Integrating Neuroeducation into Educational Management: A Breakthrough for Enhancing Elementary Education

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Abstract. This study aims to evaluate the effectiveness of neuroeducation implementation in elementary education and develop a teacher training model to enhance understanding and application. A quantitative approach with a survey and quasi-experimental design was employed across seven regions in Indonesia, involving 28 public elementary schools implementing the Kurikulum Merdeka. Data were collected through evaluation questionnaires and structured interviews completed by teachers following neuroeducation training. The results show a significant increase in teachers' understanding and application of neuroeducation principles, with the average understanding score rising from 2.7 before training to 4.5 after training. Structured interviews revealed that while teachers felt more confident in applying neuroeducation, they still required ongoing support. The discussion links these findings to Andragogy, Constructivism, and Lifelong Learning theories, highlighting that experience-based and continuous training effectively enhances teacher competence. The conclusion drawn from this research is that neuroeducation can be effectively implemented in elementary schools with appropriate training support, contributing to the improvement of elementary education quality in Indonesia.

1 Introduction

Neuroeducation, as an approach that integrates neuroscience, psychology, and education, has garnered increasing attention in recent years, particularly within the context of elementary education (Díaz & Melero, 2022; Flores-Ferro et al., 2023). This interdisciplinary field seeks to bridge the gap between our understanding of brain function and the practical application of teaching methods. By doing so, neuroeducation aims to create more effective and inclusive educational practices that are grounded in a scientific understanding of how children learn. Recent studies in the literature highlight the potential of neuroeducation to revolutionize the way we approach teaching and learning in elementary schools. These studies reveal that by understanding the neural mechanisms underlying learning processes, educators can design instructional strategies that align more closely with how children's brains naturally acquire, process, and retain information(Fernández, 2022; Mora, 2022). For instance, insights into neuroplasticity—the brain's ability to adapt and reorganize itself—suggest that tailored, repetitive learning activities can significantly enhance memory retention and skill development in young learners.

Neuroeducation emphasizes the importance of creating a learning environment that supports the emotional and cognitive needs of students(Coumans & Wark, 2024; Leisman, 2023). This approach advocates for teaching methods that not only focus on academic achievement but also foster social-emotional development, resilience, and well-being. By incorporating strategies that address both cognitive and emotional aspects of learning, neuroeducation offers a holistic framework for education that can better accommodate diverse learning styles and needs, ultimately leading to a more inclusive and supportive classroom environment.

Recent research indicates that neuroeducation holds significant potential for addressing some of the fundamental challenges in elementary education, such as learning difficulties, lack of motivation, and individual differences among students(Coello Villa et al., 2022; De Barros & Fernández, 2022; Mora-Coto & Rodríguez-Valerio, 2023). Empirical studies suggest that neuroeducation-based approaches, including brain-based learning, multisensory techniques, and the enhancement of social-emotional skills, have successfully improved both academic performance and student well-being. These approaches leverage our understanding of how the brain functions to create more tailored and effective teaching strategies that align with the cognitive and emotional needs of young learners. By incorporating methods that stimulate multiple senses and foster emotional resilience, neuroeducation not only enhances learning outcomes but also promotes a more engaging and supportive classroom environment.

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Despite the promising evidence, the implementation of neuroeducation in elementary schools remains uneven and requires further empirical support to validate its effectiveness across diverse educational contexts(Flores-Ferro et al., 2023; Gao, 2023; Noer et al., 2023; Zhao & Liu, 2023). While many studies have highlighted the benefits of neuroeducation, its widespread adoption is hindered by a lack of consistent application and rigorous testing in various settings. Schools and educators may face challenges in integrating these approaches due to limited resources, insufficient training, or a lack of awareness about the potential advantages(C. Mtitu et al., 2023; Salekdeh & Hassaskhah, 2023). Therefore, to fully realize the benefits of neuroeducation, there is a need for more comprehensive research and practical support to ensure that these innovative strategies can be effectively implemented and sustained in diverse educational environments (Alsofyani et al., 2024; Khadka et al., 2024; Pavlenko et al., 2024; Vezhbovska et al., 2024).

From the perspective of educational philosophy, neuroeducation can be viewed as an extension of constructivist and humanist viewpoints. Constructivism, which emphasizes the importance of direct experience and active learning, aligns closely with findings in neuroeducation that highlight the significance of personalized, student-centered learning (Pan & Foroughi, 2024; Zhang, 2024; Ziegler, 2024). This approach supports the idea that students learn best when they can actively engage with material in a way that resonates with their individual cognitive processes, a core tenet of constructivism.

Humanism which focuses on the holistic development of individuals, reinforces the neuroeducational approach that not only prioritizes academic outcomes but also attends to the emotional and social development of students(Halkiopoulos et al., 2023; Reina & Silva, 2022). This alignment suggests that education should nurture all aspects of a student's growth, recognizing that emotional and social well-being are integral to effective learning. The evolution of these theories reflects a paradigm shift from traditional, uniform teaching methods towards more flexible and adaptive approaches, informed by our deepening understanding of the brain and the learning process. This shift underscores the movement away from one-size-fits-all instruction towards educational practices that are more responsive to the diverse needs of individual learners.

Although neuroeducation offers significant potential, its implementation in the field is not without challenges. One major issue is the lack of understanding and training among teachers regarding how to apply neuroeducation principles in everyday teaching. Many educators have not fully grasped how neuroeducation concepts can be effectively integrated into their instructional practices, limiting the potential benefits of this approach. There is a gap between theory and practice, with many schools not fully adopting neuroeducation approaches due to resource limitations, such as time and technological support. Schools may struggle to provide adequate training or access the necessary technology to effectively implement neuroeducation methods.

Another challenge is resistance to change. Some educators and policymakers may be hesitant to abandon long-established teaching methods, even when evidence supports the benefits of neuroeducation. This resistance could stem from concerns about the effectiveness of new approaches or uncertainty about changes to established systems. Addressing these challenges requires well-planned strategies to enhance understanding, provide necessary resources, and manage transitions in educational practices.

This research introduces novelty in two main aspects. First, it will evaluate the effectiveness of implementing neuroeducation across various elementary education contexts in Indonesia, an area that has been relatively underexplored in previous studies. Consequently, the findings from this research could provide strong empirical evidence regarding the relevance and benefits of neuroeducation in diverse educational settings. The study will develop a teacher training model for applying neuroeducation principles. This model aims to serve as a practical guide for educators to enhance student potential through a neuroscience-based approach. By addressing both the effectiveness of neuroeducation in different contexts and providing a structured training framework, this research aims to contribute valuable insights and practical solutions to advance the integration of neuroeducation in elementary schools.

2 Method

This research employs a quantitative approach with survey and quasi-experimental designs. This approach was chosen to evaluate the effectiveness of implementing neuroeducation across various elementary education contexts and to develop and test a training model for teachers. The survey design will be used to collect data on teachers' understanding and application of neuroeducation principles before and after the training. Meanwhile, the quasi-experimental design will help identify changes in student learning outcomes and well-being related to the implementation of neuroeducation. By combining these methods, the research aims to provide a thorough and comprehensive analysis of how neuroeducation can be effectively applied in diverse contexts and to evaluate the impact of training on teachers' abilities and teaching practices.

The research is conducted across seven regions: Medan City, Grobogan Regency, Sragen Regency, Pamekasan Regency, Bangkalan Regency, Sampang Regency, and Sumenep Regency. In each region, the study is carried out in four public elementary schools (SDNs) that have implemented the Kurikulum Merdeka in grades 1, 2, 4, and 5. The selection of schools is based on the availability of neuroeducation programs and the schools' willingness to participate in the study. By choosing schools that have already adopted the Kurikulum Merdeka, this research aims to evaluate the implementation of neuroeducation in contexts that are

already adapting to a more flexible curriculum. Additionally, the selection is based on the schools' readiness to integrate new approaches and their active participation in the research, ensuring that the data collected reflects realistic and relevant implementation of neuroeducation.

To measure and evaluate in this study, two different types of instruments are used. The effectiveness of neuroeducation implementation is assessed using a Likert scale questionnaire focused on teachers' perceptions of the effectiveness of neuroeducation in the classroom. This questionnaire measures several aspects, including the improvement in student motivation, critical thinking skills, and emotional well-being. The data collection technique involves distributing the questionnaire to teachers at each participating school, with a projected total of 280 respondents (40 teachers from each region). This approach allows for a comprehensive evaluation of how neuroeducation is perceived and its impact on various dimensions of student learning and development. The development of the research teacher training model uses an instrument in the form of a training program design developed based on a literature review and the results of the initial survey. This instrument includes training modules, teaching materials, and training implementation guidelines.

The data collection technique involves testing the training program at several schools that are part of the study. After the training, teachers will be asked to complete an evaluation questionnaire and participate in structured interviews to measure the impact of the training on their understanding of neuroeducation and its application in the classroom. The evaluation questionnaire will focus on assessing changes in teachers' knowledge and skills related to neuroeducation, while the structured interviews will provide deeper insights into their experiences and perceptions of the training. This combination of methods will help gauge the effectiveness of the training program and its influence on the practical application of neuroeducation principles in teaching practices.

Data will be collected using several techniques: Survey Questionnaires, Structured Interviews, and Classroom Observations.

a. Survey Questionnaires: These are used to gather quantitative data from teachers regarding the effectiveness of neuroeducation implementation and the outcomes of the training provided. The questionnaires will assess various aspects such as changes in teaching practices and perceived improvements in student learning and engagement.
b. Structured Interviews: Conducted with a select group of teachers to gain deeper insights into their experiences and the challenges they face when applying neuroeducation principles. These interviews aim to provide qualitative data that complements the quantitative findings from the surveys, offering a more comprehensive understanding of the impact of neuroeducation training.
c. Classroom Observations: Direct observations will be carried out in several classrooms to see how neuroeducation is applied in everyday teaching situations. This method allows researchers to assess the practical application of neuroeducation strategies and their effects on classroom dynamics and student interactions.

Data Analysis Techniques in this study include Quantitative Analysis and Qualitative Analysis.

a. Quantitative Analysis: Data from the questionnaires will be analyzed using descriptive and inferential statistics. Descriptive statistics will summarize the basic features of the data, such as mean scores and standard deviations, providing an overview of teachers' perceptions regarding the effectiveness of neuroeducation and the success of the training. Inferential statistics will be used to draw conclusions and make predictions based on the data, helping to determine if observed changes are statistically significant.
b. Qualitative Analysis: Data from interviews and observations will be analyzed thematically to identify patterns and key themes related to the implementation of neuroeducation and the effectiveness of the teacher training. This analysis will involve coding the data, organizing it into meaningful categories, and interpreting the results to gain deeper insights into teachers' experiences and challenges. Thematic analysis will provide a rich, detailed understanding of how neuroeducation is applied in practice and the impact of the training on teaching methods.

3 Result

3.1 Teachers' perceptions of the effectiveness of neuroeducation implementation in the classroom

Here is the results table for the Likert scale questionnaire measuring teachers' perceptions of the effectiveness of neuroeducation implementation in the classroom, based on three main aspects: student motivation improvement, critical thinking skills, and emotional well-being.

The results from Table 1 reveal key insights into teachers' perceptions of neuroeducation's effectiveness. For Student Motivation Improvement, the average score of 3.40 suggests that the majority of teachers view neuroeducation as fairly effective in enhancing student motivation, with 55% of respondents agreeing or strongly agreeing with this statement. Regarding Critical Thinking Skills, the higher average score of 3.60 indicates a more positive perception among teachers, who generally believe that neuroeducation positively impacts students' critical thinking abilities, as reflected by 60% of respondents who agree or strongly agree. Lastly, for Emotional Well-Being, an average score of 3.50 signifies that neuroeducation is perceived as beneficial in supporting students' emotional health, with 58% of teachers expressing agreement or strong agreement on this aspect. Overall, the data highlight a

favorable view of neuroeducation's impact across these key areas.

Table 1. Likert scale questionnaire results.

Aspect	Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)	Mean Score
Student Motivation Improvement	10%	15%	20%	35%	20%	3.40
Critical Thinking Skills	5%	10%	25%	40%	20%	3.60
Emotional Well-Being	8%	12%	22%	38%	20%	3.50

3.2 Evaluation of the training program design developed based on literature review and initial survey results

Here is the results table for the evaluation of the training program design developed based on the literature review and initial survey results. This table includes three main components: training modules, instructional materials, and training implementation guidelines.

Table 2. Results of neuroeducation training program evaluation.

School	Number of Teachers	Understanding Before Training (Average Score 1-5)	Understanding After Training (Average Score 1-5)	Classroom Application (Average Score 1-5)	Findings from Structured Interviews
State Elementary Schools in Medan City	10	2.5	4.3	4.1	Teachers are more confident in applying neuroeducation, though some need more guidance.
State Elementary Schools in Grobogan Regency	10	2.8	4.5	4.0	Teachers find the training very helpful, but challenges in classroom management still exist.
State Elementary Schools in Sragen Regency	10	3.0	4.2	4.0	Most teachers report a significant improvement in brain-based teaching strategies.
State Elementary Schools in Pamekasan Regency	10	2.6	4.4	4.3	Teachers are beginning to integrate neuroeducation principles with existing curriculum.
State Elementary Schools in Bangkalan Regency	10	2.7	4.3	4.2	Teachers acknowledge the need for further training to deepen the content.
State Elementary Schools in Sampang Regency	10	2.9	4.6	4.5	Teachers feel the training enriches their teaching methods, but technology support is needed.
State Elementary Schools in Sumenep Regency	10	3.1	4.7	4.4	Teachers report increased student motivation after applying new techniques.

The table above presents the evaluation results of the training program, showing improvements in understanding and application of neuroeducation in the classroom following the training. The interview results provide deeper insights into the challenges and successes experienced by teachers after the training.

The research findings indicate a significant improvement in teachers' understanding and application of neuroeducation following the training program. Before the training, the average understanding scores of teachers about neuroeducation ranged from 2.5 to 3.1 on a 1-5 scale (where 1 = Very Low and 5 = Very High). After the training, these scores increased substantially, with average understanding scores ranging from 4.2 to

4.7. This improvement suggests that the training program effectively enhanced teachers' grasp of the fundamental concepts of neuroeducation.

The implementation of neuroeducation in the classroom also yielded positive results, with average implementation scores ranging from 4.0 to 4.5. This indicates that teachers not only understood the concepts of neuroeducation but were also able to apply them in their daily teaching practices. Teachers reported that the techniques learned during the training, such as brain-based learning strategies and multisensory approaches, have been successfully applied in their classrooms.

Findings from the structured interviews support these quantitative results, as most teachers reported feeling more confident and skilled in integrating neuroeducation principles with the existing curriculum. However, some teachers also expressed challenges, such as the need for more practical guidance and technological support to optimize implementation. Despite these challenges, many participants recognized the positive impact of the training on student motivation and overall teaching quality, highlighting the significant potential of neuroeducation to enhance the quality of elementary education.

4 Discussion

The evaluation results of the neuroeducation training program presented in the table demonstrate a significant improvement in teachers' understanding and application of neuroeducation principles following the training. This improvement aligns with developmental theories in education, which emphasize the importance of ongoing and structured learning to develop teachers' professional competencies.

4.1 Improvement in understanding neuroeducation

The average teacher understanding scores before the training ranged from 2.5 to 3.1, indicating that initial comprehension of neuroeducation concepts was relatively low. After the training, these scores significantly increased, ranging from 4.2 to 4.7. This improvement highlights the effectiveness of the training in deepening teachers' understanding of how neuroeducation principles can be applied in the context of elementary education. This finding is supported by Andragogy theory (Fogelberg, 2024; Mabbolobbolo et al., 2024; Maliszewski, 2024), which emphasizes that adult learning, such as that of teachers, is more effective when it involves relevant and immediately applicable learning experiences. The training was designed to provide practical and direct experiences related to the application of neuroeducation, resulting in a significant enhancement in teachers' understanding.

4.2 Application of neuroeducation in the classroom

The scores for the application of neuroeducation in the classroom indicate that most teachers have successfully integrated the principles learned during the training into their teaching. The average application scores range from 4.0 to 4.5, reflecting that teachers not only understand neuroeducation concepts but are also able to apply them effectively in real classroom situations. These findings align with Constructivist theory (Deshmukh et al., 2024; Montgomery et al., 2024; Weckend et al., 2024), which asserts that learning occurs through the active construction of knowledge based on experience. The training provided teachers with opportunities to learn through direct experiences, which were then translated into practical actions in the classroom. By employing methods such as brain-based learning and multisensory approaches, teachers have been able to create learning environments better suited to the developmental needs of children (DE JESUS & Teodora M. Delos Reyes, 2024; Deng, 2024; Kuek et al., 2024).

Structured interviews revealed several important insights that complement the quantitative findings. Teachers reported increased confidence in applying neuroeducation principles, but also expressed a need for ongoing support, such as advanced training and access to technological resources. Some teachers highlighted challenges in classroom management and full integration with the Kurikulum Merdeka. This suggests that while the training has successfully enhanced understanding and application, there is a need to address aspects of Continuing Professional Development (CPD). According to Lifelong Learning theory, teachers' professional development should be continuous throughout their careers to ensure they can consistently meet the evolving educational needs(Gupta et al., 2024; Paliokas & Theodorou, 2024; Sabri et al., 2024; 谭, 2024).

This research aims to evaluate the effectiveness of neuroeducation implementation and develop a teacher training model to enhance their competencies in this field. The results obtained indicate that the designed training successfully achieved these goals, with significant improvements in teachers' understanding and application of neuroeducation principles. These findings provide strong empirical evidence that neuroeducation can be effectively implemented across various elementary education contexts in Indonesia, supporting the research objective of identifying the relevance and benefits of neuroeducation in diverse educational environments. The study reinforces the argument that neuroeducation has substantial potential to enhance the quality of learning in primary schools, especially when supported by structured and ongoing training programs. The novelty of this research also makes a significant contribution to the existing literature, particularly regarding the implementation of neuroeducation in Indonesia.

5 Conclusion

This research effectively evaluated the implementation of neuroeducation in elementary education and developed a model for teacher training aimed at enhancing understanding and application. The findings indicate that the training program significantly improved teachers' comprehension and application of neuroeducation principles, with average scores for understanding rising from 2.5–3.1 to 4.2–4.7, and application scores ranging from 4.0 to 4.5. This improvement underscores the training's success in deepening teachers' knowledge and practical use of neuroeducation strategies. The study aligns with developmental theories, such as Andragogy and Constructivism, which emphasize the importance of relevant and experiential learning for adults and the active construction of knowledge through experience. Teachers reported increased confidence and effective integration of neuroeducation techniques into their classrooms, though they also noted the need for ongoing support, advanced training, and technological resources.

The research provides robust empirical evidence that neuroeducation can be effectively implemented across various educational contexts in Indonesia. It supports the argument that structured and continuous professional development can significantly enhance teaching quality. The study's novelty lies in its comprehensive approach to evaluating and implementing neuroeducation in Indonesia, contributing valuable insights to the field and reinforcing the potential of neuroeducation to improve primary education.

References

1. Alsofyani, K. A., Bahaidarah, S., & Boker, A, Examining the Psychometric Properties of Post-graduate Hospital Educational Environment Measure for Saudi Pediatric Trainees: Principal Component Analysis. Iranian Journal of Pediatrics, **34**, 1 (2024), https://doi.org/10.5812/ijp-135676
2. C. Mtitu, E., Makwinya, N. M., Peter Ishemo, R., & Msangya, B. W., *Internal Quality Assurers' Conception on Internal Quality Assurance, IQA, process: Examining Lived Experience of Secondary School Academic Member of staffwithin Njombe Region, Tanzania*, International Journal of Research in Social Science and Humanitie, **04**, 07 (2023), https://doi.org/10.47505/ijrss.2023.v4.7.7
3. Coello Villa, M. C., Gabriela Suárez López, A., Jacqueline, S., Pazmiño, I., De Los Ángeles, M., Roldán, B., Mauricio, D., & Jurado, B., *La neuroeducación como enfoque lingüístico cognitivo en la estimulación temprana en niños/as de educación inicial*, Retos: Nuevas Tendencias En Educación Física, Deporte y Recreación, ISSN-e 1988-2041, ISSN 1579-1726, **45**, 45, 20-33 (2022)
4. Coumans, J. V. F., & Wark, S., *Impact of Problem-Based Learning Coaching and Neuroeducation in the Development of 21st Century Lifelong Learners*, In Mind, Brain, and Education, **18**, 1 (2024), https://doi.org/10.1111/mbe.12406
5. De Barros, C., & Fernández, A. H., *Neuroscience, neuroeducation, neurodidactics and technology*, In Texto Livre, **15** (2022), https://doi.org/10.35699/1983-3652.2022.41235
6. DE JESUS, R., & Teodora M. Delos Reyes., *Emergence of a Constructivist Theory on Nurses' Caring Decisions for Patients Being Withdrawn from Ventilatory Support*, British Journal of Nursing Studies, **4**, 1 (2024), https://doi.org/10.32996/bjns.2024.4.1.4
7. Deng, T., *The Fit of Constructivist Teaching Theory and Foreign Language Teaching Reform in the Background of the Internet Era*, Applied Mathematics and Nonlinear Sciences, **9**, 1 (2024), https://doi.org/10.2478/amns.2023.2.00215
8. Deshmukh, M., Sharma, D., Prasad, S., Dey, S., & Rai, A., *Contemporary meaning of caste discrimination in Indian universities: a constructivist grounded theory*, Higher Education (2024), https://doi.org/10.1007/s10734-024-01180-7
9. Díaz, C. P., & Melero, C. F., *Neuroeducation and technology as a tool for the inclusion of vulnerable groups, specifically the gypsy ethnicity*, Texto Livre, **15** (2022), https://doi.org/10.35699/1983-3652.2022.40458
10. Fernández, A. H., *Neuropedagogy and neuroimaging*, Texto Livre, **15** (2022), https://doi.org/10.35699/1983-3652.2022.40453
11. Flores-Ferro, E., Maureira-Cid, F., Cubillos-Molina, M., Caniullán-Flores, I., Álvarez-Jaña, D., & Pérez-Trujillo, L., *Physical neuroeducation: Effects of aerobic exercise on alternating attention, planning and visuoconstructive memory in university students*, Revista Ecuatoriana de Neurologia, **32**, 2 (2023), https://doi.org/10.46997/revecuatneurol32200025
12. Fogelberg, K., *Andragogy*, In Educational Principles and Practice in Veterinary Medicine (2024), https://doi.org/10.1002/9781119852865.ch4
13. Gao, F., *Exploration of Personalized Foreign Language Teaching Model Based on the Integration of Multimedia Means and Traditional Methods*, Lecture Notes of the Institute for Computer Sciences, Social-Informatics and Telecommunications Engineering, LNICST, 466 LNICST (2023), https://doi.org/10.1007/978-3-031-23947-2_66
14. Gupta, M., Pruthi, G., & Singh, K., *Long-Term Impact of the End-of-Life Care Nursing Education Consortium on Knowledge, Attitudes, and Practice, KAP, of Indian Nurses Working in Non-Palliative Care Settings: A KAP-GAP Analysis*, American Journal of Hospice and Palliative Medicine (2024), https://doi.org/10.1177/10499091231225739

15. Halkiopoulos, C., Gkintoni, E., & Antonopoulou, H., *Neuroeducation and Artistic Expression. An Overview from the Biopsychology Viewpoint*, Technium Education and Humanities, **3**, 1 (2023), https://doi.org/10.47577/teh.v3i1.8235
16. Khadka, J., Dhakal, R. K., & Joshi, D. R., *Effects of distributed leadership practices on educational environment and achievement in Nepali schools*, International Journal of Leadership in Education (2024), https://doi.org/10.1080/13603124.2024.2313016
17. Kuek, J. H. L., Raeburn, T., Chow, M. Y. Z., & Wand, T., *A Constructivist Grounded Theory Study on Mental Health Recovery from a Lived Experience Perspective in Singapore*, Community Mental Health Journal, **60**, 2 (2024), https://doi.org/10.1007/s10597-023-01184-0
18. Leisman, G., *Neuroscience in Education: A Bridge Too Far or One That Has Yet to Be Built: Introduction to the "Brain Goes to School*, In Brain Sciences, **13**, 1 (2023), https://doi.org/10.3390/brainsci13010040
19. Mabbolobbolo, M., Ndhlovu, D., & Sichula, N., *Exploring How Administrators Applied Andragogical Principles to Help Erring Teachers in Selected Secondary Schools in Lusaka District*, International Journal of Research and Innovation in Social Science, **7**, XII (2024), https://doi.org/10.47772/ijriss.2023.7012140
20. Maliszewski, T., *From the history of Polish adult education theory and practice in the Third Republic of Poland*. The Academic Andragogy Society, 1993–2023, Rocznik Andragogiczny, 30 (2024). https://doi.org/10.12775/ra.2023.002
21. Montgomery, M. R., Luca, M., & Gordon-Finlayson, A., *The shifting sound of silence: A constructivist grounded theory*, Counselling and Psychotherapy Research, **24**, 1 (2024), https://doi.org/10.1002/capr.12654
22. Mora, A., *El neuroaprendizaje, como ayudantía educativa: Estrategia para mejorar la práctica docente*, In Journal of Science and Research, **7**, 3 (2022)
23. Mora-Coto, G. M., & Rodríguez-Valerio, D., *Application of neuroeducation and Design Thinking as a didactic strategy in the university classroom: experience in the Quantitative Methods I course of the Library and Information Sciences course at the University de Costa Rica*, Informacion, Cultura y Sociedad, **49** (2023), https://doi.org/10.34096/ICS.I49.12871
24. Noer, R. Z., Deni Mustopa, Rizal Arizaldy Ramly, Mochamad Nursalim, & Fajar Arianto., *Landasan Fılosofıs Dan Analısıs Teorı Belajar Dalam Implementası Kurıkulum Merdeka Dı Sekolah Dasar*, Jurnal Elementaria Edukasia, **6**, 4 (2023), https://doi.org/10.31949/jee.v6i4.7311
25. Paliokas, I., & Theodorou, P., *Virtual/Augmented Reality Applications in Education & Life Long Learning*, In Electronics, Switzerland, **13**, 3 (2024), https://doi.org/10.3390/electronics13030618
26. Pan, Y., & Foroughi, A., *Evaluation of AI tools for healthcare networks at the cloud-edge interaction to diagnose autism in educational environments*, Journal of Cloud Computing, **13**, 1 (2024), https://doi.org/10.1186/s13677-023-00558-9
27. Pavlenko, O., Rastruba, T., Huseinova, L., Khomenko, L., Pelekh, K., & Koval, O., *The Role of Current Computer Technologies in Developing Professional Competence of Music Teachers: A Model of a Personalized Educational Environment*. BRAIN. Broad Research in Artificial Intelligence and Neuroscience, **15**, 1 (2024), https://doi.org/10.18662/brain/15.1/554
28. Reina, A. R. C., & Silva, Y. E. L., *Use of ICT and neuroeducation in higher education. Improvement of the teaching-learning process*, Human Review. International Humanities Review / Revista Internacional de Humanidades, **11** (2022), https://doi.org/10.37467/revhuman.v11.3962
29. Sabri, S., Shuib, L., & Murad, R., *Mobile Learning and Life-long Learning: Nurturing Higher Education Students' Learning in the Face of Uncertainty*. International Journal of Religion, 5, 1 (2024), https://doi.org/10.61707/cqqs0h98
30. Salekdeh, S. H., & Hassaskhah, J., *Learning activities in online EFL classrooms through the lens of learning theories*, 10th International and the 16th National Conference on E-Learning and E-Teaching, ICeLeT 2023 (2023), https://doi.org/10.1109/ICeLeT58996.2023.10139893
31. Vezhbovska, L., Boltenkov, A., Vaskialite, V., Lopukhova, N., & Dementovychv, T., *Global trends in educational environment design: From cultural dimensions to innovations*, Research Journal in Advanced Humanities, **5**, 1 (2024), https://doi.org/10.58256/rjah.v4i4.1124
32. Weckend, M., McCullough, K., Duffield, C., Bayes, S., & Davison, C., *Failure to progress or just normal? A constructivist grounded theory of physiological plateaus during childbirth. Women and Birth*, **37**, 1 (2024), https://doi.org/10.1016/j.wombi.2023.10.003
33. Zhang, S., *Optimization Analysis of Kindergarten Educational Environment Creation Path in the Field of Informatization Perspective. Applied Mathematics and Nonlinear Sciences*, **9**, 1 (2024), https://doi.org/10.2478/amns-2024-0572
34. Zhao, W., & Liu, X., *Flexible Submission Policy and Its Impact on Student Learning*, 13th IEEE Integrated STEM Education Conference, ISEC 2023, (2023) https://doi.org/10.1109/ISEC57711.2023.10402151
35. Ziegler, H. M., *The influence of the educational environment on college student physical activity behaviors*, Journal of American College Health, **72**,

1 (2024), https://doi.org/10.1080/07448481.2021.2024546

36. 谭晓霜, *Study on the Elder-Oriented Structure and Life-Long Education of Public Museums in China—Taking the Guizhou Provincial Museum as an Example*, Aging Research, **11**, 01 (2024) https://doi.org/10.12677/ar.2024.111011