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Nearpod Integration in Science Learning for Junior High School Students: A Review

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Abstract: Learning media represents a significant innovation in educational technology, with Nearpod emerging as a valuable tool for enhancing interactive science education in junior high schools. The current generation of students often experiences boredom during traditional learning methods, necessitating the adoption of engaging platforms like Nearpod to facilitate effective material delivery. This study aims to evaluate the application of Nearpod in teaching energy concepts within junior high school science curricula. Employing a Systematic Literature Review (SLR) methodology guided by the PRISMA protocol, this research involved a comprehensive literature search using the Google Scholar database, supported by the Publish or Perish (PoP) application. Out of 386 identified research papers, 11 met the criteria for detailed analysis. The analysis reveals that the integration of Nearpod in junior high school science education is relatively underexplored, especially in topics such as energy. However, findings indicate that Nearpod is an effective medium for fostering engagement, critical thinking, and learning outcomes. These results encourage science educators to incorporate Nearpod into inquiry-based or project-based learning to support more interactive, student-centered instruction. The review is limited to open-access studies conducted in Indonesia between 2015 and 2025, focusing solely on junior high school science education.

Keywords: Learning Media; Nearpod; Science; Systematic Literature Review.

Introduction

Digital technology innovation is pivotal in educational transformation [1]. Integrating technology in education enhances access to information and enriches learning methodologies [2]. Learning media is a significant development among the various educational technology innovations. This innovation makes teaching and learning more interactive and engaging [3]. Additionally, learning media serve as a tool to support effective teaching and learning activities [4]. One notable example of interactive learning media that can be utilized in educational settings is Nearpod. Nearpod is a web-based learning tool designed to manage interactions and create an engaging learning environment for students [5][6]. It is an interactive learning medium, offering various features that facilitate discussions, provide student feedback, support formative activities, and are highly relevant to digital-based learning [7]. Using Nearpod, teachers can interactively deliver material, integrating multimedia elements, quizzes, simulations, and collaborative features to enhance students' learning experiences [8].

In natural science learning, an interactive and experiential teaching approach is necessary to foster a profound comprehension of concepts among students. The topic of energy is an example within science education that helps students grasp theoretical principles. In the Indonesian Kurikulum Merdeka, this topic is introduced in the eighth grade of junior high school, encompassing kinetic, potential, and mechanical energy [9]. Energy is a subtopic within the broader subject of work, energy, and simple machines, where formulas, concepts, and various theories elucidate the practical application in daily life [10]. However, effective media use in science learning in junior high schools is still scarcely used [11]. Therefore, effective teaching by employing interactive media is needed to integrate and elaborate more about the topic. According to the literature review, most teachers use a single media type to deliver content, such as PowerPoint slides. This limited variety in media applications during science lessons leads to student boredom and diminished interest in the material [12]. [13] concludes that repetitively using identical media in educational activities can lower student learning motivation. In contrast, Nearpod offers dynamic features such as real-time assessments, multimedia integration, and collaborative tools that support more active, student-centered instruction and address the limitations of traditional media. Hence, there is a need for interactive learning media that enhances student engagement in the science learning process. Nearpod can be an alternative solution for the media application.

Various studies related to the use of Nearpod as a learning medium have been conducted in several school subjects, such as Bahasa Indonesia [14], mathematics [15], social studies [16], and civic education [17]. In the domain of science education, research on the utilization of Nearpod spans various educational levels, including elementary school [18], junior high school [19], and high school [20]. However, there is a conspicuous lack of studies specifically examining the efficacy of Nearpod in teaching energy concepts at the junior high school level. Compared to more conventional tools, Nearpod's interactive capabilities and feedback mechanisms provide added pedagogical value, particularly for abstract scientific concepts. Nearpod's interactive features are conducive to enhancing student engagement and comprehension of energy-related material.

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This gap in the literature presents an opportunity to rigorously evaluate Nearpod's effectiveness in junior high school science education. The findings from such research could inform the development of Nearpod's educational tools and provide empirical evidence to support its integration into science curricula. Therefore, this study aims to systematically investigate and analyze the implementation of Nearpod in junior high school science classes, with a specific focus on energy topics, and to contribute to educational practice by identifying more engaging and effective instructional media solutions.

Research Methods

This study employed the Systematic Literature Review (SLR) method, a comprehensive approach to evaluate, define, and interpret all relevant findings related to the research problem, thereby addressing predefined questions [21]. To ensure transparency and rigor in the literature review process, this study adheres to the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) framework. The PRISMA framework encompasses several stages: identification, screening, eligibility, and inclusion. The application of the PRISMA framework in this study is illustrated in Figure 1.

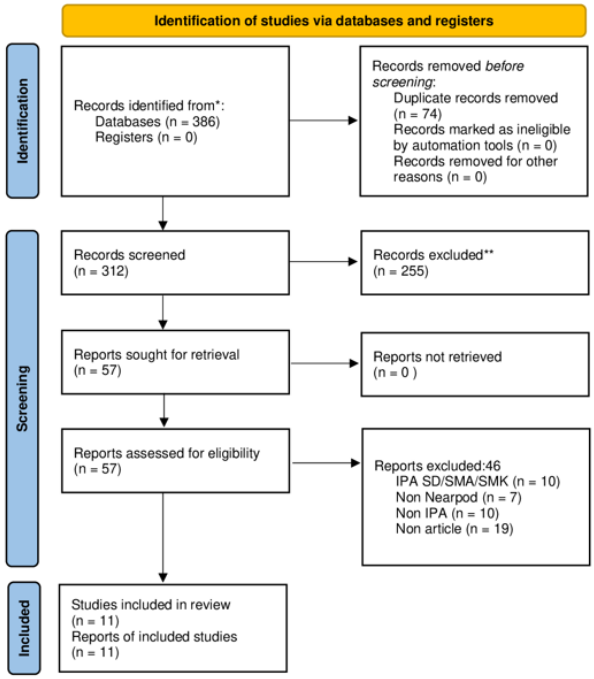

Figure 1. PRISMA framework used in this study

Based on the framework, the PRISMA selection method was used to obtain the research papers related to Nearpod in junior high school science learning. These articles were then reviewed. The steps included are as follows:

Identification, the Google Scholar database was explored using the Publish or Perish (POP) application. The keywords used in the search engine are presented in Table 1. The total number of research papers obtained was 386.

Table 1. Keywords Used in a Search Engine

Keywords	Number of Research Papers
Nearpod learning media AND junior high school science	308
Nearpod learning media AND junior high school science AND energy material	78

Screening, the elimination of similar titles or duplicates, was done in this step. It was found that 74 research papers were identified as duplicates, and only 312 papers were obtained for further steps. Titles, abstracts, and keywords were used to filter the papers and obtain related papers, and 57 papers passed the screening.

Eligibility, the filtering was done again based on the inclusion and exclusion criteria as available in Table 2, where 46 research papers were eliminated in this process, and 11 eligible papers were obtained.

Inclusion, after the eligibility process, 11 final research studies were obtained for further review and discussion.

Table 2. Inclusion Criteria and Exclusion Criteria

Inclusion Criteria	Exclusion Criteria
Papers from 2015-2025	Outside of that year
Covering the use of Nearpod media in science learning	Not using Nearpod media in science learning
Limited to junior high school level	Non-junior high school (elementary school, high school, vocational high school)
Open access papers	Paid papers
Indonesian and English	Non-Indonesian and English
Research in Indonesia	Research abroad

To enhance methodological rigor, a quality appraisal of the selected studies was conducted using a simplified checklist adapted from the Critical Appraisal Skills Programme (CASP) tool. The appraisal assessed four key criteria: clarity of research questions, appropriateness of methodology, transparency of data collection, and relevance to the topic. Only studies that met at least three of the four criteria were included in the final synthesis.

For synthesis, thematic analysis was conducted through open coding of study findings and discussions. Key patterns were identified across studies, including implementation strategies, observed learning outcomes, and challenges in applying Nearpod to science education. These emerging themes were then grouped and interpreted to address the research objectives and provide insights for educational practice.

Results and Discussion

Research questions were raised to ensure a focused discussion. Three questions included: 1) How many studies are related to the use of Nearpod in science learning in junior high schools in the 2015-2025 period?; 2) How effective is the use of Nearpod media in science learning in junior high schools?; and 3) what are the things that have been developed

related to the use of Nearpod in science learning in junior high schools?

In this literature review, the research papers analyzed were obtained through the Publish or Perish application with the Google Scholar database. The keywords "Nearpod learning media AND junior high school science" and "Nearpod learning media AND junior high school science AND energy material" were used to find papers that matched the research topic. The literature search was carried out in February-March 2025. Then, the research papers were filtered based on the research topic, where 11 eligible papers were obtained related to the use of Nearpod media in science learning in junior high schools, especially on energy. Based on the PRISMA framework, research papers that followed the topic and objectives of this study, including the inclusion and exclusion criteria, were used for further selection. The review and analysis were done for 11 research papers regarding using Nearpod in science learning in junior high schools on energy material (Table 3).

The year of paper publication was analyzed, and Figure 2 shows that Nearpod research is categorized as new research that has not been widely conducted. The papers were filtered in the last ten years (2015-2025) based on the inclusion criteria. Based on the data obtained, the use of Nearpod in science learning in junior high schools only started to appear in 2021. The most significant number of articles was published in 2023 and 2024 (three articles each).

Table 3. Review and Analysis of the Selected 11 Research Papers

Title	Journal	Research Result	Author, Year
Korelasi Antara Minat Belajar dan Hasil Belajar Melalui Platform Pembelajaran Nearpod pada Peserta Didik Kelas VIII di MTsN 1 Kota Makassar	Journal of Health, Education, Economics, Science, and Technology (J-HEST) Vol.6, No.2 (138-144)	The correlation test between learning interest and learning shows a strong relationship between interest and learning outcomes after using Nearpod media.	[22]
Pengembangan Media Pembelajaran Interaktif Nearpod pada Materi Pencemaran Lingkungan untuk Peserta Didik Kelas VII SMP/MTs	PISCES (Proceedings of Integrative Science Education Seminar) Vol. 1 (106-116)	The development of Nearpod-based interactive learning media on environmental pollution material, based on validation by language experts, material experts, and media experts, is included in the good category.	[23]
Persepsi Peserta Didik Terhadap Penggunaan Media Interaktif Nearpod Dengan Model Pembelajaran Inkuiri Terbimbing Untuk Melatihkan Belajar Digital	Eksakta: Jurnal Penelitian dan Pembelajaran MIPA Vol.9, No.2 (212-220)	Learning with Nearpod based on guided inquiry can attract students' motivation, enthusiasm, and passion for digital learning.	[24]
Development of Nearpod-Based Interactive Learning Media on Environmental Pollution Materials	Jurnal Penelitian Pendidikan Ipa Vol.9, No.3 (1314-1319)	Media experts and material experts have validated Nearpod-based interactive learning media to implement it in science learning, especially environmental pollution material.	[25]
Development of Nearpod-Based Interactive Science Learning Media to Improve Students' Learning Activities and Critical Thinking Ability in Junior High School	IJIS Edu: Indonesian Journal of Integrated Science Education Vol. 5, No.2	The media developed is valid, practical, and effective for science learning, especially to improve students' learning activities and critical thinking skills.	[26]
Development Of Instructional Design Project-Based Learning Model Integrated Science Process Skills To Improve Science Literacy	Jurnal Pendidikan Sains Vol.9, No.1 (104-112)	Developing instructional design products based on project-based learning integrated with science process skills can improve students' scientific literacy.	[27]
Pengembangan Instrumen Penilaian Berbantuan Media Nearpod Untuk Mengukur Kemampuan Berpikir Kreatif Siswa Pada Pembelajaran IPA SMP	Eduproxima: Jurnal Ilmiah Pendidikan IPA Vol.6, No.3 (963-975)	The assessment instrument to measure students' creative thinking abilities with the help of Nearpod media is declared valid, practical to use, and effective.	[28]
The Development of Critical Thinking Skills Assessment Instrument Based on Nearpod in Junior High School Science Learning	Prisma Sains: Jurnal Pengkajian Ilmu dan Pembelajaran Matematika dan IPA Vol.11, No.3 (706-718)	The developed instrument is categorized as valid based on expert validation and item validity. The developed instrument is also reliable, with an average moderate difficulty level.	[29]
Profile of Science Literacy Competence of Junior High School Students in Ecology and Biodiversity in Indonesia	IJIS Edu: Indonesian Journal of Integrated Science Education Vol.7, No.1 (173-185)	Intensive and appropriate efforts must be made to improve students' scientific literacy through more effective and interactive teaching methods.	[30]
Pengembangan Video Pembelajaran Pada Materi Pewarisan Sifat Siswa Kelas IX	RinTVET (Research in Technical and Vocational Education and Training) Vol.1, No.2	The development of learning videos and quizzes on the inheritance of traits material is declared valid for use.	[31]

Transformasi Pembelajaran: Pelatihan E-LKPD Berbasis PBL Berbantuan Nearpod bagi Guru IPA di Muara Enim	Jurnal Pengabdian Masyarakat Bangsa	Based on the evaluation results, this training improves digital literacy and teacher competence in designing learning devices using Nearpod media.	[32]

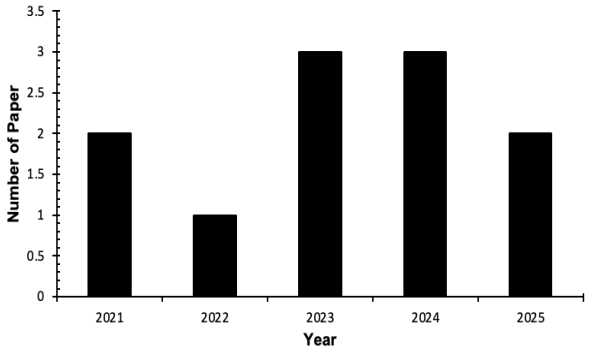

Figure 2. Number of articles published each year from 2021-2025

The variables used in the research papers are shown in Figure 3. Based on Figure 3, the variables investigated in research articles exhibit considerable diversity. These variables encompass creative thinking, science literacy, learning activities, critical thinking, digital learning, digital literacy, learning outcomes, and learning interests. Among these, critical thinking emerged as the most frequently studied variable, particularly in relation to its impact following the implementation of Nearpod media in junior high school science education. Critical thinking skills, as a core component of 21st-century competencies, are vital for students to acquire. These skills are crucial in enhancing their problem-solving abilities and facilitating informed decision-making [33][34].

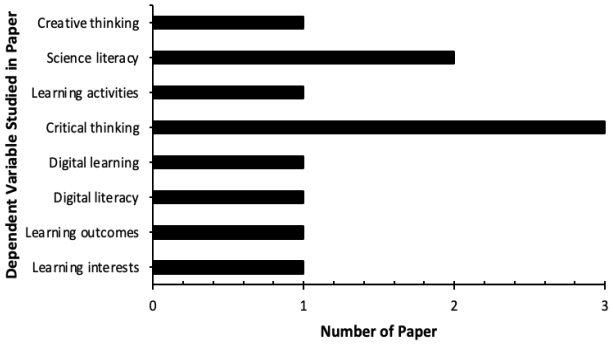

Figure 3. The dependent variable studied in the papers

The summary of the science material used with the Nearpod application can be seen in Figure 4. Figure 4 illustrates that some research papers' titles and main texts do not explicitly indicate the inclusion of scientific materials. For instance, two papers delve into environmental pollution and solar systems. At the same time, other research encompasses themes such as the inheritance of traits, substances and their transformations, work, energy, simple machines, ecology, and biodiversity. These findings suggest that certain aspects of science curricula at the junior high school level warrant deeper investigation.

A review of the types of Nearpod media development is presented in the research papers summarized in Figure 5. The analysis indicates that not all articles elaborate on the specific Nearpod media innovations implemented in their studies. Examples of such innovations include the development of student worksheets, quizzes, videos, and instructional designs rooted in project-based learning (PjBL). Assessment instruments were most frequently developed among these, leveraging Nearpod's diverse features that enhance interactive teaching and learning processes. One notable feature supporting assessment instrument development is the formative activity tool, which enables teachers to design questions that students can respond to directly via Nearpod [35]. This allows immediate access to student responses and results. As an interactive platform for disseminating educational content, Nearpod holds the potential to foster increased student engagement and motivation in science education, thus encouraging active participation in the learning process.

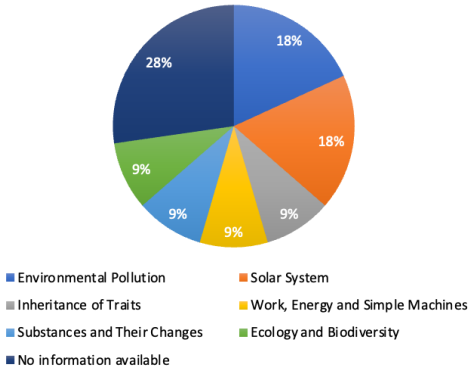

Figure 4. Study materials are delivered in the science learning using Nearpod

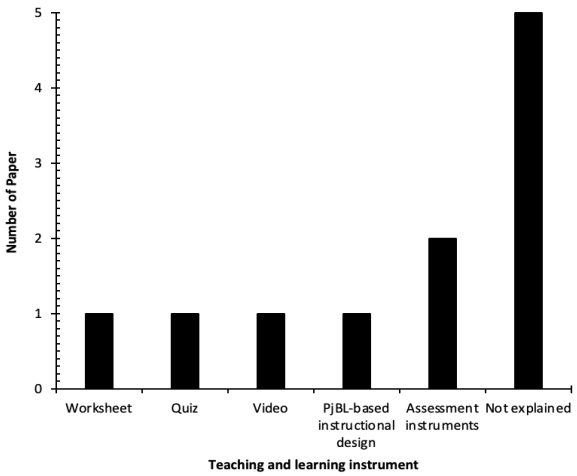

Figure 5. Nearpod-integrated teaching and learning products developed in research papers

Among the eleven research papers reviewed, seven focused on the development of Nearpod media for science education at the junior high school level [23], [25], [26], [27], [28], [29], [31]. The remaining four papers explored diverse topics, including the correlation between variables [22], student perceptions [24], science literacy profiles of students [30], and teacher training programs [32].

The literature review indicates that not all articles provide detailed explanations regarding the development of

Nearpod media in their studies. For example, [23] did not explicitly discuss the specific type of development in their research. However, they generally developed teaching materials utilizing Nearpod-based learning media focused on environmental pollution content. Validation results showed that the learning media produced in this study were categorized as effective and suitable for educational use. Similarly, [25] developed Nearpod-based learning media on environmental pollution material, which was also deemed appropriate for use in the learning process. The key distinction between these two studies lies in the development model employed.

Other studies have also explored the development of Nearpod-based learning media. Unlike previous research, this study emphasizes the role of Nearpod media in enhancing student learning activities and critical thinking skills, utilizing solar system content as the focal material. Validation results categorize the developed media as valid, practical, and effective for fostering improved learning engagement and critical thinking [26]. This research is closely related to the study by [29], as both investigate critical thinking skills in students following the use of Nearpod-based learning media. However, it focused specifically on developing a Nearpod-based critical thinking assessment instrument. Their study yielded a valid and reliable tool for evaluating students' critical thinking abilities within the context of science education.

In the context of assessment instrument development, [28] conducted a similar study, with a notable difference in the variables measured. Their research focused on designing assessment instruments to evaluate students' creative thinking abilities using content related to effort, energy, and simple machines. The resulting assessment tool, supported by Nearpod media, was validated and deemed adequate for measuring science learning outcomes in junior high school education. Science lessons often include abstract topics that require appropriate media to facilitate students' understanding [36]. For instance, [31] highlighted the challenges faced by teachers in explaining abstract concepts, particularly the inheritance of traits. To address this issue, they developed Nearpod-based learning videos and quizzes designed to present the material effectively. The validation results demonstrated that the videos and quizzes were suitable and valid for implementation in science education. These examples show Nearpod's flexibility in supporting both content delivery and assessment tools.

Developing project-based learning instructional designs to enhance students' scientific literacy [27]. The media employed in their research incorporated Nearpod-based learning integrated with science process skill variables. The findings demonstrated that the developed instructional materials effectively improved students' scientific literacy in science lessons. This research aligns with the study by [30] , which also examined students' scientific literacy. However, it concentrated on profiling scientific literacy in the context of biodiversity material. Their results revealed that students' scientific literacy profiles were generally categorized as low, indicating a need for improvement. More effective and interactive teaching methods are required to address this challenge, including using interactive media such as Nearpod [37]. In this regard, Nearpod's interactive features could offer an advantage over conventional media, such as static worksheets or slides, in enhancing students' scientific reasoning.

Nearpod-based learning media can also examine the relationship between students' learning interests and academic performance [38][39]. This aligns with the findings of [22], which revealed a significant correlation between learning interest and students' achievement in science education after adopting Nearpod media [40][41]. The interactive nature of Nearpod enhances students' engagement and interest in learning [42], facilitating better comprehension of the material presented. Consequently, heightened learning interest contributes to improved academic outcomes. This contrasts with traditional lecture-based methods often used in Indonesian classrooms, such as PowerPoint-based presentations or textbook-centred delivery.

Additionally, Nearpod-based interactive media can serve as an effective tool for fostering digital learning among students [43][44]. [24] investigated students' perceptions after utilizing Nearpod interactive media within a guided inquiry learning model centered on solar system material. Their findings indicated that integrating Nearpod-based science learning media with a guided inquiry approach significantly enhanced students' motivation, enthusiasm, and engagement in digital learning.

The article analysis in Table 3 identified one study that stands out from the rest, as it is categorized within a community service journal. This study explores the training provided to science teachers for developing project-based learning (PBL)-oriented electronic student worksheets (E-LKPD) using Nearpod media. Evaluation results demonstrated that the training enhanced teachers' digital literacy and competence in designing science learning materials. Consequently, these skills enable educators to develop interactive science learning media that make the learning experience more engaging and enjoyable [32]. This finding supports current national education initiatives that promote the use of technology in classrooms, such as Indonesia's Kurikulum Merdeka.

Additionally, the literature review revealed a gap in research concerning the application of Nearpod media in science learning at the junior high school (SMP) level, particularly concerning energy-based topics. Among the analyzed articles in Table 3, only one study focused on energy-related content, specifically developing an assessment instrument to measure students' creative thinking skills using Nearpod media on work, energy, and simple machines [28]. This highlights the potential for further exploration into the integration of Nearpod media in teaching energy-related subjects within junior high school science curricula.

Conclusion

The data analysis and discussion reveal that the use of Nearpod media in junior high school science education remains limited. Existing studies, however, have demonstrated the effectiveness of interactive Nearpod media in enhancing science learning outcomes. These findings provide a valuable reference for teachers, encouraging the adoption of Nearpod as an alternative interactive learning tool in science subjects. Furthermore, the limited research on the application of Nearpod in junior high school science,

particularly on energy-related topics, highlights an opportunity for further investigation in this area. Future research could include long-term studies to measure lasting impact and explore the use of Nearpod in other science topics beyond energy. Teachers can apply Nearpod in project-based or inquiry-based learning to make science lessons more interactive and student-centered.

Author's Contribution

Awaludin Pandu Ramadhan: responsible for identifying articles through the database using the Publish or Perish application, then carrying out the screening process, further screening, and analyzing and reviewing the selected articles according to the inclusion and exclusion criteria.
Fidia Fibriana: responsible for writing the research report and compiling the findings systematically and academically as part of the final documentation of the study.

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