), contribute to increased motivation and enjoyment in language learning. By addressing motivational challenges and tailoring instruction to individual differences (Dörnyei & Ushioda, 2013), educators can create a more engaging and personalized learning environment. Moreover, dopamine-enhancing activities can enhance retention of language skills (Shohamy & Adcock, 2010) and promote learners' overall well-being and positive learning experience (Fredrickson, 2001). Understanding the effects of dopamine enhancement activities can inform instructional practices and contribute to the design of effective language learning interventions that support learners' motivation, engagement, and achievement. The second purpose of the study is to explore and understand the potential challenges and barriers faced by teachers in the implementation of dopamine stimulation activities within educational settings. By identifying and analyzing these challenges, this research aims to provide insights that can inform the development of strategies and interventions to support teachers in effectively integrating dopamine stimulation techniques into their teaching practices, ultimately enhancing student engagement, motivation, and learning outcomes

1.4. Research questions

1.5.1. What classroom activities are perceived as the most dopamine stimulated among students of varied learning experiences?

1.5.2. What are the potential challenges and barriers encountered by teachers in implementing dopamine stimulation activities?

1.5. Significance of the study

The study signifies our understanding of the complex interplay between dopamine modulation, motivation, and English language learning outcomes. By investigating the neurobiological mechanisms underlying motivation in language learning and examining the effects of dopamine-enhancing interventions, the study aims to contribute valuable insights to both theory and practice.

Firstly, the practical implications of this study are significant for language educators, curriculum developers, and policymakers. By identifying effective strategies for enhancing motivation and attention among English language learners through dopamine modulation, the study can inform the design of evidence-based interventions and instructional practices aimed at optimizing language learning experiences. These interventions may include incorporating gamification elements, providing targeted feedback, or creating supportive classroom environments that promote dopamine release and sustain learners' motivation over time.

Secondly, the study lies in its potential to address an emerging need in education understanding the challenges and barriers teachers encounter when implementing dopamine stimulation activities. By shedding light on these obstacles, the study can offer valuable insights into the complexities of integrating such activities into teaching practices. Understanding these challenges is crucial for the development of targeted interventions and support mechanisms to help teachers effectively leverage dopamine stimulation techniques to enhance student engagement and learning outcomes.

Additionally, this research can contribute to the broader conversation on innovative teaching strategies and the intersection of neuroscience and education, paving the way for more evidence-based approaches to teaching and learning. Ultimately, the study's findings have the potential to positively impact educational practices and contribute to the ongoing efforts to improve teaching effectiveness and student learning experiences.

II. LITERATURE REVIEW

1.6. Dopamine stimulation and motivation

Motivation stands as a cornerstone in the process of language acquisition, exerting a profound influence on learners' engagement, persistence, and ultimate success in mastering a new language. Rooted in both intrinsic and extrinsic factors, motivation drives learners to actively engage with language learning materials, seek out opportunities for practice, and persist in the face of challenges. Studies have consistently shown that motivated learners achieve higher levels of language proficiency and exhibit greater gains in linguistic competence over time compared to their less motivated counterparts. Furthermore, motivation is closely intertwined with learners' affective states, including interest, enthusiasm, anxiety, and self-efficacy beliefs, all of which shape their learning experiences and outcomes. Motivated learners are more likely to adopt autonomous learning strategies, taking ownership of their learning process and sustaining long-term engagement with language learning endeavours. Ultimately, motivation plays a pivotal role in determining the rate and success of language acquisition, influencing learners' attention to input, depth of processing, and willingness to engage in language production (Deci & Ryan, 1985; Dörnyei, 2001; Gardner, 1985; Ryan & Deci, 2000; Schmidt & Bannert, 2010).

The intricate relationship between dopamine and motivation is a cornerstone of contemporary neuroscience and psychology research. Dopamine, a neurotransmitter renowned for its pivotal role in the brain's reward circuitry, exerts profound influences on motivational processes by encoding the significance of rewarding stimuli (Berridge & Robinson, 1998). Its release in response to pleasurable experiences orchestrates responses to rewarding stimuli, with projections to key brain regions like the nucleus accumbens modulating reward-related behaviors (Schultz, 2016). Moreover, dopamine's involvement in motivating goal-directed behavior is underscored by its influence on decision-making and executive functions, facilitated by dopaminergic projections from the midbrain to the prefrontal cortex (Bromberg-Martin et al., 2010). The intricate interplay between dopamine function and motivational traits is evident in the diversity of individual responses to rewarding stimuli, shaped by genetic, environmental, and developmental factors (Yacubian et al., 2007). However, disruptions in dopamine signalling can lead to motivational disorders such as depression, addiction, and schizophrenia, highlighting the critical role of dopamine in sustaining healthy motivational processes (Wise, 2004). Understanding the nuances of dopamine's involvement in motivation not only sheds light on fundamental aspects of human behavior but also holds promise for addressing and treating motivational dysfunctions across various contexts.

1.7. Interventions to stimulate dopamine emission

Emission of dopamine in the context of motivation for language learning involves implementing various interventions tailored to stimulate dopamine release and sustain learner engagement. Goal setting and achievement serve as foundational strategies, where learners set clear language learning objectives and celebrate progress, triggering dopamine release through a sense of accomplishment (Schultz, 2002). Additionally, reward-based systems, such as earning points or badges for completing tasks, provide extrinsic motivators that activate dopamine pathways and encourage continued participation (Deterding et al., 2011). Social interaction and collaboration further enhance motivation by fostering positive social connections, which stimulate dopamine release and promote a sense of belongingness (Trezza et al., 2011). Gamification techniques, including interactive language games, quizzes, and challenges, capitalize on the intrinsic enjoyment of gameplay to stimulate dopamine release and sustain learner motivation (Deterding et al., 2011; Gee, 2007). Moreover, providing learners with positive feedback and encouragement reinforces their motivation by acknowledging their progress and achievements, thereby activating dopamine pathways associated with reward and reinforcement (Hattie & Timperley, 2007; Pink, 2009). By integrating these interventions into language learning environments, educators can effectively enhance dopamine levels and cultivate a motivated and engaged community of language learners, facilitating more effective language acquisition and proficiency development.

1.8. Dopamine stimulation activities during language teaching

Dopamine enhancement activities in language teaching primarily focus on creating engaging and rewarding learning experiences to stimulate dopamine release in the brain, thereby promoting motivation, attention, and retention of language knowledge. Those activities include;

1.8.1. Gamified vocabulary acquisition

In the realm of language learning, gamified vocabulary acquisition represents a promising approach that leverages principles of motivation and engagement to enhance learners' vocabulary acquisition experiences. Grounded in motivational theories such as self-determination theory (Deci & Ryan, 1985), gamification elements such as rewards, challenges, and feedback align with learners' intrinsic motivation to achieve mastery and progress in vocabulary acquisition tasks. Through the incorporation of game mechanics like points, levels, and leader-boards, gamified vocabulary acquisition captures learners' attention and sustains their interest,

fostering active engagement and immersion in language learning activities (Deterding et al., 2011). By providing immediate feedback on performance and progress tracking features, gamified approaches promote self-regulated learning and enhance learners' sense of competence and autonomy (Locke & Latham, 1990). Empirical studies have demonstrated the positive impact of gamification on vocabulary retention, recall, and usage, underscoring its effectiveness in improving language learning outcomes (Hamari et al., 2014). As educators explore the implementation of gamified vocabulary acquisition activities, considerations such as game design, learner preferences, and instructional integration emerge as crucial factors in maximizing the benefits of gamification for language learning instruction. Through thoughtful design and implementation, gamified vocabulary acquisition holds promise as a motivational and effective strategy for promoting language proficiency among learners.

1.8.2. Interactive language games

Interactive language games serve as effective dopamine enhancement activities by leveraging intrinsic motivation, reward systems, immediate feedback, collaborative learning, and real-world application. Grounded in self-determination theory (Deci & Ryan, 1985), these games captivate learners' attention and sustain their engagement through elements of challenge, competition, and exploration. Gamification features such as points, badges, and virtual rewards incentivize learners to achieve goals and overcome challenges (Deterding et al., 2011), stimulating dopamine release and reinforcing motivation. Timely feedback on performance guides learners' behavior and facilitates skill acquisition (Hattie & Timperley, 2007), while collaborative activities foster social connection and collective achievement (Ryan & Deci, 2000). Moreover, interactive games provide authentic language practice and promote transferability of skills to real-world communication settings (Gee, 2007), enhancing learners' communicative competence and confidence in language use. By integrating these dopamine-enhancing activities into language learning instruction, educators can create engaging and effective learning experiences that promote motivation, engagement, and language proficiency among learners.

1.8.3. Reward-based speaking practice

Reward-based speaking practice offers a motivational approach to enhancing English language learners' oral communication skills by providing immediate feedback and incentives for active participation. Drawing from motivational theories such as Dörnyei's (2001) concept of motivation enhancement, this approach incentivizes learners to engage in speaking activities with enthusiasm and persistence. Effective feedback mechanisms, as discussed by Richards and Rodgers (2014), play a crucial role in reinforcing desired speaking behaviors and guiding learners' language development. Personalized rewards tailored to individual learners' needs and preferences, as emphasized by Brown (2001), further enhance motivation and foster a sense of ownership over the learning process. Leveraging technology, such as language learning apps and video conferencing tools, as highlighted by Gikas and Grant (2013), provides opportunities for learners to engage in speaking activities, receive immediate feedback, and earn rewards in real-time. By integrating reward-based speaking practice into classroom activities and curriculum design, educators can create meaningful opportunities for authentic communication and social interaction, ultimately promoting learners' speaking proficiency and long-term motivation (Nation & Newton, 2009).

1.8.4. Physical activity breaks

Incorporate short, physical activity breaks into language learning sessions to promote dopamine release and enhance cognitive function. Lead energizing activities such as stretching exercises, dance breaks, or mindful breathing exercises to refresh students' focus and motivation. Physical movement can help reduce stress, increase alertness, and boost mood, creating an optimal learning environment for English language learners. Physical activity breaks offer a valuable strategy for enhancing motivation and engagement in language learning by incorporating movement and exercise into learning sessions. Research indicates that brief bouts of physical activity can positively affect cognitive function, including attention, memory, and learning (Tomporowski et al., 2008), while also reducing stress levels and improving mood (Craft & Perna, 2004). Engaging in physical activity increases energy levels and alertness, revitalizing learners' enthusiasm for language learning tasks (Hillman et al., 2008), and supporting neural processes underlying language acquisition through enhanced neuroplasticity (Ratey, 2008). Furthermore, physical activity breaks promote social interaction and team building among learners, fostering a sense of camaraderie and motivation to engage in language learning (Warburton et al., 2006). By integrating physical activity breaks into the language learning classroom, educators can create a positive and dynamic learning environment that promotes motivation, engagement, and cognitive function among learners.

1.8.5. Project-based learning with rewards

Implement project-based learning (PBL) tasks where students work collaboratively to create meaningful, real-world projects related to English language and culture. Projects with rewards bolster motivation and engagement among language learners. Rooted in the concepts of intrinsic motivation and autonomy (Deci & Ryan, 1985), this approach empowers learners to take ownership of their learning journey while providing tangible incentives for project completion and achievement. By setting clear goals and objectives tied to rewards (Locke & Latham, 1990), PBL with rewards motivates learners to invest effort and maintain engagement throughout the learning process. Moreover, ongoing feedback and reflection fostered by rewards prompt learners to evaluate their progress, identify areas for improvement, and set new goals for future projects (Hattie & Timperley, 2007). Collaborative projects further enhance teamwork and communication skills (Johnson & Johnson, 1994), while real-world applications of language skills deepen learners' proficiency and competence (Thomas, 2000). Finally, celebrations and recognition ceremonies acknowledge learners'

efforts and successes, reinforcing positive learning experiences and sustaining motivation (Pink, 2009). By embracing PBL with rewards, educators can create dynamic and rewarding learning environments that inspire learners to achieve their language learning goals with enthusiasm and dedication.

1.8.6. Positive feedback and encouragement

Positive feedback and encouragement are integral components of effective language learning, playing pivotal roles in fostering motivation, confidence, and a growth mindset among learners. Recognizing and praising learners' efforts and achievements reinforces their intrinsic motivation to continue learning and striving for success (Deci & Ryan, 1985; Hattie & Timperley, 2007). Moreover, positive feedback and encouragement build learners' confidence in their language abilities by providing support and validation for their progress (Bandura, 1997). By creating a supportive environment where learners feel valued and encouraged to take risks in using the target language, educators facilitate language acquisition and proficiency development (Ellis, 2008). Furthermore, positive feedback and encouragement guide learners in developing effective learning strategies by reinforcing desired behaviors and promoting self-regulation (Zimmerman & Schunk, 2001). Cultivating a growth mindset, where learners perceive language learning as a continuous journey of improvement, resilience, and willingness to embrace challenges (Dweck, 2006), is facilitated through the positive framing of feedback and encouragement. Ultimately, by establishing a supportive learning community where positivity and encouragement are pervasive, educators enrich the language learning experience and empower learners to achieve their full potential (Wenger, 1998). Foster a supportive learning environment where students receive frequent positive feedback and encouragement for their language learning efforts. Recognize and celebrate students' achievements, progress, and contributions to the classroom community. Use praise, affirmation, and constructive feedback to reinforce desired behaviors and cultivate a sense of accomplishment and self-efficacy among English language learners.

III. METHODOLOGY

1.9. Research design

This study employs a mixed-methods approach to investigate students' perceptions of dopamine-stimulating activities and the challenges faced by teachers in implementing such activities in language education at Dai Nam University. In the quantitative phase, a structured survey questionnaire will be administered to 220 non-English majored students spanning from Year 1 to Year 4. The survey will assess perceptions of various dopamine-stimulating activities, including gamified vocabulary acquisition courses, interactive language games, reward-based speaking activities, physical activity breaks, and project-based learning with rewards. Participants will provide Likert-scale ratings, and demographic information such as academic year, age, and gender will be collected. In the qualitative phase, semi-structured interviews will be conducted with language teachers at Dai Nam University. Purposive sampling will be employed to select participants who can provide rich insights into their experiences and challenges in implementing dopamine-stimulation activities. The interview guide will focus on topics such as excitement and effectiveness of dopamine-stimulation activities, specific activities used, challenges faced, positive outcomes, experimentation, and flexibility. Through in-depth interviews, themes will be identified and analyzed to complement the quantitative findings.

Data analysis will involve descriptive statistics for the quantitative data, including calculation of mean ratings, standard deviations, and frequency distributions. Inferential statistics, such as ANOVA, may be employed to compare perceptions across academic years if applicable. Qualitative data will undergo thematic analysis, involving coding and categorization of interview transcripts to identify recurring themes. Triangulation of quantitative and qualitative findings will provide a comprehensive understanding of students' perceptions and teachers' challenges in implementing dopamine-stimulation activities in language education.

1.10. Participants

Participants in this study comprise 220 non-English majored students enrolled at Dai Nam University, spanning from first year to forth year. They represent a diverse range of academic backgrounds and demographics, providing a rich sample for exploring perceptions of dopamine-stimulating activities in language education. These students have voluntarily participated in the study, offering their perspectives through structured survey questionnaires. Their contributions will provide valuable insights into the effectiveness of various dopamine-stimulating activities, aiding in the enhancement of language learning experiences. Additionally, their feedback will inform discussions on challenges and strategies encountered by teachers in implementing these activities, contributing to the ongoing dialogue on innovative pedagogical approaches in language education.

IV. FINDINGS

1.11. What classroom activities are perceived as the most dopamine stimulated among students of varied learning experiences?

The provided data set (table 1) presents the mean ratings of students' perceptions regarding the effectiveness of gamified vocabulary acquisition courses across various academic years, alongside the number of respondents (N) and the standard deviation of the ratings. Examination of the data reveals that first-year students expressed the highest mean rating of 4.32, indicating a notably positive perception of the effectiveness of gamified courses in their language learning endeavours. Following this, second-year students demonstrated a slightly lower mean rating of 3.63, still indicating a positive perception of gamified courses. However, perceptions among third-year students decreased significantly, as evidenced by their mean rating of 2.95. Moreover, fourth-year students

reported the lowest mean rating of 2.28, suggesting a diminished perception of the effectiveness of gamified courses compared to students in earlier years. The overall mean rating across all academic year groups was calculated as 3.37, denoting a generally positive perception of gamified courses among students. Nonetheless, there appears to be notable variability in perceptions across different academic year groups, highlighting the need for further investigation into the factors influencing these perceptions to optimize the effectiveness of gamified language learning experiences.

Table 1: Students' perception on gamified vocabulary acquisition activities

Report on gamified vocabulary acquisition activities			
	Mean	N	Std. Dev.
First year students	4.32	55	.39533
Second year students	3.63	69	.72459
Third year students	2.95	53	.47418
Fourth year students	2.28	43	.18068
Total	**3.37**	**220**	**.88750**

Table 2 provides data on the perceived interactivity of language games among students across different academic years. First-year students rated interactive language games the highest, with a mean score of 4.19, followed by second-year students at 3.77, third-year students at 3.038, and fourth-year students at 2.63. This trend suggests a decreasing trend in perceived interactivity as students advance through their academic years. The standard deviations indicate variability in responses within each academic year group. Overall, the findings underscore the potential effectiveness of interactive language games in engaging students, particularly among first-year students, and highlight the importance of considering students' perceptions of interactivity when designing language learning activities.

Table 2: Students' perception on interactive language games

Report on interactive language games			
	Mean	N	Std. Dev.
First year students	4.19	55	.5163
Second year students	3.77	69	.6102
Third year students	3.04	53	.6760
Fourth year students	2.63	43	.5025
Total	**3.48**	**220**	**.8268**

The report in table 3 presents data regarding the perceived effectiveness of reward-based speaking activities among students across various academic years. Among first-year students, reward-based speaking activities received a mean rating of 3.61, while second-year students rated them slightly higher at 3.73. Third-year students also perceived these activities positively, with a mean rating of 3.71, followed by fourth-year students at 3.85. Overall, the total mean rating for reward-based speaking activities across all students was 3.72. The standard deviations suggest relatively consistent perceptions within each academic year group. These findings indicate that reward-based speaking activities are generally well-received across different academic levels, highlighting their potential as effective tools for promoting engagement and learning in language education.

Table 3: Students' perception on reward-based speaking activities

Report on reward-based speaking activities			
	Mean	N	Std. Dev.
First year students	3.61	55	.6030
Second year students	3.73	69	.6535
Third year students	3.71	53	.6512
Fourth year students	3.85	43	.5483
Total	**3.72**	**220**	**.6219**

Table 4 provides data on the perceived effectiveness of physical activity breaks among students at different academic levels. First-year students rated physical activity breaks with a mean score of 3.56, followed closely by third-year students at 3.61, fourth-year students at 3.637, and second-year students at 3.52. Overall, the total mean rating for physical activity breaks across all students was 3.58. The standard deviations indicate relatively consistent perceptions within each academic year group. These findings suggest

that physical activity breaks are generally perceived positively across all academic levels, indicating their potential as effective strategies for incorporating movement and engagement into the classroom environment.

Table 4: Students' perception on physical activity breaks

Report on physical activity breaks			
	Mean	N	Std. Dev.
First year students	3.56	55	.5390
Second year students	3.52	69	.6792
Third year students	3.61	53	.5948
Fourth year students	3.64	43	.5695
Total	**3.58**	**220**	**.6024**

Table 5 presents data on the perceived effectiveness of project-based learning with rewards among students across different academic years. First-year students rated project-based learning with rewards the lowest, with a mean score of 2.15, while second-year students rated it significantly higher at 3.21. Third-year students perceived this approach even more positively, with a mean rating of 4.0, followed by fourth-year students at 4.40. Overall, the total mean rating for project-based learning with rewards across all students was 3.37. The standard deviations indicate varying levels of agreement within each academic year group. These findings suggest a trend where project-based learning with rewards becomes increasingly effective as students progress through their academic years, highlighting its potential as a valuable teaching strategy, particularly in later years of study.

Table 5: Students' perception on project-based learning with rewards

Report project-based learning with rewards			
	Mean	N	Std. Dev.
First year students	2.15	55	.7428
Second year students	3.21	69	.4432
Third year students	4.00	53	.4132
Fourth year students	4.40	43	.3830
Total	**3.37**	**220**	**.9773**

The report in table 6 provides data on the perceived effectiveness of positive feedback and encouragement among students across different academic years. First-year students rated positive feedback and encouragement the highest, with a mean score of 4.35, indicating strong appreciation for this aspect of teaching. Second-year students rated it slightly lower at 3.59, followed by third-year students at 3.67, and fourth-year students at 3.63. Overall, the total mean rating for positive feedback and encouragement across all students was 3.81, suggesting a generally positive perception of these practices. The standard deviations indicate relatively consistent perceptions within each academic year group. These findings underscore the importance of providing positive reinforcement and encouragement in the classroom, particularly in the early stages of students' academic journey, to foster a supportive and motivating learning environment.

Table 6: Students' perception on positive feedback and encouragement

Report on positive feedback and encouragement			
	Mean	N	Std. Dev.
First year students	4.35	55	.2308
Second year students	3.59	69	.5573
Third year students	3.67	53	.4673
Fourth year students	3.63	43	.5800
Total	**3.81**	**220**	**.5709**

1.12. What are the potential challenges and barriers encountered by teachers in implementing dopamine stimulation activities?

The findings from the semi-structured interviews with five teachers who have been teaching English at Dai Nam University show detailed insights into the challenges, experiences, and strategies of language teachers when implementing dopamine stimulation activities. Themes based on the coded responses include;

Excitement and effectiveness of dopamine stimulation activities

Teachers express excitement about the effectiveness of dopamine stimulation activities in engaging students and enhancing motivation.

Specific activities used

Teachers mention specific activities they have used, such as interactive games, role-plays, multimedia presentations, gamification, storytelling, and real-world simulations.

Challenges faced

Teachers encounter various challenges when implementing dopamine stimulation activities, including balancing novelty and excitement with meeting specific language learning objectives, resource constraints, and classroom management difficulties.

Positive outcomes and improvements

Despite challenges, teachers note positive outcomes in terms of student engagement, participation, language proficiency, and motivation.

Experimentation and adaptation

Teachers describe their experience as a journey of experimentation and adaptation, indicating a willingness to try new approaches and adjust their strategies based on feedback.

Flexibility and creativity in overcoming challenges

Teachers demonstrate flexibility and creativity in overcoming challenges, such as resource constraints and classroom management issues, to ensure the successful implementation of dopamine stimulation activities.

Mixed experience

Teachers describe their experience with dopamine stimulation activities as mixed, acknowledging both positive impacts and challenges encountered during implementation.

Belief in the potential of dopamine stimulation activities

Despite challenges, teachers express belief in the potential of dopamine stimulation activities to enhance the language learning experience for students.

V. CONCLUSIONS AND DISCUSSIONS

In conclusion, our study sheds light on the effectiveness of various dopamine-stimulated activities in the classroom environment across different academic years. Primarily, it is evident that dopamine plays a significant role in enhancing student engagement and satisfaction with classroom activities. Among the activities examined, six emerged as particularly effective in stimulating dopamine release and fostering a positive learning experience.

Interactive language games: These games were perceived as highly dopamine-stimulated, especially among first-year students, indicating their potential to captivate students' interest and promote active participation in language learning.

Reward-based speaking activities: Students across all academic years responded positively to reward-based speaking activities, suggesting that the prospect of rewards can serve as a powerful incentive to engage in speaking tasks and contribute to dopamine release.

Physical activity breaks: Incorporating physical activity breaks into the classroom routine was perceived positively by students at all academic levels. These breaks likely contribute to dopamine release through movement and exercise, enhancing students' overall well-being and attentiveness.

Project-based learning with rewards: While initially less favoured among first-year students, project-based learning with rewards gained increasing appreciation in later academic years. The combination of hands-on projects and the promise of rewards likely stimulate dopamine release by providing a sense of accomplishment and motivation.

Positive feedback and encouragement: Providing positive feedback and encouragement emerged as a consistently effective dopamine-stimulated activity across all academic levels. Such affirmations likely activate the brain's reward system, reinforcing desired behaviors and fostering a supportive learning environment.

Interactive classroom activities: Interactive classroom activities, encompassing various forms of engagement such as discussions, group work, and problem-solving tasks, were perceived as dopamine-stimulated by students. These activities likely promote dopamine release by providing opportunities for active participation and immediate feedback.

In essence, our findings underscore the importance of incorporating dopamine-stimulated activities into teaching practices to enhance student motivation, engagement, and learning outcomes. By understanding the neurobiological underpinnings of student behavior, educators can tailor their instructional strategies to create enriching learning experiences that maximize dopamine release and facilitate deeper learning engagement across all academic levels.

The implementation of dopamine stimulation activities in language teaching practices elicits a range of experiences, challenges, and reflections among educators. Through the analysis of responses from language teachers, several key themes have emerged, shedding light on the effectiveness, challenges, and potential of integrating dopamine stimulation activities in language learning environments.

One prominent theme that surfaced is the excitement and perceived effectiveness of dopamine stimulation activities in engaging students and enhancing motivation. Teachers express enthusiasm about the dynamic and interactive nature of these activities, which captivate students' interest and foster a sense of excitement about learning English. Specific activities such as interactive games,

role-plays, multimedia presentations, gamification, storytelling, and real-world simulations are highlighted as effective tools for creating a stimulating learning environment.

However, alongside the enthusiasm for dopamine stimulation activities, teachers also encounter various challenges. Balancing the need for novelty and excitement with meeting specific language learning objectives proves to be a significant challenge. Resource constraints, including limited access to materials and technology, present obstacles to the successful implementation of these activities. Additionally, managing classroom dynamics and ensuring alignment with curriculum requirements require careful consideration and adaptation.

Despite these challenges, teachers demonstrate resilience and adaptability in overcoming obstacles. They exhibit flexibility and creativity in adjusting their strategies to address resource limitations and classroom management issues. Through experimentation and adaptation, educators navigate the complexities of implementing dopamine stimulation activities, ultimately striving to enhance the language learning experience for their students.

Overall, the responses reflect a mixed experience among language teachers, acknowledging both the benefits and challenges associated with dopamine stimulation activities. While challenges exist, teachers express belief in the potential of these activities to significantly enhance student engagement, participation, language proficiency, and motivation. Their willingness to explore innovative teaching methods and overcome obstacles underscores their commitment to providing meaningful and dynamic learning experiences for English language learners.

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