ASEAN Journal for Science Education

Journal homepage: https://ejournal.bumipublikasinusantara.id/index.php/ajsed

Introducing the ASEAN Journal for Science Education (AJSEd) as a Catalyst for Advancing Science Education in Southeast Asia

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ABSTRACT

This study introduces the ASEAN Journal for Science Education (AJSEd) as a strategic publication that supports the growth of science education in Southeast Asia. Using a descriptive and content analysis method, this paper examines the journal's scope, published article trends, and contribution to science education from 2022 to 2024. The findings show that AJSEd provides a platform for theoretical, empirical, and practice-based research that addresses both global scientific issues and regional educational needs. Through its open-access model and interdisciplinary focus, AJSEd fosters collaboration among educators, researchers, and policymakers. This study highlights the journal's role in supporting the Sustainable Development Goals (SDGs), especially SDG 4 and SDG 9, strengthening academic exchange, and promoting contextual innovation in science education. The implications of this study affirm AJSEd's relevance in the landscape of global science education and its role as a transformative agent in the ASEAN region.

ARTICLE INFO

Article History:
Submitted/Received 01 Oct 2023
First Revised 12 Dec 2023
Accepted 18 Feb 2024
First Available online 19 Feb 2024
Publication Date 01 Sep 2024

Keyword:
Academic journal,
AJSEd,
Educational development,
Science education,
Southeast Asia.

1. INTRODUCTION

Established in 2022 by Yayasan Bumi Publikasi Nusantara, the ASEAN Journal for Science Education (AJSEd) emerged as a dedicated publication to address these issues. AJSEd is an open-access, peer-reviewed journal that publishes biannually (March and September) and accepts a variety of article types, including theoretical papers, empirical studies, case studies, and reviews. With its broad scope (ranging from chemistry and engineering education to environmental science and vocational training), AJSEd has created an inclusive academic space for both novice and senior researchers. Its regional focus and interdisciplinary approach position it as a promising platform for promoting equitable, relevant, and future-oriented science education. Papers published in AJSEd are presented in **Table 1**.

This paper aims to (i) introduce AJSEd and its editorial vision, (ii) analyze published articles thematically, and (iii) assess its role in developing science education practices and policies in ASEAN countries.

Table 1. Previously published articles in AJSEd.

No	Title	Ref.
1	Student development: Implementation of water rocket media as a project-based learning tool to improve the literacy of junior high school students during the pandemic	Putra & Sakti (2022)
2	Factors that affect the performance of selected high school students from the third district of Albay in International Mathematics Competitions	Jose (2022)
3	Undergraduate students' awareness of adopting gamification for learning in University of Ilorin, Nigeria	Ekunola *et al*. (2022)
4	Analysis of teacher skills in e-learning content development during distance learning during the COVID-19 pandemic	Nafsi & Maryanti (2022)
5	Teaching and learning with technology: Effectiveness of ICT integration in schools	Jadhav *et al*. (2022)
6	Environmental education: A tertiary institution's indoor air quality assessment in Nigeria	Abulude *et al*. (2022)
7	Methodology for investigating competency index of technical vocational education and training (TVET) instructors for 4.0 industrial revolution	Shahroni *et al*. (2022)
8	Improving activities and learning outcomes of elementary school students through experimental methods using lime as an alternative electrical energy source during the COVID-19 pandemic	Octaviani *et al*. (2022)
9	Community extension: Literacy and numeracy enhancement program for alternative learning system and out-of-school youth learners	Arciosa *et al*. (2022)
10	Efforts to increase the interest of junior high school students in mathematics lessons using the TikTok learning tool	Dermawan *et al*. (2022)
11	Literature review: Technical and vocational education and training (TVET) in Malaysia	Minghat *et al*. (2022a)
12	Education on the importance of food consumed by breastfeeding mothers and exclusive breastfeeding against stunting prevention through PowerPoint media	Ibrahim & Nandiyanto (2022)
13	3D simulation of muscular system in anatomy learning	Shabudin *et al*. (2022)
14	Development of an animation package in biology for teaching vertebrate, anatomy, and physiology	Ala *et al*. (2022)

Table 1 (continue). Previously published articles in AJSEd.

No	Title	Ref.
15	Learning color theory in elementary school using basic infographic media during the COVID-19 pandemic	Pangestu & Sakti (2023)
16	Science education research methodology: A case study investigating the correlation between construction, safety, accident, and the effectiveness Construction Industry Development Board (CIDB) Green Card Training Program	Wahab *et al.* (2023)
17	Learning of objects, elements, compounds, and mixtures in daily life's elementary school students	Zahra & Nandiyanto (2023)
18	Broensted acids and bases: History, misconception, and application today	Barke (2023)
19	Math readiness and its Effect on the online academic performance of science, technology, engineering, and mathematics students	Lagcao *et al.* (2023)
20	Barriers and measures for enhancing the conduct of transformative research among industrial and technology education lecturers and postgraduate students in university	Idris *et al.* (2023)
21	Effect of conceptual change instructional strategy on chemistry students' performance in acids and bases concepts	Swafiyah *et al.* (2023)
22	Quantitative analysis of the problems and prospects of the Nigerian industrial sector in the 21st century	Mohammed (2023)
23	Effect of peer-tutoring strategy on senior secondary school students' achievement in mathematics	Awofala and Agbolade (2024).
24	Identifying and dispelling students' misconceptions about electricity and magnetism using inquiry-based learning in selected junior high schools.	Assem *et al.* (2024)
25	Retaining female students in school: Intervention for improving menstrual hygiene	Saadu *et al.* (2024)
26	Exploring effective differentiated instruction in the teaching and learning of mathematics	Padmore and Ali (2024)
27	Can the inquiry learning model improve students' system thinking skills?	Nelvarina *et al.* (2024)
28	How to make a cognitive assessment instrument in the merdeka curriculum for vocational high school students: A case study of generating device materials about the Stirling engine	Fiandini *et al.* (2024)
29	The paradigm of curriculum differentiation in higher IT education	Glushchenko (2024)
30	Industrial engineering students' readiness towards industrial revolution 4.0 at technical and vocational university: Literature review	Anwar and Minghat (2024)

2. METHODS

This study employed a descriptive qualitative approach using document analysis as the primary method. This study also compared data in Google Scholar. Detailed information regarding this method is explained elsewhere (Al Husaeni & Nandiyanto, 2022a; Al Husaeni & Al Husaeni, 2022). The steps were:

(i) Data Source: All volumes and issues of AJSEd from 2022 to 2024 (Vol. 1 No. 1 to Vol. 3 No. 1) were examined, comprising a total of 50 articles.

(ii) Data Collection: Metadata (title, author, country, type of article) and content (themes, disciplines, research focus) were extracted manually.
(iii) Interpretation: Results were discussed with reference to the role of academic journals in educational development and regional collaboration.

3. RESULTS AND DISCUSSION

3.1. Thematic Distribution

A longitudinal review of AJSEd articles from Volume 1 (2022) to Volume 3 (2024) reveals a dynamic progression in research focus areas. In 2022, most publications addressed urgent educational responses to the COVID-19 pandemic. These included adaptations such as distance learning (Nafsi & Maryanti, 2022), the integration of technology in science education (Shah, 2022), and community-based alternative learning (Arciosa *et al*., 2022).

By 2023, submissions began shifting toward curriculum development, student-centered instruction, and environmental sustainability. For example, some researchers (Zahra & Nandiyanto, 2023) explored chemistry education through daily-life contexts, while other researchers (Fiandini *et al*., 2023) introduced environmental learning using water hyacinth. This thematic shift highlights the transition from emergency pedagogy to long-term curriculum innovation.

In 2024, AJSEd showcased a rise in topics related to engineering education reform, equity, gender inclusion, and the Sustainable Development Goals (SDGs). Articles (Saadu *et al*., 2024) addressed menstrual hygiene as a barrier to girls' education, while other articles (Awofala & Agbolade, 2024) emphasized peer tutoring strategies to improve math outcomes. This indicates a deepening of social awareness within the scope of science education.

This trend suggests AJSEd is maturing into a responsive platform; one that not only documents current issues but also encourages forward-looking, solution-driven research.

Analysis revealed a strong emphasis on applied and contextual science education, with major themes including:

(i) Project-based learning (Putra & Sakti, 2022)
(ii) Integration of ICT (Nafsi & Maryanti, 2022; Shah, 2022)
(iii) Environmental education and sustainability (Abulude *et al*., 2022; Fiandini *et al*., 2023)
(iv) Educational technology and simulation (Shabudin *et al*., 2022)
(v) Technical and vocational education (TVET) (Minghat *et al*., 2022a; Anwar & Minghat, 2024)

These contributions go beyond academic theorizing, addressing the realities of classrooms in low-resource contexts, making AJSEd a useful source for educational policy formulation.

Moreover, the journal's openness to submissions from technical and vocational institutions has widened the scope of what "science education" entails, making space for engineering workshops, rural innovation, agricultural learning, and even local wisdom integration.

3.2. Geographic and Institutional Diversity

The journal includes authors from Indonesia, Malaysia, Nigeria, Ghana, Nepal, and the Philippines, showing early success in attracting cross-country collaboration. Many contributors were affiliated with teacher education institutions, polytechnic universities, and research centers, aligning with the journal's mission to amplify voices from diverse academic environments.

This geographic diversity not only contributes to a richer academic discourse but also strengthens South-South collaboration, particularly among nations facing similar science education challenges.

3.3. Article Types

Articles in AJSEd demonstrate a methodologically diverse landscape. Across reviewed articles:

(i) Quantitative designs dominate, particularly quasi-experimental and survey research designs. These are evident in studies assessing academic performance, instructional strategy effectiveness, and learning outcomes.
(ii) Qualitative studies, though fewer, offer rich insights into student experiences and classroom dynamics. Examples include case studies on inquiry-based teaching and community extension programs (Arciosa *et al*., 2022).
(iii) Mixed-methods approaches are emerging, especially in TVET and instructional design articles, reflecting efforts to triangulate data sources and enhance research validity.

The methodological rigor is enhanced by clear research objectives, well-structured instruments (e.g., questionnaires, lesson plans, activity sheets), and, increasingly, statistical analysis software (e.g., SPSS, ANOVA tests). This trend illustrates growing research capacity among AJSEd contributors.

To support this growth, AJSEd may consider offering methodology-focused special issues or reviewer notes that guide early-career researchers in refining their methods. AJSEd maintains a balanced portfolio of publication types:

(i) 42% empirical studies
(ii) 28% practice-oriented reports
(iii) 20% review articles
(iv) 10% theoretical or conceptual frameworks

This composition encourages both rigorous scientific research and practical classroom innovation, making it relevant for a wide readership, from researchers and teacher educators to policymakers and curriculum developers.

3.4. Comparative Positioning on Science Education Journals: AJSEd, AJSEE, and IJOTIS

To substantiate the strategic role of the AJSEd in advancing science and engineering education in the Southeast Asian region, it is essential to examine the journal's editorial vision, publication trends, and thematic focus in comparison to other peer-reviewed journals in the field. Since its inception in 2022, AJSEd has curated a diverse and interdisciplinary collection of articles that not only reflect pedagogical innovation but also address regional educational challenges aligned with global development goals. The journal's open-access policy, inclusive scope, and emphasis on both research and practice-based contributions have positioned it as a unique platform for bridging classroom realities with policy-relevant scholarship. To validate this positioning, we analyze selected publications across volumes, explore their alignment with SDGs, and contrast AJSEd's contributions with those of closely related journals, namely the ASEAN Journal of Science and Engineering Education (AJSEE) and the Indonesian Journal of Teaching in Science (IJOTIS). The following sections and tables provide concrete evidence of AJSEd's distinctive impact and scholarly relevance.

In comparison to two related journals (AJSEE and IJOTIS), the AJSEd positions itself as a strategic regional platform that bridges the gap between research, classroom practice, and

policy in science and engineering education. **Tables 2 and 3** show articles published in AJSEE and IJOTIS, respectively.

Table 2. Articles published in AJSEE.

No	Title	Ref.
1	The integration of the engineering design process in biology-related STEM activity: A review of Thai secondary education	Tipmontiane & Williams (2022)
2	How to read and calculate diameter size from electron microscopy images	Yolanda & Nandiyanto (2022)
3	Constructive alignment approach for capstone project with industry involvement: Case study in Malaysia University	Nugroho (2022)
4	Teaching programming to chemical engineering students	Andika & Putra (2022)
5	Barriers limiting the use of Google Classroom for learning vocational and entrepreneurship courses	Joshua *et al*. (2022)
6	Application of Scrabble game in improving learning of simple sentence structure on the student with hearing impairment	Rusyani *et al*. (2022)
7	Permissive parenting style and maladaptive behavioral tendencies among junior high school students of Notre Dame of Tacurong College, Mindanao, Philippines	Cabanatuan & Ahmad (2022)
8	Effect Glogster on students' academic achievement in selected basic technology concepts in Ilorin metropolis	Asuquo *et al*. (2022)
9	Attitudes and perceptions towards cultured meat among general population in Pakistan	Ahsan *et al*. (2022)
10	Construction process of robotic devices to teach aspect of auto mechanic in Nigeria Basic Schools	Babalola & Omolafe (2022a)
11	Earthquake disaster preparedness for students of junior high school	Widdyusuf *et al*. (2022)
12	Earthquake disaster preparedness for students of junior high school	Ngag *et al*. (2022)
13	Rice tariffication law: Education and views of farmers in the Southern Philippines	Nueva *et al*. (2022)
14	Earthquake disaster mitigation explanation to prepare a disaster response generation for students in 3th-grade of elementary school	Nurfalah *et al*. (2022)
15	Study the relationship of earthquake and ionosphere using IRI TEC for education	Phansori *et al*. (2022)
16	Real-time air quality index app: The use of e-weather HDF app for education in monitoring of pollutants and meteorological parameters in Nigeria	Abulude *et al*. (2022)
19	A study on attitude of urban and rural college students towards science	Shah (2022)
20	Numerical minimum competence assessment for increasing students' interest in mathematics	Wijaya *et al*. (2022)
21	Improved information literacy of elementary school students about living pharmacies through information and communication media (ICT)	Dwiana *et al*. (2022)
22	Problems of teaching practical biology in senior secondary schools	Abdussemiu (2022)

Table 2 (continue). Articles published in AJSEE.

No	Title	Ref.
23	The effectiveness of using a virtual laboratory in distance learning on the measurement materials of the natural sciences of physics for junior high school students	Azizah *et al*. (2022)
24	Effect of developed mobile application on undergraduates academic performance in computer science	Babalola & Omolafe (2022c)
25	Models for interactions in boundary layers at rotational motions in noncircular orbits: The concept for teaching science	Strömberg (2022)
26	The challenges of remote e-assessments during COVID-19 outbreaks among undergraduate engineering programs	Minghat *et al*. (2022b)
27	A case study at the University of West Florida on improving recruitment and retention of female students in engineering	Ramachandran *et al*. (2022)
28	Awareness and acceptability of the university's vision, mission, goals, and objectives in Bachelor of Science in Electrical Engineering program	Cruz *et al*. (2022)

AJSEd is distinguished by its interdisciplinary openness (accepting theoretical, empirical, practice-based, and review papers), its regional orientation within ASEAN, and its explicit alignment with the Sustainable Development Goals (SDGs), especially SDG 4 (Quality Education) and SDG 9 (Industry, Innovation, and Infrastructure). It emphasizes inclusive, equitable, and contextually relevant innovations in science education across both formal and non-formal educational settings.

AJSEE tends to focus more on applied science and engineering pedagogy, often presenting research involving technical prototypes, classroom-based STEM experiments, and engineering-focused tools. For example, articles published in AJSEE cover topics such as sustainable development themes in science test items (Suryani & Hamdu, 2021), solar-powered water pumps, Excel-based scheduling tools, LED grow light circuits for plant cultivation, and real-world engineering design projects like CNC machines. In addition, AJSEE documents innovations in distance learning and evaluation practices during the pandemic, and increasingly explores bibliometric techniques, showing strong integration between engineering practice and classroom-based STEM instruction.

IJOTIS focuses more specifically on pedagogical strategies and teaching practices in science education, particularly within the Indonesian context, but with increasing regional contributions. It often features studies on teaching strategies (e.g., inquiry, cooperative, game-based learning), teacher readiness, online assessment, use of Zoom and learning management systems (LMS), development of multimedia teaching tools, and learner-centered interventions. IJOTIS presents a wide range of topics, including student wellness, learning during the COVID-19 pandemic, and innovative assessment tools in primary and secondary education settings.

In summary, AJSEd functions as a conceptual and empirical hub for advancing science education through regional collaboration and policy relevance; AJSEE serves as a technical and project-based journal connecting science/engineering practices with pedagogy; while IJOTIS operates as a pedagogical workshop for science teachers and lecturers, focusing on

improving instructional practices and student learning outcomes through practical teaching innovations and digital tools.

Table 3. Articles published in IJOTIS.

No	Title	Ref.
1	Design and development of 3-dimensional model of human circulatory system to teach a concept of biology in senior secondary schools	Babalola (2022)
2	Attitudes of high special school students with hearing impairment to online adaptive physical education learning	Rusyani *et al*. (2022)
3	The development and evaluation of the instructional kid blog for teaching selected computer science concepts in primary schools in Ilorin Metropolis	Daramola (2022)
4	Information communication technology (ICT)-based instructional software and its effectiveness in teaching high school geometry	Arciosa (2022)
5	Learning mathematics formulas by listening and reading worked examples	Maryati *et al*. (2022)
6	Rural-urban migration among women farmers: Science education, survey, and implication for food crop production in Cross River State, Nigeria	Effiong & Aya (2022)
7	How to calculate paired sample t-test using SPSS software: From step-by-step processing for users to the practical examples in the analysis of the effect of application anti-fire bamboo teaching materials on student learning outcomes	Afifah *et al*. (2022)
8	Requirement, dietary sources, and efficiency of absorption of major minerals by farm animals: From an educational perspective	Olowoyeye (2022)
9	Implementation of the reading and writing literacy program to elementary school students about the impact of the natural disaster of Mount Merapi	Agustin *et al*. (2022)
10	Design and development of human excretory system model to teach a biology concept in Ilorin, Nigeria	Olumorin *et al*. (2022)
11	Undergraduates perception towards the use of Google Classroom for learning	Aderele & Sanni (2022)
12	A bibliometric analysis of computational mapping on publishing teaching science engineering using VOSviewer application and correlation	Nordin (2022)
13	Media learning patch board in science learning energy change materials for children with intellectual disabilities	Juhanaini *et al*. (2022)
14	Animation for educating, socializing, and giving understanding characteristics of malnourished children	Al Husaeni & Nandiyanto (2022b)
15	Science teachers' lived experiences and challenges during the COVID-19 pandemic	Pandoy *et al*. (2022)
16	Manipulatives in learning fraction for improving first-year elementary students' understanding	Asoy *et al*. (2022)

Table 3 (continue). Articles published in IJOTIS.

No	Title	Ref.
17	Information and communication technology as a veritable tool for administrators in university: From teaching perspectives to challenges in education	Bolaji (2022)
18	Indonesian public response to online learnings during the COVID-19 pandemic: An analysis of social media	Prabowo & Suroso (2022)

3.5. Further AJSED direction and Contribution to Sustainable Development Goals (SDGs)

The AJSEd demonstrates a clear alignment with several of the United Nations SDGs, especially SDG 4: Quality Education, SDG 9: Industry, Innovation, and Infrastructure, and SDG 17: Partnerships for the Goals. This alignment is not merely thematic or symbolic, but is deeply reflected in the journal's editorial mission, the content of its published articles, and its commitment to open and inclusive knowledge dissemination. Detailed SDGs focuses are in the following:

(i) SDG 4: Quality Education. At the core of AJSEd's focus is inclusive, equitable, and high-quality education that promotes lifelong learning. Many of its publications directly support SDG 4. For example, studies on inquiry-based learning, differentiated instruction, use of ICT tools in science classrooms, and educational strategies to retain female students in school (e.g., Saadu *et al*., 2024) reflect innovative pedagogies aimed at improving learning outcomes. Several articles also investigate how marginalized or disadvantaged students (such as those in rural or low-income communities) can access science education more effectively through low-cost technology, community partnerships, and culturally relevant curriculum. These works exemplify how AJSEd not only contributes to academic scholarship but also directly informs educational practice and policy that can drive progress toward SDG 4 targets (Awofala & Agbolade, 2024).

(ii) SDG 9: Industry, Innovation, and Infrastructure. AJSEd also supports technological innovation and the integration of industry-based skills through research in technical and vocational education and training (TVET), engineering education, and science-technology integration. Articles exploring the use of simulators, robotics in classrooms, and technical competencies in vocational education demonstrate the journal's relevance to SDG 9, which advocates for building resilient infrastructure and fostering innovation. In particular, studies (Minghat *et al*., 2022a; Minghat *et al*., 2022b) on the competency framework for TVET instructors and industrial readiness (Anwar & Minghat, 2024) showcase how education systems can adapt to industrial transformation and the demands of the Fourth Industrial Revolution (IR 4.0). These contributions align with the broader goals of economic development and technological progress in ASEAN nations.

(iii) SDG 17: Partnerships for the Goals. One of AJSEd's most distinctive strengths lies in its promotion of international and regional collaboration. The diversity of its contributors (from Indonesia, Malaysia, the Philippines, Ghana, Nigeria, and beyond) reflects its commitment to fostering partnerships among educators, researchers, and institutions. Through its open-access publishing model, AJSEd enables equitable access to scholarly work regardless of authors' institutional resources or geographic location. This directly supports SDG 17, which emphasizes multi-stakeholder collaboration and global partnerships for sustainable development. Moreover, the journal serves as a cross-

border communication bridge among ASEAN member states and between the Global South and North.

Further, expanding SDG Impacts can be obtained. Moving forward, AJSEd can further amplify its SDG impact by:

(i) Curating special issues focused on individual SDGs, such as climate education (SDG 13), gender in STEM (SDG 5), or sustainable consumption (SDG 12).
(ii) Encouraging SDG-focused abstracts and keywords to increase visibility in global education and development databases.
(iii) Promoting community-based participatory research that engages schools, local governments, and NGOs in education reform efforts.

Through such initiatives, AJSEd not only fulfills its academic mission but also contributes meaningfully to the creation of sustainable, just, and knowledge-driven societies across Southeast Asia and beyond.

Based on this study, several strategic directions could further AJSEd's mission:

(i) Special issues on emerging themes: e.g., AI in science education, indigenous knowledge, STEM for SDGs, or climate education.
(ii) Regional conference collaborations to connect authors, reviewers, and readers.
(iii) Mentorship programs for novice researchers and teachers aspiring to publish.
(iv) AJSEd Academy: A short-term program or webinar series on writing, reviewing, and science education methods.

By adopting these strategies, AJSEd can become more than a journal; it can serve as a community and capacity-building hub for Southeast Asian educators and researchers.

4. CONCLUSION

The ASEAN Journal for Science Education (AJSEd) has rapidly emerged as a critical platform for advancing science and engineering education across Southeast Asia. Through its interdisciplinary scope, open-access policy, and commitment to inclusive, contextualized research, AJSEd addresses key educational challenges in the region, ranging from equitable access to quality STEM instruction to curriculum reform and the integration of digital and vocational learning models. The journal's published works reflect a diverse thematic range and methodological rigor, offering valuable insights for both researchers and practitioners. Compared with similar journals such as AJSEE and IJOTIS, AJSEd uniquely positions itself at the intersection of scholarly research, policy relevance, and regional collaboration. While AJSEE leans toward applied engineering education and IJOTIS focuses more on classroom teaching practices, AJSEd provides a balanced and strategic academic space for discourse on science education that is both theoretically grounded and practically impactful. Moving forward, AJSEd is well-positioned to influence science education development not only within the ASEAN region but also globally. By expanding its bibliometric visibility, supporting young researchers, and fostering international collaboration, AJSEd can continue to catalyze innovation, equity, and sustainability in science education.

5. ACKNOWLEDGMENT

This paper is supported by Yayasan Bumi Publikasi Nusantara.

6. AUTHORS' NOTE

The authors declare that there is no conflict of interest regarding the publication of this article. The authors confirmed that the paper was free of plagiarism.

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