Vol. 3 No. 1 Edisi Januari 2026 E. ISSN. 3032-2472
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INTEGRATING ARTIFICIAL INTELLIGENCE INTO COLLABORATIVE LEARNING TO FOSTER 21ST-CENTURY SOFT SKILLS: EVIDENCE FROM A BEST PRACTICE STUDY IN MAN 1 BANDA ACEH

MENGINTEGRASIKAN KECERDASAN BUATAN KE DALAM PEMBELAJARAN KOLABORATIF UNTUK MENGEMBANGKAN KETERAMPILAN LUNAK ABAD KE-21: BUKTI DARI STUDI PRAKTIK TERBAIK DI MAN 1 BANDA ACEH

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DOI: https://doi.org/10.62567/micjo.v3i1.1888

Abstract

This best practice study aims to develop 21st-century soft skills in students at MAN 1 Banda Aceh through the implementation of an artificial intelligence-based collaborative learning model called KOTAK (Artificial Intelligence-Based Brain Collaboration). The study used a qualitative case study design with 39 students. Data collection was conducted through learning observations, interviews, and analysis of student activities and learning outcomes in the Integrated Economic Exploration material. The KOTAK model was designed by integrating various easily accessible AI tools, such as Google Lens, ChatGPT, and QuestionWell, to support interactive, collaborative, and problem-solving-based learning. The results showed that implementing the KOTAK model significantly improved students' critical thinking, communication, collaboration, and creativity (4C) skills. Analysis of learning outcomes indicated a 94.87% absorption rate and achievement of the curriculum objectives for the taught material. The use of the AI platform has proven to be an effective interactive medium for encouraging active student engagement, strengthening higher-order thinking, and fostering collaboration in problem-solving. This research makes an original contribution by offering and testing a contextual learning model that integrates collaborative pedagogy and AI technology in a madrasah environment, while also presenting a practical framework for developing 21st-century skills in integrated subjects such as Economics, in line with the implementation of the Merdeka Curriculum.

Keywords : Collaborative learning, Artificial Intelligence (AI), 21st-century skills, Economics education, Merdeka Curriculum.

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Abstrak

Studi praktik terbaik ini bertujuan untuk mengembangkan keterampilan lunak abad ke-21 peserta didik di MAN 1 Banda Aceh melalui penerapan model pembelajaran kolaboratif berbasis kecerdasan buatan yang dinamakan KOTAK (Kolaborasi Otak Berbasis Kecerdasan Buatan). Penelitian ini menggunakan pendekatan kualitatif dengan desain studi kasus yang melibatkan 39 peserta didik. Pengumpulan data dilakukan melalui observasi pembelajaran, wawancara, serta analisis aktivitas dan hasil belajar peserta didik pada materi Eksplorasi Ekonomi Terpadu. Model KOTAK dirancang dengan mengintegrasikan berbagai perangkat kecerdasan buatan yang mudah diakses, seperti Google Lens, ChatGPT, dan QuestionWell, guna mendukung pembelajaran yang interaktif, kolaboratif, dan berbasis pemecahan masalah. Hasil penelitian menunjukkan bahwa penerapan model KOTAK mampu meningkatkan secara signifikan keterampilan berpikir kritis, komunikasi, kolaborasi, dan kreativitas (4C) peserta didik. Analisis hasil pembelajaran menunjukkan tingkat daya serap sebesar 94,87% serta ketercapaian tujuan pembelajaran pada materi yang diajarkan. Pemanfaatan platform kecerdasan buatan terbukti berfungsi sebagai media interaktif yang efektif dalam mendorong keterlibatan aktif peserta didik, memperkuat kemampuan berpikir tingkat tinggi, dan memfasilitasi kolaborasi dalam proses pemecahan masalah. Penelitian ini memberikan kontribusi orisinal dengan menawarkan dan menguji model pembelajaran kontekstual yang mengintegrasikan pedagogi kolaboratif dan teknologi kecerdasan buatan dalam konteks pendidikan madrasah, sekaligus menyajikan kerangka kerja praktis untuk pengembangan keterampilan abad ke-21 pada mata pelajaran terpadu, khususnya Ekonomi, sejalan dengan implementasi Kurikulum Merdeka.

Kata Kunci : Pembelajaran kolaboratif, Kecerdasan Buatan (AI), Keterampilan abad ke-21, Pendidikan ekonomi, Kurikulum Merdeka.

1. INTRODUCTION

The rapid transformation of the global socio-economic landscape in the 21st century has fundamentally reshaped the goals and practices of education. Contemporary societies are characterised by uncertainty, technological acceleration, and complex interdependencies across economic, social, environmental, and cultural domains. In response, education systems worldwide are shifting from content-oriented instruction toward competency-based learning that equips learners with transferable skills necessary for lifelong learning and adaptive problem-solving (Sen et al., 2018). Central to this paradigm shift is the development of 21st-century competencies, particularly critical thinking, creativity, communication, and collaboration—commonly referred to as the 4Cs (Lapek, 2018). These competencies are no longer viewed as supplementary outcomes but as core learning objectives that must be intentionally cultivated through meaningful learning experiences.

In Indonesia, this global shift is reinforced through the implementation of the Kurikulum Merdeka (Merdeka Curriculum), a significant reform of national education policy. The Merdeka Curriculum emphasizes learner autonomy, differentiated instruction, project-based learning, and the integration of higher-order thinking skills (Damiati et al., 2024). This curriculum mandates a student-centred pedagogical approach that promotes inquiry, collaboration, reflection, and contextual learning, aligning national education goals with international competency frameworks (Cholilah et al., 2023). Within this framework, teachers

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are positioned as facilitators of learning environments that nurture cognitive, social, and emotional development (Wahyuni, 2022).

In parallel with these developments in general education, the Ministry of Religious Affairs has implemented similar reforms within the madrasah system. A notable initiative is the Madrasah Science Competition (Kompetisi Sains Madrasah/KSM), which seeks to enhance academic achievement while integrating Islamic values and interdisciplinary learning. The KSM includes an Integrated Economics Exploration section that requires students to examine contemporary economic issues by synthesizing concepts from economics, social studies, environmental science, mathematics, and Islamic ethics. This approach aligns with the Merdeka Curriculum's emphasis on interdisciplinary learning, real-world problem-solving, and the cultivation of global citizenship, consistent with the Sustainable Development Goals (SDGs), particularly those related to economic equity, sustainability, and social justice (Fauzi, 2022).

Despite these progressive policies, significant challenges remain in classroom implementation. Observations and teacher reports indicate that many educators struggle to design lessons that foster the 4Cs, particularly in subjects requiring exploration and integration. This challenge is pronounced in areas such as Integrated Economics Exploration, which demand analytical thinking, data interpretation, collaboration, and ethical reflection. In practice, instruction often continues to rely on traditional methods such as lectures, note-taking, and rote exercises focused on factual recall. Although these approaches may facilitate rapid content acquisition, they do not support the development of higher-order thinking, teamwork, or creative problem-solving skills expected by the Merdeka Curriculum.

Observations at MAN 1 Banda Aceh, exemplify this pedagogical gap. Prior to the intervention described in this study, classroom practices were characterized by passive student engagement, limited peer interaction, and few opportunities for inquiry-based learning. Students relied predominantly on teacher explanations and textbooks, with minimal exposure to authentic problems or collaborative knowledge construction. As a result, students encountered difficulties with complex, integrative tasks, such as those required for KSM preparation, where success depends on content mastery and the ability to analyze data, articulate arguments, negotiate meaning with peers, and propose innovative solutions grounded in scientific reasoning and Islamic values.

To close this gap, teaching methods need to be both well-designed and practical for real classrooms. One promising solution is to use Artificial Intelligence (AI) in lesson planning. Recent progress in AI has turned digital tools into strong supports for learning, helping students find information, solve problems, and work together (Song et al., 2024). When used thoughtfully, AI does not replace teachers or students but acts as a partner that guides inquiry, gives quick feedback, and offers access to many learning resources (Joseph et al., 2024). This fits with the Merdeka Curriculum's focus on digital skills and flexible learning, and AI-supported teaching can help create more engaging, student-centered classrooms (Bai, 2024).

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However, using AI well in education depends on having a clear teaching approach. Without a strong instructional model, AI tools might be used only on the surface, leading to passive learning rather than active engagement (Wang et al., 2024). To address this, this study introduces the KOTAK (Kolaborasi Otak Berbasis Artificial Intelligence) learning model, an AI-based collaborative framework designed to develop 21st-century soft skills across integrated subjects. The KOTAK model is based on brain-based learning theory (Harden & Jones, 2022), which holds that learning is most effective when it is social, emotionally engaging, and mentally challenging. This view holds that students learn most when they build knowledge through interaction, exploration, and reflection in real-world situations (Abidin et al., 2025).

Within the KOTAK framework, collaboration underpins learning activities, while AI tools facilitate inquiry and creativity. Widely available platforms such as Google Lens, ChatGPT, and QuestionWell are employed to support data exploration, concept clarification, question generation, and reflective discussion. These tools are purposefully integrated into collaborative tasks that require students to analyze real-world economic phenomena, interpret both quantitative and qualitative data, and develop solutions informed by interdisciplinary perspectives and Islamic ethical principles (Saif et al., 2024; Yassin & Bashir, 2024). Thus, AI functions not only as an information source but also as a catalyst for higher-order thinking and collective problem-solving.

This study contributes to the broader discourse on enhancing education in madrasahs, where balancing religious values, academic achievement, and technological integration is essential. By aligning the KOTAK model with the objectives of the Merdeka Curriculum and KSM, the study seeks to demonstrate how AI-supported collaborative learning can translate policy initiatives into effective classroom practices. The primary objective is to evaluate whether the KOTAK model can enhance student motivation, improve literacy and numeracy skills, and foster the development of the 4Cs, particularly within the context of Integrated Economics Exploration.

In pursuing these aims, the research contributes to both theoretical and practical domains. Theoretically, it applies brain-based and collaborative learning principles to AI-supported instruction in Islamic secondary schools. Practically, it offers a model for teachers to implement the Merdeka Curriculum in complex subject areas. Ultimately, the study suggests that integrating AI within a structured collaborative learning model provides an effective means for madrasah students to address the intellectual, ethical, and social challenges of the 21st century.

2. RESEARCH METHOD

This research adopts a qualitative best-practice approach (Linder & Hayes, 2023), focusing on the in-depth exploration and analysis of an implemented pedagogical innovation. The study was conducted at MAN 1 Banda Aceh, an institution designated as an Academic Excellence Madrasah. Participants comprised 39 Grade X class students, selected for their

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diverse learning styles and average-to-high academic ability, making them suitable for observing the developmental impact of the intervention.

The KOTAK model procedure involved several stages: (1) Problem Presentation: Contextual economic problems related to SDGs were introduced. (2) AI-Assisted Exploration: Student groups used AI tools (Google Lens for data/image analysis, ChatGPT for brainstorming and information synthesis, QuestionWell for generating discussion questions) to research and deconstruct the problem. (3) Collaborative Brainstorming: Groups analysed AI-generated information, debated interpretations, and integrated findings with Islamic values and other disciplinary perspectives. (4) Creative Synthesis & Communication: Groups developed and presented innovative solutions.

Data were triangulated through observation of group dynamics and engagement, semi-structured interviews with students on their learning experience, and document analysis of student worksheets and learning outcome tests. Quantitative data on skill achievement (scored via rubrics for each 4C dimension) and final test scores were processed using Microsoft Excel to calculate descriptive statistics (mean, min, max) and the overall absorption rate (percentage of students meeting minimum mastery criteria).

3. RESULT AND DISCUSSION

a. Development of 21st-Century Skills

The implementation of the KOTAK (Kolaborasi Otak Berbasis Artificial Intelligence) learning model demonstrated a substantial impact on students' development of 21st-century soft skills, particularly in critical thinking, collaboration, creativity, and communication (4Cs). These competencies constitute the core learning outcomes mandated by the Merdeka Curriculum, which emphasises holistic learner development through authentic, student-centred, and competency-based instruction (Supriadi et al., 2024). Assessment of students' performance was conducted using analytic rubrics aligned with curriculum indicators and international frameworks for 21st-century skills, ensuring both validity and relevance. Table 1 shows that students performed well in all skill areas. Their average scores ranged from 83.2 to 86.6, which means most students reached the expected level in these skills.

Table 1. Student Achievement in 21st-Century Skill Domains

Skill Domains	Maximum	Minimum	Average
Critical Thinking	96	75	84.5
Collaboration	96	79	86.6
Creativity	96	75	85.9
Communication	90	75	83.2

Collaboration had the highest average score (86.6), showing that the KOTAK model helped students work well in groups. Students took shared responsibility, participated equally, resolved conflicts, and made decisions together. This is especially important in madrasah

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education, where working together supports academic achievement, social unity, religious moderation, and the community values encouraged by the Ministry of Religious Affairs.

Students' critical thinking skills, with an average score of 84.5, showed in their ability to spot economic problems, analyze causes, interpret data from different sources, and weigh different solutions. They had to support their arguments with economic ideas, real evidence, and ethical reasoning based on Islamic teachings. This matches the Merdeka Curriculum's focus on higher-order thinking and deep learning, where students are expected to think deeply and analyze information.

Creativity was another strong area, with an average score of 85.9. Students were able to suggest new and practical solutions to real economic problems linked to the Sustainable Development Goals (SDGs), like reducing poverty, promoting sustainable consumption, and caring for the environment. They showed originality in how they defined problems, used ideas from different fields, and made recommendations that included economic, social, and religious factors.

Communication skills had a slightly lower average score (83.2) but were still strong. Students improved in sharing their ideas in group discussions, presenting arguments clearly, and giving helpful feedback to classmates. The lower score suggests that students may need more practice and support, especially for academic discussions and formal presentations.
Cognitive achievement was measured with tests that checked both understanding and skill use. The absorption rate was 94.87%, and 37 out of 39 students met or passed the mastery score of 78. This shows that the KOTAK model kept academic standards high while helping students master content and skills, supporting the Merdeka Curriculum's focus on integrated learning.

b. Discussion of Findings

The study found that the KOTAK model works well for applying the Merdeka Curriculum in madrasahs. One important feature is how it brings Artificial Intelligence (AI) into group learning. Instead of using technology without structure, the KOTAK model treats AI as a thinking *partner* to help students ask questions, build understanding, and solve problems together. AI tools like ChatGPT and Google Lens made it easier for students to start complex learning tasks. For students who do not enjoy reading or have less background knowledge, getting quick explanations, summaries, and visuals helped them understand and feel more confident. This is important in Indonesian madrasahs, where students' reading and math skills can vary widely. By showing information in different ways, AI tools supported learning that meets each student's needs, which is a key part of the Merdeka Curriculum (Song et al., 2024).

Using AI helped students move beyond just finding information to using higher-level thinking skills. Once they had the basic facts, they could analyze, evaluate, and combine ideas—skills that are important for 21st-century learning and KSM-style assessments. This shows that, when used well, AI can boost students' thinking instead of reducing it. QuestionWell played a key role in structuring inquiry and dialogue. By generating high-quality, open-ended questions, it facilitated deeper group discussions and encouraged students to

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challenge assumptions, consider multiple perspectives, and refine arguments. This structured approach enhanced collaboration and prevented issues such as superficial agreement or dominance by a single member, highlighting the importance of cognitive scaffolding in collaborative learning. The KOTAK model's success can also be understood through brain-based learning theory (Syarifudin et al., 2021). This theory says learning works best when students interact with others, feel emotionally involved, and face real challenges. KOTAK's group work created a rich social setting, and using real economic problems tied to SDGs and Islamic values made learning meaningful. These factors help students pay attention, stay motivated, and remember what they learn. Focusing on real-world economic issues was key for deep learning. Students studied problems that affect their own communities and society, not just abstract ideas. This matches the Merdeka Curriculum's focus on learning in context and through projects, and it supports education for sustainable development. Adding Islamic ethical principles also helped students think about morals and values.

The Integrated Economics Exploration tasks encouraged students to be creative and think in complex ways. They combined knowledge from economics, social studies, math, environmental science, and Islamic studies. This approach reflects the complexity of real economic issues and helps prepare students for future challenges that need skills from different fields.Even with good results, the study found some challenges. Three out of 39 students did not reach mastery, mostly because they had low basic literacy and struggled to manage their own learning. These students often depended too much on AI-generated answers without thinking critically or combining information. This shows that, without the right guidance, students might only learn on the surface or rely too much on technology (Wang et al., 2024).

This problem shows the need to teach digital literacy and thinking skills directly. Teachers should help students use AI in a responsible way, such as checking information, knowing its limits, and using AI results as part of their own thinking. AI should be seen as a tool to help, not replace, students, following ethical rules for using technology in education(Lin et al., 2024). Several factors affected how the KOTAK model was used. Learning loss after the pandemic made it harder for students to learn on their own or through inquiry. Boarding school rules, like limits on smartphone use, also made it tough to use AI tools. These challenges show the need for support from schools, flexible rules, and good infrastructure to expand new teaching methods.

Overall, these challenges can be managed and do not outweigh the benefits of the KOTAK model. With the right support, teacher guidance, and good policies, AI-based group learning can work well, even where resources are limited. This is especially important for madrasahs, which often have less access to technology and training. From a policy point of view, the KOTAK model gives a practical way to put the Merdeka Curriculum's student-centered, skills-based approach into action. By combining AI, teamwork, and learning across subjects, the model turns policy goals into real classroom activities. Its fit with the Madrasah Science Competition (KSM) also shows its value for academic excellence programs by the Ministry of Religious Affairs.

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The model also supports MAN 1 Banda Aceh's goal of being an Academic Excellence Madrasah, showing how new teaching methods can improve school quality. The good results from this study suggest that the KOTAK model could be used in other madrasahs that want to build 21st-century skills while staying true to Islamic values and national standards. In summary, the results show that the KOTAK model is a practical and effective way to use AI in group learning to build 21st-century skills. By supporting both thinking and social-emotional growth, the model helps madrasah students become skilled in academics, critical thinking, creative problem-solving, ethical reasoning, and teamwork in a complex world

4. CONCLUSION

This best-practice study demonstrates that the AI-Based Collaborative Learning (KOTAK) model is a viable, effective, and contextually appropriate pedagogical innovation for fostering 21st-century soft skills in a madrasah setting. Implemented in Grade X at MAN 1 Banda Aceh, the KOTAK model successfully enhanced students' critical thinking, collaboration, creativity, and communication through structured, technology-enhanced collaborative inquiry applied to Integrated Economics learning. The high learning absorption rate of 94.87% indicates that the development of soft skills can occur simultaneously with strong content mastery, thereby supporting the core principle of the Merdeka Curriculum that deep learning and competency development are mutually reinforcing.

The results show that using Artificial Intelligence tools like ChatGPT, Google Lens, and QuestionWell in a collaborative teaching approach can turn learning from a passive activity into an active process where students build knowledge. AI helped by making complex tasks easier to start, supporting different learning needs, and letting students focus on skills like analysis, evaluation, and synthesis. When students worked on real-world, interdisciplinary problems connected to the Sustainable Development Goals and Islamic values, the KOTAK model made learning more meaningful and increased motivation, engagement, and depth of understanding.

This study adds to research on technology-based collaborative learning by offering real-world evidence from Islamic secondary education, a context that is not often studied. The KOTAK model supports social constructivist and brain-based learning theories by demonstrating that AI performs best in interactive, challenging, and values-based learning environments. Instead of replacing teachers or students, the model views AI as a tool that supports group thinking and discussion.

In practical terms, this study provides educators with a framework for applying the Merdeka Curriculum's focus on student-centered, skill-based teaching. It points out that teachers need training in lesson design, especially in creating group tasks and helping students use AI tools wisely. The study also shows that it is important to build students' basic literacy, self-control, and digital ethics to avoid shallow learning and excessive reliance on technology. At the school and policy level, the success of the KOTAK model suggests that schools and madrasahs should rethink strict rules about digital technology. With clear rules and teacher

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guidance, smartphones and AI apps can become useful learning tools that help meet curriculum goals. The model's fit with national programs like the Madrasah Science Competition (KSM) also shows its value for supporting academic achievement and interdisciplinary learning in madrasahs.

In summary, this study shows that well-designed, AI-supported collaborative learning can connect curriculum policy, teaching methods, and student skill development. The KOTAK model gives a practical way to achieve the goals of the Merdeka Curriculum in madrasah education, helping students succeed academically and prepare for ethical, cooperative, and flexible roles in today's world.

5. REFERENCES

Abidin, S. R. Z., Noor, S. F. M., Ashaari, N. S., & Yadegaridehkordi, E. (2025). Improving literacy skills using the serious game model compatible with brain-based learning. Multimedia Tools and Applications, 84(1). https://doi.org/10.1007/s11042-024-20305-9

Bai, S. (2024). Factors Affecting the Attitude Towards AI Learning: Moderating Role of Information Management. Profesional de La Informacion, 33(5). https://doi.org/10.3145/epi.2024.ene.0518

Cholilah, M., Tatuwo, A. G. P., Komariah, & Rosdiana, S. P. (2023). Pengembangan Kurikulum Merdeka Dalam Satuan Pendidikan Serta Implementasi Kurikulum Merdeka Pada Pembelajaran Abad 21. Sanskara Pendidikan Dan Pengajaran, 1(02). https://doi.org/10.58812/spp.v1i02.110

Damiati, M., Junaedi, N., & Asbari, M. (2024). Prinsip Pembelajaran dalam Kurikulum Merdeka. Journal of Information Systems and Management (JISMA), 3(2).

Fauzi, A. (2022). Implementasi Kurikulum Merdeka Di Sekolah Penggerak. Pahlawan: Jurnal Pendidikan-Sosial-Budaya, 18(2). https://doi.org/10.57216/pah.v18i2.480

Harden, V., & Jones, V. N. (2022). Applying the Principles of Brain-Based Learning in Social Work Education. Advances in Social Work, 22(1). https://doi.org/10.18060/25142

Joseph, G. V., Athira, P., Anit Thomas, M., Jose, D., Roy, T. V., & Prasad, M. (2024). Impact of Digital Literacy, Use of AI tools and Peer Collaboration on AI Assisted Learning: Perceptions of the University students. Digital Education Review, 45. https://doi.org/10.1344/der.2024.45.43-49

Lapek, J. (2018). Promoting 21st Century Skills in Problem-Based Learning Environments. CTETE - Research Monograph Series, 1(1). https://doi.org/10.21061/ctete-rms.v1.c.4

Lin, X. F., Zhou, Y., Shen, W., Luo, G., Xian, X., & Pang, B. (2024). Modeling the structural relationships among Chinese secondary school students' computational thinking efficacy in learning AI, AI literacy, and approaches to learning AI. Education and Information Technologies, 29(5). https://doi.org/10.1007/s10639-023-12029-4

Linder, K. E., & Hayes, C. M. (2023). HIGH-IMPACT PRACTICES IN ONLINE EDUCATION: Research and Best Practices. In High-Impact Practices in Online Education: Research and Best Practices. https://doi.org/10.4324/9781003445104

Multidisciplinary Indonesian Center Journal (MICJO)
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Email: admin@jurnalcenter.com

Saif, N., Khan, S. U., Shaheen, I., Alotaibi, A., Alnfiai, M. M., & Arif, M. (2024). Chat-GPT; validating Technology Acceptance Model (TAM) in education sector via ubiquitous learning mechanism. Computers in Human Behavior, 154. https://doi.org/10.1016/j.chb.2023.108097

Sen, C., Ay, Z. S., & Kiray, S. A. (2018). STEM Skills in the 21 St Century Education. Research Highlights in STEM Education, April.

Song, Y., Weisberg, L. R., Zhang, S., Tian, X., Boyer, K. E., & Israel, M. (2024). A framework for inclusive AI learning design for diverse learners. In Computers and Education: Artificial Intelligence (Vol. 6). https://doi.org/10.1016/j.caeai.2024.100212

Supriadi, T., Yatim, D., Nofika, I., Handayani, S. G., & Jalinus, N. (2024). Pengembangan Kurikulum Merdeka dalam Satuan Pendidikan. Jurnal Pendidikan Tambusai, 8(1).

Syarifudin, A., Dhewy, R. C., & Agustina, E. N. S. (2021). PENGARUH MODEL BRAIN BASED LEARNING TERHADAP HASIL BELAJAR SISWA. JEDMA Jurnal Edukasi Matematika, 1(2). https://doi.org/10.51836/jedma.v1i2.155

Wahyuni, S. (2022). Kurikulum Merdeka untuk Meningkatkan Kualitas Pembelajaran. Jurnal Pendidikan Dan Konseling, 4(6).

Wang, Y. M., Wei, C. L., Lin, H. H., Wang, S. C., & Wang, Y. S. (2024). What drives students' AI learning behavior: a perspective of AI anxiety. Interactive Learning Environments, 32(6). https://doi.org/10.1080/10494820.2022.2153147

Yassin, A., & Bashir, A. (2024). Student Satisfaction with The Use of Chat-GPT as A Learning Resource. Vocational: Journal of Educational Technology, 1(1). https://doi.org/10.58740/vocational.v1i1.247