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Analysis of the Role of Magnetism in Modern Technology in Everyday Life; Literature Study Review

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Abstract-This study aims to analyze the role of magnetism in modern technology that affects everyday life through literature studies. Using the PRISMA method, this study collected and analyzed 100 studies from 2012 to 2024, which were then selected into 8 relevant articles and e-books. The results show that magnetism contributes significantly to various fields, such as health, transportation, energy, and security. Magnetic therapy has been shown to accelerate healing, while maglev technology improves transportation efficiency. Magnets are also used in electronic devices and as an environmentally friendly alternative energy source. The application of magnetism in IoT-based security systems has a positive effect on quality of life. This study emphasizes the importance of a deeper understanding of magnetism to optimize its benefits and encourage future technological innovation.

Keywords:*Physics, Magnets in Technology, Magnets in Everyday Life, Magnetism in the Human Body*

1 Introduction

Physics is a subject that consists of various concepts in everyday life.(Soeharto, 2022). Physics is a basic science that is very relevant to everyday human life, not just a theory, but also has a close relationship with various events that occur in everyday life, such as the phenomenon of electromagnetic fields.(Fuad et al., 2018). Magnetism is a physical phenomenon that plays an important role in various modern technological applications. This phenomenon occurs due to the interaction between a magnetic field and magnetic materials, both permanent magnetic materials and materials that can be magnetized by an external field (Sumarno).Magnetism is one aspect of electrical phenomena, which is caused by the movement of electric charges. In addition, the light we receive comes from various electromagnetic waves, which are also part of the electrical aspect.(Firdaus, 2023). Can be concluded,Magnetism is a physical phenomenon that occurs due to the interaction between a magnetic field and magnetic matter, which is related to the movement of electric charges. This phenomenon underlies various modern technological applications and is also related to electromagnetic waves, including light. A magnet is an object or thing that has the ability to attract or repel other objects that have magnetic properties.(Jhoni et al., 2024). In everyday life, although not always visible, magnetism plays a major role in various technologies that support the advancement of human life. Magnets can be divided into two types based on their origin, namely natural magnets and artificial magnets. Natural magnets are magnets that exist naturally in nature, while artificial magnets are magnets made by humans.(Murdayani, 2022). In everyday life, magnetic force is used for various purposes such as picking up metal objects, indicating direction, converting electrical energy into sound energy, generating electricity, replacing wheels on maglev trains, and bringing two objects together.(Asiva Noor Rachmayani, 2015). On the super sophisticated train that uses maglev technology, it will provide a means of mass transportation that is safe, comfortable, affordable, on time, and can reduce air pollution.(Kristanty, 2018). Magnets also play a role in improving home security through the implementation of a notification system on an Internet of Things (IoT)-based smart gate, which integrates magnetic sensors to detect gate

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movement precisely.(Dewi & Fikri, 2023). Magnetic sensors are devices that are very sensitive and responsive to magnetic fields, which then produce changes in the output conditions.(Widharma, 2020; Rohmah, 2020).

As technology advances, permanent magnets are now used in a variety of devices such as household appliances, audio, telephones, children's toys, and small DC motors.(Hindasyah et al., 2002). Meanwhile, electromagnets, which are coils of wire that carry electric current and produce magnetic fields, are widely used in devices such as weightlifters, electric bells, relays, electric motors, and loudspeakers, thanks to their ability to convert electrical energy into magnetic or mechanical energy.(Saadah, 2015). Magnets also have an important role in the medical field, one of which is in Magnetic Resonance Imaging (MRI) technology, which is the main tool in diagnosing various diseases.(Wibowo et al., 2022). In addition, the human body contains metal elements, such as iron, which interact with the magnetic field.(Naiyena & Lizelwati, 2023). Where magnetic fields are believed to stimulate the body's natural healing mechanisms. Magnetic fields can increase blood circulation, stimulate the nervous system, and increase the production of body repair cells.(Saras, 2023). It turns out that electromagnetic fields also provide benefits for plants. One of them is in the agricultural sector, where this technology is used to inhibit bacterial growth and produce agricultural products or fruits with superior quality.(Navira, 2021). Thus, magnetism not only plays a role in industrial technology, but also in the development of technology that supports the quality of human life. The purpose of this study is to review several literature studies using the PRISMA method regarding the role of magnetism in modern technology in everyday life. Where sourced from research journal articles in 2012-2024, it is expected that the results of this study will be the basis for subsequent studies that examine the role of magnets in growth or others related to magnets.

2 Research methods

This study is a systematic review that adopts the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-analyses) method. This method is carried out with orderly steps and follows a predetermined research protocol. Systematic review itself is a method that collects, analyzes, and classifies previously existing evidence in a structured and organized manner.(Anggraeni et al., 2023). Literature review is the process of searching for and researching library sources, such as books, journals, and other publications, that are relevant to the research topic, to produce a piece of writing that discusses a particular issue or topic.(Abraham & Supriyati, 2022). A literature review is a researcher's effort to collect relevant information about the topic or problem being researched, in order to obtain a theory as a basis for research and to find out similar related research.(Mahanum, 2021). Literature review involves searching and collecting journals, then analyzing them in depth to draw relevant conclusions, thus producing results that are in accordance with the research objectives.(Mahanum, 2021). It can be concluded that literature review is the process of collecting, analyzing, and classifying library sources that are relevant to the research topic. The goal is to obtain basic theories, find out similar research, and produce in-depth conclusions that are in accordance with the research objectives. The author uses the PRISMA approach to select scientific studies on magnetism in modern technology in everyday life from well-known scientific databases, by setting detailed inclusion and exclusion criteria.(Rachman & Sadikin, 2024). The PRISMA method is a widely recognized way to organize and present information in an orderly manner in previously conducted research.(Wicaksono et al., 2023). The procedure of this systematic review consists of several steps, namely: 1) compiling Background and Purpose, 2) Research Question, 3) Searching for the literature, 4) Selection Criteria, 5) Practical Screen, 6) Quality Checklist and Procedures, 7) Data Extraction Strategy, 8) Data Synthesis Strategy(Fitriyani, 2021). The purpose of this study is to review several literature studies regarding recommendations for methods that can be used in the Analysis of the Role of Magnetism in Modern Technology in Daily Life using the PRISMA method through Publish or Perish Software version 7 and Google Scholar as a medium for collecting data and information relevant to the writing of this journal. Several research questions that will be reviewed in this study are as follows:

RQ1: What information is obtained to understand the role of magnetism in modern technology in everyday life?

Table 1: Literature Study Search

Source	Keywords
Publish or Perish version 7 And Google Scholar	"Magnets in Everyday Life" "Magnetism in Modern Technology"

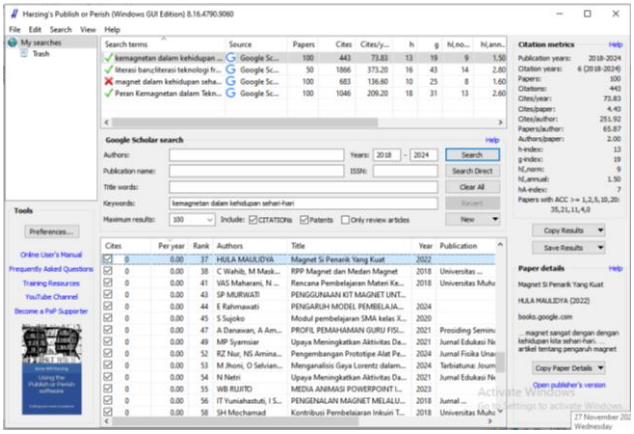

Figure 1. Google Scholar Keyword Search using Publish or Perish v7

PRISMA Producer

The Literature Study used in this writing is 100 literature studies and a selection was made on the title of the writing problem of 69 literature studies, and a second stage selection was carried out according to the topic that is in accordance with this research of 8 literature studies. Each literature study consists of a Journal that is relevant to the research. The selection process can be seen in Figure 2.

Database Resources

The data sources and information for the literature study were obtained from Google Scholar and Publish or Perish v7 Software, which collected 100 Literature Studies using Literature Studies from 2012 – 2024.

Systematic Review Process

This process can be seen in Table 2.

Table 2: Explanation of Compiling a Review Protocol

No	Process	Information
1.	Data Search	Data search in this study refers to Google Scholar and Publish or Perish version 7 which are official in nature and use keywords that are adjusted to the research title and abstract or research topic.
2.	Data Screening	This process includes filtering or selecting data (articles or research journals) that are adjusted to the topic or title, abstract and keywords of the research problem.
3.	Data Quality (Eligibility) Assessment	This process is based on data (research articles or journals) with full text that meets the inclusion and exclusion criteria shown in Table 3.
4.	Data Search Results	All data (articles or research journals) that meet all the requirements and criteria will be subject to further analysis.

Table 3: Inclusion and Exclusion Criteria

Criteria	Inclusion	Exclusion
Types of Literature Studies	Articles / Journals	eBook

Language	Indonesia	Indonesia
Field	Physics, Electrodynamics	Physics, Electrodynamics
Timeline	2012-2024	Old

3 Results and Discussion

Two steps taken at the screening stage are by selecting literature studies based on the titles taken as many as (n = 69) and based on the most frequently used methods as many as (n = 8) that are relevant to the research topic. This stage can be seen in Figure 2.

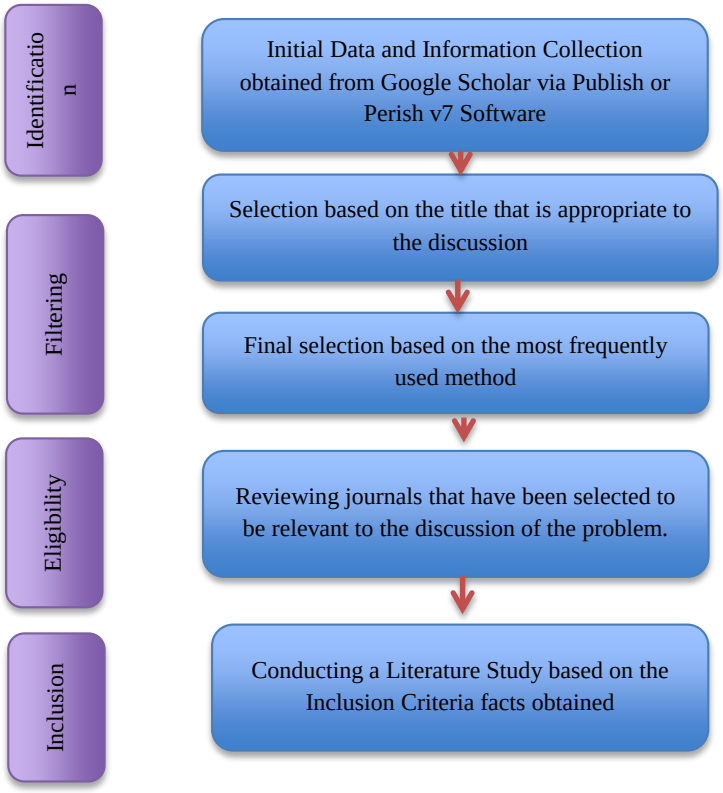

Figure 2. PRISMA Flow Diagram

The diagram above illustrates a structured process in collecting and selecting data and information for a literature study. The process begins with initial data collection conducted through Google Scholar using Publish or Perish v7 software. At this stage, researchers collect various articles and journals that are relevant to the topic to be discussed. After the data is collected, the next step is screening which is carried out in two stages. First, researchers select articles based on the suitability of the title to the discussion, ensuring the relevance of the article to the topic being studied. Second, the final selection is based on the most frequently used research methods, allowing researchers to focus on approaches that have been proven effective. After the screening process, the next stage is the feasibility evaluation, where researchers review the selected journals to ensure that they are relevant to the issue being discussed. This process is important so that the information used in the literature study can be accounted for and valid. At the final stage, namely inclusion, researchers compile a literature study based on facts obtained from articles that meet the predetermined inclusion criteria. Thus, this chart reflects a planned methodological approach in conducting a literature study, which aims to produce a comprehensive and in-depth analysis of the topic being studied.(Habibi & Artha Glory Romey Manurung, 2023).

Penelitian Relevan

Table 5: Results of the review of Literature Study Articles and e-Books

Tahun	Penerbit	Judul	Hasil
2013	Sri Maiyena, Novia Lizelwati	Kajian analisis magnet dalam tubuh manusia	This article discusses the impact of magnets, especially negative magnets, on human health. This study revealed that negative magnets can improve blood circulation, relieve pain, and accelerate the healing process. Based on data analysis from various sources, the author concludes that magnets have the potential to be an alternative therapy for various health problems, although further research is needed to understand the mechanism and its application in more detail.
2015	Asiva Noor Rachmayani	Kegunaan magnet pada kehidupan sehari-hari	This article emphasizes the importance of magnets in various aspects of everyday life. Magnets are used in everything from electronic devices to medical technology, making a major contribution to increasing efficiency and convenience. The widespread use of magnets shows that many technological innovations rely on magnetic properties to produce solutions that are useful to society..
2018	Desita Rini Kristanti	Revolusi perkembangan magnet pada sarana transportasi kereta api dengan menggunakan teknologi *maglev* (*magnetic levitation*)	This article discusses the innovation of rail transportation with maglev technology that allows trains to float above the tracks, reducing friction, and increasing speed and efficiency. Although it offers advantages such as high speed and better environmental impact, this technology faces challenges of infrastructure costs and the need for further research. In conclusion, maglev has the potential to revolutionize rail transportation, but requires further development and investment.
2019	Sumarno	Analisa rancang bangun turbin tenaga magnet sederhana sebagai sumber listrik skala rumah tangga	This article reveals the potential of magnetic power turbines as an alternative energy source for households. By utilizing basic principles of physics, these turbines offer an efficient and environmentally friendly solution. In-depth discussions on design, efficiency, applications, and challenges provide a comprehensive picture of how this technology can be applied in everyday life.
2022	Tuti Murdayani	Meningkatan hasil belajar siswa pada materi menerapkan hukumhukum kemagnetan dalam persoalan sehari-hari dengan penerapan model pembelajaran *problem based learning* (PBL) di kelas XI kimia industri -A SMK Negeri 2 Cimahi	This article reveals the potential of magnetic power turbines as an alternative energy source for households. By utilizing basic principles of physics, these turbines offer an efficient and environmentally friendly solution. In-depth discussions on design, efficiency, applications, and challenges provide a comprehensive picture of how this technology can be applied in everyday life.
2023	Ika Parma Dewi, Ryan Fikri	Optimalisasi keamanan rumah dengan implementasi sistem notifikasi gerbang cerdas berbasis *internet of things* (IoT)	This article discusses the application of IoT technology to improve home security through a notification system based on motion sensors, cameras, and a mobile application that monitors gates in real-time. The advantages include faster response to threats and remote control, but the main challenges are data security and dependence on a stable internet connection. In conclusion,

Tahun	Penerbit	Judul	Hasil
			this system offers an innovative solution, but requires attention to cybersecurity and infrastructure.
2023	Tresno Saras	Terapi magnet: menggali energi untuk penyembuhan dan kesehatan	This article provides interesting insights into the potential of magnetic therapy for healing and wellness. Based on research and data, the article emphasizes the importance of exploring alternative methods in modern medicine. This research could be a first step in better understanding how magnetic therapy can be applied to broader health practices.
2024	Siti Nur Fitri, Tri Budi Utami dan Wahyu Kurniawati	Analisis penerapan gaya gesek pada kehidupan manusia	This article provides an in-depth understanding of the application of friction in everyday life. By linking physics theory with practical examples, this article emphasizes the importance of friction in various fields, such as transportation and technology. This research can be a valuable reference for understanding the application of physics concepts in real contexts as well as the relevance of science education in everyday life..

Based on the literature review, it can be concluded that magnetism plays an important role in modern technology that affects everyday life. Research shows that magnets contribute to the health sector, such as magnetic therapy to accelerate healing, as well as in maglev transportation technology that increases efficiency and speed. Magnets are also used in electronic devices and as alternative energy sources, such as magnetic power turbines, which are environmentally friendly. The application of magnetism in IoT-based home security systems also improves the quality of life. This analysis emphasizes the importance of a deeper understanding of magnetism to optimize its benefits and drive technological innovation. Further research is needed to overcome challenges and explore the potential of magnetism in technological advancement and social welfare.

RQ1: What information is obtained to understand the role of magnetism in modern technology in everyday life?

This Literature Study consists of Articles or Journals and e-Books that have been collected and have been selected based on the title and abstract information and related topics to see whether the Articles or Journals and e-Books have met the author's inclusion criteria to be used as literature in the literature review, 8 journals and e-Books were analyzed, with the number of literature studies published in 2015 as many as 1 e-Book, in 2018 as many as 1 Article or Journal, in 2019 as many as 1 Article or Journal, in 2021 as many as 1 Article or Journal, and in 2022 as many as 1 Article or Journal, in 2023 as many as 2 Articles or Journals, and in 2024 as many as 1 Article or Journal. With the materials that have been collected and reviewed, there is a relationship between the Articles or Journals and e-Books obtained, so that with this literature study it can be used as information material and recommendations to study more about the role of magnets in everyday life around us.

4 Conclusion

Based on the literature review, it can be concluded that magnetism plays an important role in modern technology that affects everyday life. Research shows that magnets not only contribute to the health sector through magnetic therapy that accelerates healing, but also in transportation innovations, such as maglev technology that increases efficiency and speed. In addition, magnets are used in electronic devices and as alternative energy sources, such as environmentally friendly magnetic power turbines. The application of magnetism in IoT-based home security systems also improves people's quality of life. Therefore, a deeper

understanding of magnetism and its applications is essential to optimize its benefits and encourage further technological innovation. Further research is needed to explore the challenges and potential of magnetism in technological advancement and public welfare.

Referensi

Abraham, I., & Supriyati, Y. (2022). *Desain Kuasi Eksperimen dalam Pendidikan: Literatur Review*. Jurnal Ilmiah Mandala Education, 8(3), 2476–2482.

Anggraeni, T., Samosir, R. H., Siahaan, T. P., & Pasaribu, F. Y. (2023). *2023 Madani : Jurnal Ilmiah Multidisipline Kajian : Pestisida Glifosat (N-phosphonomethyl-glycine) Pada Perkebunan Kelapa Sawit dan Lingkungan Menggunakan Alat Pendekatan PRISMA*. 1(9), 489–494.

Asiva Noor Rachmayani. (2015). *Kegunaan Magnet pada Kehidupan Sehari-hari Magnet*. 6.

Dewi, I. P., & Fikri, R. (2023). *Optimalisasi Keamanan Rumah dengan Implementasi Sistem Notifikasi Gerbang Cerdas Berbasis Internet of Things (IoT)*. Journal of Computer System and Informatics (JoSYC), 4(4), 816–829.

Firdaus. (2023). *Buku Ajar Fisika Teknik*.

Fitriyani, N. I. (2021). *Metode PRISMA untuk memprediksi penyakit kanker payudara.* JII : Jurnal Inovasi Informatika Universitas Pradita, 6(September 2021), 13–18.

Fuad, F., Sudarti, & Harijanyo, A. (2018). *Analisis Dampak Paparan Medan Magnet Extremely Low Frequency (ELF) Terhadap Pertumbuhan Tanaman.* Seminar Nasional Pendidikan Fisika, 3(2), 46–51.

Habibi, R., & Artha Glory Romey Manurung. (2023). *SLR Systematic Literature Review: Metode Penilaian Kinerja Karyawan Menggunakan Human Performance Technology.* Journal of Applied Computer Science and Technology, 4(2), 100–107.

Hindasyah, A., Pramono, Y., & Agus Sunardi, E. (2002). *Aplikasi Magnet Permanen Pada Motor Dc Untuk Penggerak Alat Pengaduk Larutan*. Jurnal Sains Materi Indonesia Indonesian Journal of Materials Science, 4(1), 1411–1098.

Jhoni, M., Selviana, O., & Damayanti, S. (2024). *Menganalisis Gaya Lorentz dalam Sistem Listrik dan Magnetik. Tarbiatuna:* Journal of Islamic Education Studies, 4(1), 302–306.

Kristanti, D. R. (2018). *Revolusi Perkembangan Magnet pada Sarana Transpotasi Kereta Api dengan Menggunakan Teknologi Maglev (Magnetic Levitation).* Semanticsholar. www.semanticscholar.or

Mahanum, M. (2021). *Tinjauan Kepustakaan. ALACRITY :* Journal of Education, 1(2), 1–12.

Murdayani, T. (2022). *Meningkatan Hasil Belajar Siswa pada Materi Menerapkan Hukum- hukum Kemagnetan dalam Persoalan Sehari-hari dengan Penerapan Model Pembelajaran Problem Based Learning (PBL) di Kelas XI KIMIA Industri -A SMK Negeri 2 Cimahi Tuti Murdayani SMK Negeri 2 Cim*. 3(1), 1–10.

Naiyena, S., & Lizelwati, N. (2023). *Kajian Analisis Magnet dalam Tubuh Manusia.* Jurnal Sainstek, V.

Navira, N. L. (2021). *Pengaruh Pemberian Medan Magnet pada Air untuk Pertumbuhan Kangkung (Ipomoea reptans) Hidroponik.* Pharmacognosy Magazine, 75(17), 399–405.

Rachman, M. I., & Sadikin, A. (2024). *Tren Publikasi Asuransi Siber : Evaluasi Melalui Lensa PRISMA dalam Literatur Ilmiah*. 4, 10076–10093.

Saadah, N. (2015). *Implementasi Strategi Pembelajaran Teams Games Tournament terhadap Hasil Belajar Siswa pada Pokok Bahasan Kemagnetan Kelas IX MTs Ikhwan Klitih Karangtengah Demak*. 6.

Saras, T. (2023). *Terapi Magnet: Menggali Energi untuk Penyembuhan dan Kesehatan* (Wahyu Anita (Ed.)). *Tiram Media.*

Soeharto, T. (2022). *Penerapan Media Pembelajaran "Micropascien " Untuk Meningkatkan Pemahaman Konsep Kemagnetan.* Jurnal Lingkar Mutu Pendidikan, 19(1), 1–10.

Wibowo, P., Bakti, P., & Supono, I. (2022). *Sistem Verifikasi Medan Magnet untuk Sumber Magnet Kumparan Sejajar.* Elkomika: Jurnal Teknik Energi Elektrik, Teknik Telekomunikasi, & Teknik Elektronika, 10(2), 379.

Wicaksono, S. R., Setiawan, R., & Purnomo. (2023). *Gap Analysis Of Modeling And Green IT Policy: A Systematic Literature Review Using PRISMA.* Jurnal Pekommas, 8(1), 17–28.

Widharma, I. G. (2020). *Sensor Magnet Pada Sistem Instrumentasi.* Research Gate, December.